UNIVERSITY OF CALIFORNIA

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DIVISION OF ADMINISTRATION
BUDGET OFFICE

UNIVERSITY OF CALIFORNIA, MERCED
5200 NORTH LAKE ROAD
MERCED, CALIFORNIA 95343

July 30, 2010

PROFESSOR AND CHAIR CAMFIELD
WASC Steering Committee

Re: UC Merced Educational Effectiveness Review

Dear Professor and Chair Camfield,

I am pleased to respond the request for information in support of the campus preparation for the Educational Effectiveness Review as part of our very important accreditation efforts.

The Budget Office role in the Instructional Budget Process:

The base for temporary academic staffing, or TAS, (lecturers, Teaching Assistants, and course support funding) was established a few years ago. There have been incremental increases given to the Schools and linked to several factors, most specifically overall enrollment growth and responsibility for service courses.

In preparation for a given academic year and intended to align with the Campus Budget Process, a separate sheet is sent out to the Schools requesting projected TAS needs for both undergraduate and graduate level courses. The Schools are asked to complete the spreadsheet by providing comprehensive information regarding curricular needs, anticipated lecturers, TAships per course, associated course support and any projected course fees intended to offset some costs. These are sent to the Budget Office to be compiled and summarized. The reports are presented to the EVC/Provost with a recommendation for the annual allocation.

The factors utilized for developing a recommendation for a block allocation focus on the undergraduate courses with the understanding that Schools will ensure that the funds are directed to the highest curricular needs. Student credit hours, classes for majors, and numbers of service courses required, such as in Math and in Writing, are significant cost drivers that must be considered in the process.

A preliminary allocation is given to the Schools in writing so that key academic personnel deadlines may be met and Schools are able to plan for specific curricular needs. This is important as the campus generally does not have the final allocation from the Office of the President. Utilizing the preliminary notice offers Schools confirmation of the support that they can count on to move forward with scheduling and appointments. The target date for preliminary allocations is in early May, with possible augmentations by early fall semester.

These preliminary allocations go out with the understanding that additional extraordinary needs may arise and should be forwarded to the EVC/Provost for consideration. Examples of extraordinary need include a sufficient number of Writing Courses to meet frosh demand due to unexpected enrollments of continuing students in Writing. Enrollment growth, even with sound projections, often requires additional funding for service courses in Natural Sciences, such as Math, in order to meet unexpected student demand that can be

associated with a spike in students planning to major in Engineering or the Sciences. The Budget Office retains a portion of the total projected dollars to devote to instruction in order to be able to respond quickly to requests for additional funding approved by the EVC/Provost. This has proven very important during summer orientation when students are enrolling in courses on site, and it is possible to open additional sections to support the need.

There have been many questions about the base funding for instructional needs, including the metrics used to establish the base. In 2009-10, at the request of the EVC/Provost, the Budget Office and the Office of Academic Affairs began a review of the level of funding per Schools, comparing requested funding to approved funding, and identifying the criteria utilized for the annual increases. With help from the Assistant Deans from each School, a list of potential budget drivers was created from their unique perspective. These include course load, calculated faculty workload, enrollment growth patterns, number and range of service courses, complexity of upper division courses for majors, and special needs such as infrastructure (instrumentation and computer labs for example). These are being used and will continue to be utilized for further review by the Vice Provost for Planning. The Vice Provost for Planning has now been charged with overseeing this review and will see that proposed changes in the allocation methodology are modeled and presented to the EVC/Provost for approval. The Budget Office has already prepared several versions based on different factors, such as majors, faculty, and total student credit hours. The goal is to present a full proposal to the EVC/Provost in the fall. As part of the process, meetings will be held with the Schools in order to discuss the implications of the review and to solicit feedback on a proposed new allocation methodology for the EVC/Provost.

The Budget Office wants to ensure that we build into the annual processes key measures or metrics for accountability purposes in order to enhance the annual allocation process for academic and all other campus needs. For example, an annual review of the utilization of TAS funding will help support the decision-making process and ensure that the EVC/Provost has comprehensive information to utilize for apportioning the annual block. A brief report submitted by the Schools to the EVC/Provost regarding the number of courses supported, courses for majors, total enrollments, lecturer and TA appointments funded by TAS dollars will help assess the adequacy of the funding levels to meet programmatic needs and student demand. In turn, this will help formulate the next year's allocation. The Budget Office has outlined a sample report and will work with the Vice Provost for Planning to finalize this for the EVC/Provost's review.

The Budget Office role in FTE Planning and Allocations

The EVC/Provost in consultation with the Deans identifies the priorities for an annual recruitment plan. The Schools submit an annual Strategic Academic Plan that includes the faculty recruitment priorities to meet both curricular and research needs. In turn the recruitment priorities are shared with the Academic Senate (CAPRA). A plan is formulated by the EVC/Provost based on student demand and programmatic needs (both academic and research) and further consultation with the Senate and the Deans as necessary.

This plan is then analyzed by the Budget Office for projected costs. A funding plan is then presented to the EVC/Provost for approval and for commitment to the Schools and reflects information regarding the expected overall Campus allocation for a given fiscal/academic year. The faculty recruitments and funding commitments are approved during the summer in order to allow Schools to be well-placed for the recruitment process during the academic year.

The factors included in the analysis for the EVC/Provost include available permanent faculty lines currently allocated to the School and open due to separation or retirement, or due to failed recruitments, as well as new funding from the Office of the President as part of the workload allocation to the campus (based on total enrollment growth and the established 18.7 FTE: 1 FTE faculty ratio). The Budget Office confirms the expected level and salary range of the faculty with the EVC/Provost and the Office of Academic Personnel so that accurate salary needs are part of the projected budget. The established scale for faculty start-up is then utilized to project the total one-time funding necessary for the anticipated approved faculty hires and

will vary significantly depending on the total number of hires apportioned to the Schools. Approval and tracking sheets created by the Budget Office are utilized for certifying central funding commitments and for transmittal to the Schools.

Tracking the permanent faculty lines is a critical role for the Budget Office for several reasons, including responsibility for quarterly and year-end reporting of filled and unfilled faculty lines to the Office of the President. The Budget Office converts part of the block allocation annually to faculty lines, based on the projections for the recruitment needs. Throughout the year, the Budget Office works closely with the EVC/Provost's Office and with Academic Personnel to share information and to keep on top of changes in existing faculty (i.e. separation and retirement; merits; advancements) and new faculty hires in order to comprehensively manage these essential resources for UC Merced.

The Budget Office utilizes a complex funding model developed prior to the opening of the campus and enhanced over the last few years in order to project core funding required for campus operations. The most intricate factors are those associated with faculty costs and instructional costs, although the full range of elements included populates multiple linked spreadsheets that incorporate all campus revenue sources, and all commitments, as well including debt service. It is the tool utilized to prepare documents for the Office of the President, such as those prepared recently in support of the 'Memorandum of Understanding' to be finalized to guaranty funding levels for the next three years supporting enrollment growth of 600 per year.

The model is updated as necessary to reflect changes in faculty salaries in order to keep current the average costs utilized in the model. Lecturer salaries, TAships, and course support needs are reviewed annually in order to keep the total costs as reliable as possible. Projections for out years are based on as much trend data as available. The total investment for instruction - from Library support, student technology needs, to advising needs in academic support areas - are all important factors incorporated into parameters of the model in order to adequately project the full range of resources required to support the teaching mission of the University.

To date, the instructional funding needs and the faculty costs have been approved via parallel processes to the Campus Budget Process which has traditionally focused on the allocation of core administration funding. The Committee does see the total projected funding necessary for increases to the TAS budget which are based on the portion of the annual campus block allocation received from OP and that will be apportioned to academic need.

Sincerely,

Kathleen A. Jefferds
Budget Director

UCMERCED

Memorandum

To: Deans,
Vice Chancellors
Chief Information Officer
University Librarian

From: Keith Alley, Executive Vice Chancellor and Provost
Mary Miller, Vice Chancellor for Administration

Re: 2010-11 Budget 'CALL'

Date: February 5, 2010

This letter officially launches the budget planning and resource allocation process for 2010-11. We ask that you give serious thought to the budget needs for your area and provide both a brief narrative and updated budget templates to support the decision-making process.

It is necessary to first remark on the planning process that was undertaken last spring for 2009-10. We want to thank you for the detailed responses that you provided to the questions posed regarding the impacts of the permanent S/E reductions and no budget growth during 2009-10. Your thoughtful responses have given us comprehensive insight into the decisions that you routinely face in order to maximize your funding for meeting unit goals. It was not an empty exercise by any means; the results have been utilized in our funding negotiations with and funding requests to OP. Your responses helped provide for OP a clear picture of the challenges of building a new research university in the current fiscal climate. These have also endorsed our consistent message that the current Systemwide funding model does not meet the needs of a new and developing campus. In other words, your hard work last year has helped frame an important appeal to OP to work with us on implementing a more stable funding model for UC Merced until we reach the enrollment level that allows us to be 'self-sufficient'.

Pursuant to this, the 2010-11 Governor's Budget contains a $5M augmentation for UC Merced, citing that a longer start-up period is required for the campus than originally envisioned. This is a crucial factor for us, since the Special State Supplement we have enjoyed for several years is due to end after this year. These dollars, decreasing over the last two years, have been critical for our development. Although this does not add new revenue to the budget, it is a visible declaration of support for the campus that comes as welcome news, especially in light of the opportunity for Californians to reestablish higher education as a priority for the State. We will all follow the debates over the next few months carefully, and hope for the best possible outcome for UC.

We estimate that if we are successful in our negotiations with OP securing the level of resources for the enrollment growth that we expect, then we can plan to set aside a modest amount of funding for various pressing campus needs, including growing the faculty and providing critical new staff positions in support of our faculty and students. It is clear that we have work pressures and serious needs across the campus to address. These needs should be reflected in your requests and will be considered in light of the established campus funding principles, scheduled budget hearings with principal officers, and recommendations from the Campus Budget Committee.

While we are still working with OP on the key factors of a stable funding compact for the next few years, we need to move forward to conduct a proper process in order to be as prepared as possible for the 2010-11 academic and fiscal year. Keeping in mind the established funding principles of faculty support, graduate student support, student academic success, and accreditation efforts, and given a limited amount of new resources to allocate, we ask that you build a budget request for 2010-11 and include the following:

- Funding for only the highest personnel needs
- Any anticipated reclassifications of staff; any anticipated salary adjustments
- Special line-items that cannot be funded from existing S/E dollars
- Funding for equipment and/or large ticket items
- Any revenue/recharge income that can off-set the total budget

Caution and a conservative approach must be emphasized, as we ultimately do not know how UC or our campus will fare. It is conceivable that an agreement for enrollment support will be in place, but the total funding may be less than the previously allocated marginal cost increase. The $5M line in the Governor's budget may not materialize. We can hope for the best outcome for the campus, yet we must plan for any eventuality.

Faculty recruitments and the instruction funding needs will be requested separately. The faculty recruitment plans for the campus have already been discussed with the deans, and 15 new faculty recruitments are anticipated for next year. Schools will be sent a template to use to submit all instructional needs (delivery of instruction, teaching assistants, lecturers, course materials, etc.), and will be consulted regarding the appropriate due date in order to meet critical academic personnel deadlines. In the interim, base funding for instructional needs will be confirmed for each School, so that the EVC/Provost and the Committee can understand the full range of costs associated with expected and projected enrollment growth.

The Campus Budget Committee and senior leadership will again be faced with difficult decisions about resources. It may be necessary to discuss a certain level of funding in targeted areas that must be realigned and reallocated in order to meet the highest or most pressing needs of the campus in order to keep pace with enrollment needs and provide the range of services and support for students and faculty that will continue to bring distinction to this university. Your narrative, as well as your templates, should reflect the needs that are essential to your mission and to meeting your goals.

Your budget templates will be sent shortly under separate cover. This year we have included a budget process calendar so that you have an understanding of the milestones and our commitment to important deadlines. We intend to provide you with written communication regarding your preliminary allocations before July 1, 2010.

Your narratives and validated/corrected templates are due March 25, 2010. The Budget Office will prepare summaries for the Campus Budget Committee to review and consider before budget hearings are scheduled with the unit heads in April and May. This is your opportunity to present your requests and to argue that your needs align most clearly with the campus funding principles.

Please submit all materials electronically to the Budget Office via budget@ucmerced.edu. The Budget Office will work with you and discuss any concerns you have regarding funding levels. Director Jefferds and Assistant Director Perez will be scheduling meetings with your budget officer in order to be available for discussions and questions before your final submittal is made. These will be scheduled individually throughout February and early March. In the meantime, please feel free to contact Kathy Jefferds at extension 4632, or Sandra Perez at extension 4450, with any questions or issues.

cc: Chancellor S. Kang
Campus Budget Committee
Assistant Vice Chancellor Tanaka
Budget Director Jefferds
Assistant Director Perez

UC MERCED
INSTRUCTIONAL BUDGET REQUEST FORM

UNDERGRADUATE			Fall 2009 Budget Projection																		Fall Net Req	
Discipline	**Crs #**	**Course Title**	Instructor	Enrollment Projections	IWC for Course	Lecturer %Time	Lecturer Annual Salary	Sub-Total Lecturer Cost	TA FTE	TA Annual Salary	Tuition Cost Per FTE	SubTotal TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Copier Services Costs	Speakers Series Costs	Fall Total	Crs Fee	Fee Income	Net Request	
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Fall 2010 Budget Projection - Undergraduate

School	Enrollment Projections	Lecturer Cost	TA FTE	TA Costs	One Time Costs	S&E	Field Trips	Copies	Speakers	Fall Total
SSHA	7,610	541,825	64.5	953,516	8,450	6,050	3,500	30,440	4,350	1,548,131
SNS	5,762	247,863	25.46	1,273,025	13,500	140,202	3,952	40,334	-	1,718,876
SoE	2,451	200,191	11.25	550,000	20,750	116,148	4,800	3,887	-	895,776
Total Fall 2010	15,823	989,879	101.211	2,776,541	42,700	262,400	12,252	74,661	4,350	4,162,783

Spring 2011 Budget Projection - Undergraduate

School	Enrollment Projections	Lecturer Cost	TA FTE	TA Costs	One Time Costs	S&E	Field Trips	Copies	Speakers	Fall Total
SSHA	6,375	600,601	38.5	574,069	7,100	3,700	4,000	25,500	2,150	1,217,120
SNS	5,539	234,079	23.58	1,178,900	30,500	135,440	5,668	38,493	-	1,623,080
SoE	2,352	259,497	10.75	540,500	16,535	129,291	1,000	3,952	-	950,775
Total Spring 2011	14,266	1,094,177	72.828	2,293,469	54,135	268,431	10,668	67,945	2,150	3,790,975
Total 2010-11	30,089	2,084,056	174.039	5,070,010	96,835	530,831	22,920	142,606	6,500	7,953,758

Fall 2010 Budget Projection - Graduate

School	Enrollment Projections	Lecturer Cost	TA FTE	TA Costs	One Time Costs	S&E	Field Trips	Copies	Speakers	Fall Total
SSHA	180	-	0	-	-	2,250	-	1,320	7,500	11,070
SNS	361	-	0	-	-	5,250	-	2,646	6,000	13,896
SoE	415	-	0	-	-	2,999	-	560	3,500	7,059
Total Fall 2010	956	-	0	-	-	10,499	-	4,526	17,000	32,025
Total UG+G Fall	16,779	989,879	101.211	2,776,541	42,700	272,899	12,252	79,187	21,350	4,194,808

Spring 2011 Budget Projection - Graduate

School	Enrollment Projections	Lecturer Cost	TA FTE	TA Costs	One Time Costs	S&E	Field Trips	Copies	Speakers	Fall Total
SSHA	155	-	0	-	-	800	-	960	6,500	8,260
SNS	315	-	0	-	-	3,250	-	2,205	6,000	11,455
SoE	260	-	0	-	-	8,142	-	455	6,800	15,397
Total Spring 2011	730	-	0	-	-	12,192	-	3,620	19,300	35,112
Total 2010-11	1,686	-	0	-	-	22,691	-	8,146	36,300	67,137
Total UG+G Spring	14,996	1,094,177	72.828	2,293,469	54,135	280,623	10,668	71,565	21,450	3,826,087
Total UG+G 2010-11	31,775	2,084,056	174.039	5,070,010	96,835	553,522	22,920	150,752	42,800	8,020,895

Instructional Resource Base

Budget Year 2010-11

Schools Overview

	Description	Base Funding	% of Total	Enr Growth Ratio	Share of the Workload Allocation in 2008-09 based on Enr Growth Applied to $1.5M	Recalculated Base Funding for 2009-10	Readjusted % of Total	Temporary Adjustments 2009-10	Recalculated Base Funding for 2010-11	Readjusted % of Total	Proposed Increm. Allocation for 2010-11	Proposed Total Allocation for 2010-11	Approved By EVC/Provost for 2010-11 Instructional Needs
		Original Base Funding By School						Allocation of Additional Dollars to TAS: Recalculated Base Funding					
SSHA:													
	Lecturers										$ 229,600		
	Writing Program and Core Lecturers							$ 250,000			$ 350,000		
	Teaching Assistants							$ 176,000					
	Other Resources												
	Total	**$ 2,191,556**	**40.56%**	**55.30%**	**$ 829,500**	**$ 3,021,056**	**43.77%**	**$ 426,000**	**$ 3,447,056**	**46.09%**	**$ 579,600**	**$ 4,026,656**	
ENG:													
	Lecturers	$ 149,112											
	Teaching Assistants	$ 281,053						$ 150,000					
	Other Resources	$ 100,000											
	Total	**$ 530,165**	**9.81%**	**6.25%**	**$ 93,750**	**$ 623,915**	**9.04%**	**$ 150,000**	**$ 773,915**	**10.35%**	**$ -**	**$ 773,915**	
NAT SCI:													
	Lecturers	$ 273,372											
	Teaching Assistants	$ 2,079,790											
	Other Resources	$ 328,000											
	Total	**$ 2,681,162**	**49.62%**	**38.45%**	**$ 576,750**	**$ 3,257,912**	**47.20%**	**$ -**	**$ 3,257,912**	**43.56%**	**$ 344,400**	**$ 3,602,312**	
	Distribution of Org. Base Funding:	**$5,402,883**	**100%**	**100%**	**$ 1,500,000**	**$ 6,902,883**	**100%**	**$ 576,000**	**$ 7,478,883**	**100.00%**	**$ 924,000**	**$ 8,402,883**	

SSHA - 40.56%
Eng - 9.81%
NatSci - 49.63%

Revised Base	**$ 7,478,883**
Increm Growth	**$ 924,000**
($1.5M - 576K)	
Total	**$ 8,402,883**

$	350,000	Writing Program
$	229,600	SSHA Proper
	-	
$	344,400	Nat Sci

Fall Enrollment Growth - Year over Year Change:

SSHA:
WRIT
ENG
NatSci

Distribution of Recalculated Base Funding:

Dear Dean Pallavicini,
I want to provide an update to the base funding for instruction for the School of Natural Sciences for the 2009-10 year. EVC/Provost Alley confirmed today that he intends that the $1.5M allocated for growth needs for this current year be included in the base funding for the Schools. The additional funding to be added to the dollars outlined below is $576,750. Thus the total base for the school is now $3,257,912.

Please let me know if you have any questions.

Sincerely,
Kathy

From: Kathleen Jefferds [mailto:kjefferds@ucmerced.edu]
Sent: Wednesday, March 25, 2009 6:37 PM
To: mpallavicini@ucmerced.edu
Cc: dacker@ucmerced.edu; msmith29@ucmerced.edu; ntanaka@ucmerced.edu
Subject: Base Instructional Funding for the SNS

Dear Dean Pallavicini,

I write to confirm your base funding for instruction for 2009-10 for planning purposes. To date, we do not have definite information regarding the total funding that we can count on for UC Merced, but realize that you need to move forward with personnel actions and assignments for teaching assistants for the next academic year.

The base funding for the School is a total of $2,681,162. For 2008-09 it was apportioned as follows:

$273,372 Lecturers
$2,079,790 Teaching Assistants
$328,000 Other Resources

This morning AVC Tanaka and I met with Assistant Deans Acker, Gavilan, and Ortez to discuss the instructional cost drivers specific to each school. I thought it was a good discussion; certainly useful for us in order to explore a new and sustainable funding model for instructional support. The goal is to implement a model that can provide adequate funding to each school while factoring in differing needs. The group will make a recommendation to EVC/Provost Alley as soon as possible. The new model can then be utilized for allocations once we know if additional funding will be available to add to your base funding. In the meantime, you have the confirmation of the above funding in order to proceed with your personnel actions and distribution of curriculum support.

The official Budget CALL for 2009-10 will be released shortly and explain the request for information in planning for next year. It does mention instructional funding. I will be following up with a separate email regarding the materials to submit, the template, and the deadline for submittal. I will send this directly to the assistant dean and the director of operations.

Amidst unsettling budget news, as a campus we continue to honor our commitment to keep our emphasis on our core missions of instruction and research. I appreciate all your efforts in these challenging fiscal times.

Please do not hesitate to contact me with any questions or concerns.

Sincerely,
Kathy

Kathleen A. Jefferds
Director of the Operating Budget
Budget Office, Division of Administration
University of California, Merced
kjefferds@ucmerced.edu
209.228.4632

University of California, Merced
School of Engineering
Five-Year Strategic Plan (SP2015)

1. Introduction and Overarching Goals

The UC Merced School of Engineering (SoE) five-year Strategic Plan (SP2015) is outlined herein. The forwarded plan is based on an overarching strategy, which is summarized in Figure 1.

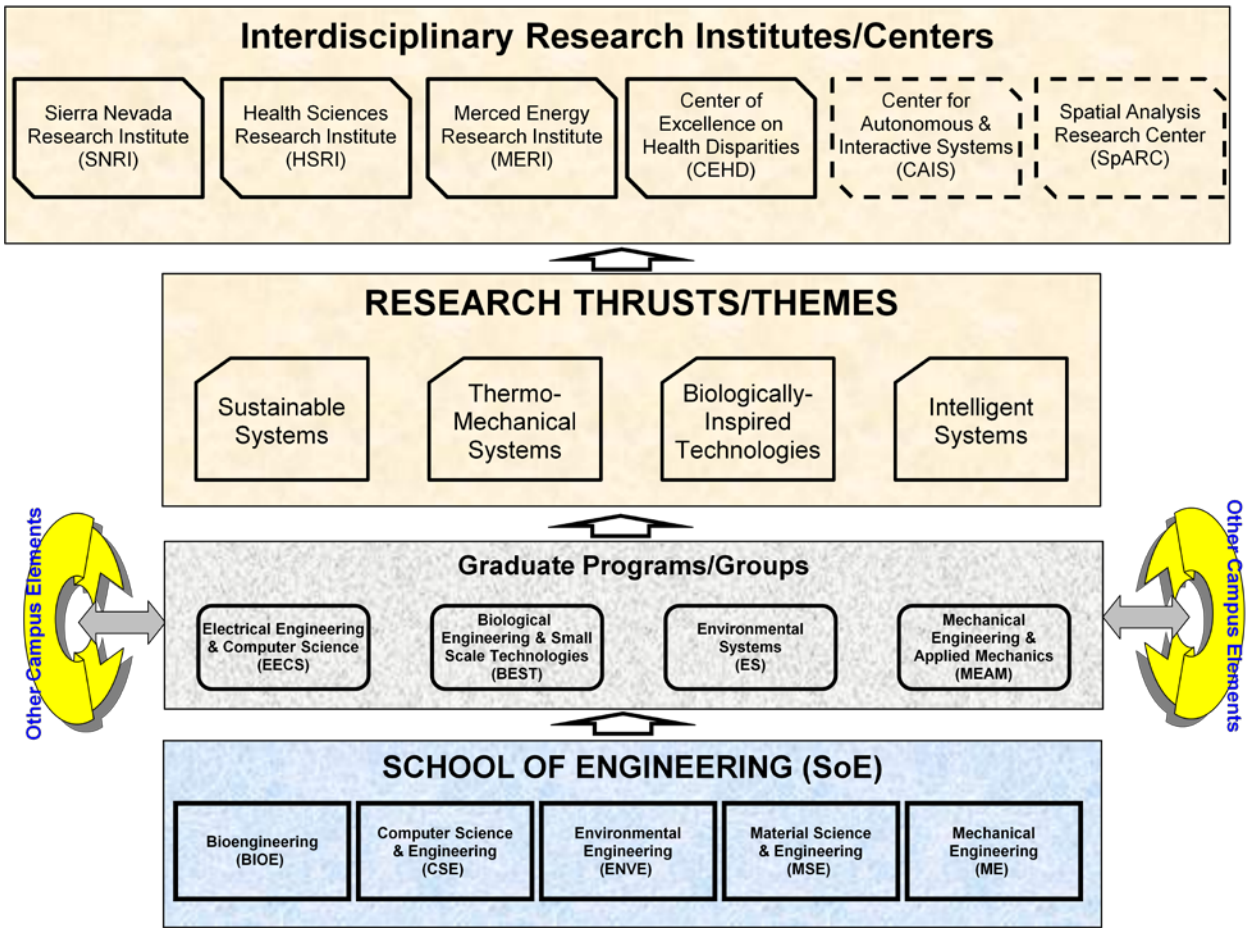

Figure 1. Guiding Strategy for the School of Engineering Strategic Plan.

The SoE faculty is organized in disciplinary groups, which align with their educational and research-related backgrounds as well as the current undergraduate SoE majors. The SoE faculty, along with faculty members from other schools, support four graduate groups/programs that are currently overseen by the SoE. Principal research and graduate program thrusts are organized in four broad interdisciplinary areas: 1) Sustainable Systems, 2) Thermo-Mechanical Systems, 3) Biologically-Inspired Technologies, and 4) Intelligent Systems. These emphases align the existing campus interdisciplinary institutes or centers, and new centers being proposed in the near future. The overarching strategy of the SoE faculty is consistent with the campus' 2009 Strategic Academic Vision.

This plan was formed by the SoE Resources Committee by synthesizing 1) input obtained during formal faculty meetings (bi-weekly), 2) information obtained from relevant research institutes and graduate groups, and 3) document exchange-review cycles that occurred from December 13, 2009 through February 15, 2010.

The SoE remains the smallest of the three Schools with a faculty numbering 31, or 26 regular full-time equivalents (FTE) when accounting for split and administrative appointments. This number constitutes about 26% of the ladder-rank faculty at UC Merced. Of the 31 faculty members, 14 are tenured and 17 are tenure-track. This faculty oversees 5 undergraduate majors and is affiliated with 4 graduate groups.

First and foremost, SP2015 reaffirms the SoE faculty commitment to building a world-class research university for the creation of new knowledge and the development of new technologies. The key success factors to achieve this goal are to: (1) hire the highest quality faculty (measured by their impact publications, awards, fellowships, service on editorial boards, etc.), (2) attract high quality graduate and undergraduate students, and (3) receive exceptional external funding.

However, we recognize the currently severe constraints on growth, especially with respect to faculty research space, startup funding, and the ongoing economic downturn in California. The status of the SoE and its assessable short-term goals for research and teaching are summarized in the following sections.

2. Proposed Milestone Goals

2.1. Research Goals

The SoE faculty continues to compete effectively for extramural support. Thus far during the 2009-2010 AY SoE faculty have been responsible for $0.8M to $2.3M per month of extramural funding, roughly 50 to 90% of the total campus award funding in a given month (Figure 2).

The SoE intends to improve upon this impressive effort in terms of both extramural funding and graduate student enrollment, both of which are a function of faculty size. Thus, additional FTEs are proposed in research areas that are either highly complementary to existing research strengths and increase multi-

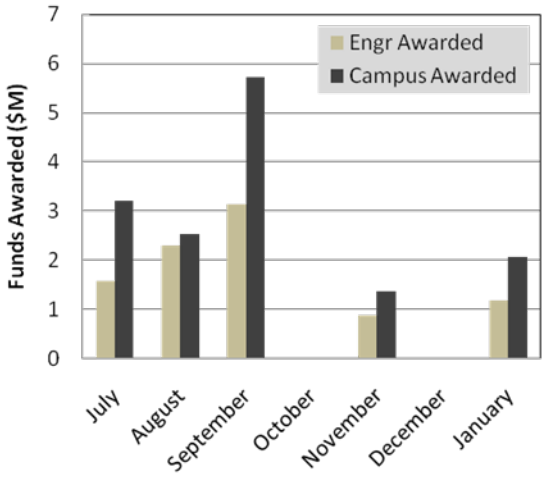

Figure 2 - Monthly contract and grant awards to SoE versus UCM Campus (data source: UCM Sponsored Research monthly activity reports).

disciplinary research opportunities. Although SoE investigators are rapidly becoming space-limited, they remain highly productive in terms of sponsored research. In the current academic year, SoE faculty have already exceeded $9M in awards, an amount which may be somewhat inflated by the availability of economic recovery funds in FY 2009-2010. However, it is realistic to expect an average of approximately $250,000 per year per SoE faculty member in absence of recovery funds from current and anticipated investigators. This average is similar to the current one and may be conservative as junior faculty mature and become more successful in acquiring grants. In addition, establishment of new interdisciplinary research centers (see Goal 2) is also expected to increase funding levels. However, it is important to note that space limitations in the near term may temper these affects.

SoE-Goal 1. **SoE investigators will maximize return on available facilities in the near term (SE2, Castle, and the academic surge building) by successfully competing for sponsored research awards amounting to more than $40M (direct + indirect cost) over the next 5 years.**

Interdisciplinary research and educational programs are central to the overall development of the UC Merced campus. During this planning horizon, the EECS faculty group intends to establish two new interdisciplinary centers, the *Center for Autonomous and Interactive Systems (CAIS)* and *Spatial Analysis Research Center (SpARC)*. Both of these centers are directed towards the Intelligent Systems thrust and the result of the maturing and growth of the CSE faculty, and collaborations with key researchers in our sister schools.

SoE-Goal 2. **SoE investigators will establish two new interdisciplinary research centers aimed at increasing research strengths and funding in the intelligent systems research thrust area.**

2.2. Graduate Enrollment Goals

Commensurate with the achieved research funding, the SoE faculty is also responsible for a significant fraction of the graduate student population, as about 76 of the 224 graduate students are affiliated with engineering faculty (34%). This represents an 11% graduate/total student fraction, compared to the other campus units (5.3%).

A projection goal for future PhD student productivity by the SoE faculty is shown in Figure 3. This projection assumes that the SoE faculty will grow at a rate of 4 regular FTE/year (full and partial FTEs), that each faculty member supervises an average of 3 PhD students, and that each junior and senior faculty member will graduate 0.20 and 0.40 PhD/year, respectively. These production rates are low relative to UC system wide productivity, which ranges from amout 0.8 to 1.0 PhD/faculty/yr, and may therefore be conservative. However, most of the graduate programs at UCM are at the developing stage and the typical rate of progress toward degree is not yet well-documented. Base on these estimates,

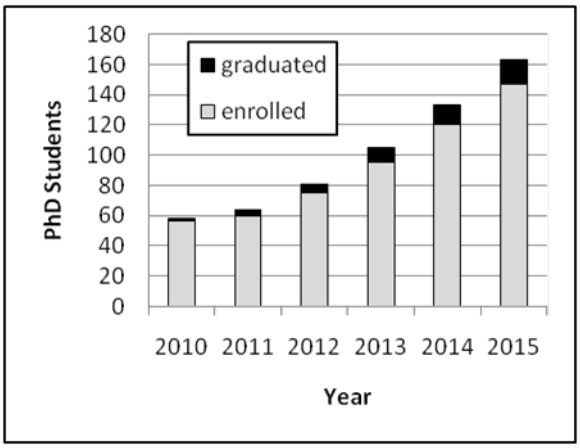

Figure 3. Projected PhD student enrollment by SoE investigators from AY 2009-10 (actual enrollment) to AY 2014-15.

the SoE faculty support the following School goal:

> ***SoE-Goal 3.*** **SoE investigators will be mentoring more than 160 PhD students and these students will complete 15 or more doctoral degrees during AY 2014-15.**

2.3. Undergraduate Educational Goals

Engineering majors remain popular at UCM, with several of the largest majors on campus being Mechanical Engineering (ME, 4th largest), Computer Science Engineering (CSE, 5th), and Bioengineering (BioE, 7th). We anticipate that these majors will continue to show strong enrollments. We also envision plans for increasing enrollments in other majors. For example, an expanded emphasis in Environmental Engineering (EnvE) on sustainably infrastructure is expected to create more interest in this major. Also, our Material Science & Engineering (MSE) faculty is building ties to the Bioengineering and Mechanical Engineering (bio- and energy materials) programs to strengthen their enrollments. Through prudent enhancement of these majors, the overall undergraduate enrollment goal is as follows:

> ***SoE-Goal 4.*** **SoE undergraduate majors will maintain its current fraction of undergraduate enrollment (approximately 18%), achieving a total enrollment of 950-1050 by AY 2014-15.**

Our main short-term undergraduate educational focus in the SoE is to (1) stabilize the curriculum in a sustainable manner so as to render short-term accreditation (ABET) is feasible, and (2) positioning ourselves for enrollment growth through modification of existing majors. One new major is being planned in the near term, the B.S. Engineering degree. However, as currently planned, this new major will have few resource implications because it will be designed to reside within the other majors. The motivation for this is that the ABET accreditation process is more feasible for this basic engineering major, and we anticipate that we can apply for accreditation approximately one year after the major is approved. Other majors for which accreditation is important (EnvE, ME), will follow later as they become able to expand their respective curricula. This leads to our second short-term SoE goal:

> ***SoE-Goal 5.*** **SoE will develop the B.S. Engineering degree program without encumbering new resources, and achieve ABET accreditation for this program by 2013, regardless of future faculty recruitment. Given successful faculty recruitment at the rates discussed herein, ME and EnvE will become ABET-accredited by 2015.**

Although no new majors are planned in the near term (beyond the B.S. Engineering mentioned above), we do recognize the need for an Electrical Engineering (EE) component in our curriculum. Initially, we plan to recruit faculty into the EECS group and charge them with creating an "emphasis area" within the existing CSE major. In fact, as the EE emphasis becomes more evident, we may decide to modify this major's name. When we have a sufficient faculty to support it, we can then develop the separate EE major.

To support the ambitious research and educational goals outlined above, additional FTEs in the form of regular faculty and lecturers will be needed. Given the near term resource constraints, recruitment must be highly strategic. The FTE recruitment plan proposed by the SoE is front-loaded over the next three years to insure against failed searches; it corresponds to an overall recruitment effort of 15 regular ladder faculty members, 5 cross-school positions, and 5 lecturers over a five-year period. It also assumes that all SoE administrative appointments are adequately compensated with respect to school teaching allocations. Projecting these assumptions over the next five years, accounting for regular promotions, leads to the projection shown in Figure 4. The SoE faculty will be composed of 55 regular faculty and lecturers (31 tenured (senior) faculty, 18 tenure-track (junior) faculty, and 6 full-time lecturers).

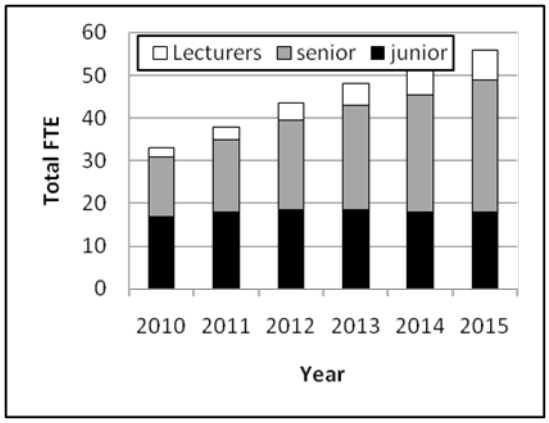

Figure 4. Projected SoE faculty number and distribution over the next 5 years.

In support of the aforementioned School goals, SoE proposes a steady hiring plan that respects short-term resource constraints. First, to immediately enhance program stability and existing research strengths in concomitance with the campus' Strategic Academic Vision, the SoE proposes 12 regular FTEs and 5 lecturers with potential security of employment (LPSoE)—see Table 1. Each of these positions is discussed further in program-specific context in Section 4 of this plan. The SoE faculty recognizes that this goal extends them beyond the three positions allocated for 2010-11. Each of these positions will require relatively modest startup and space as searches will focus on computational investigators. Furthermore, critical needs in all of these groups imply that "over-searching" is prudent as insurance against failed searches.

In addition to SoE FTE recruitment, and in order to enhance SoE synergy with other academic and research units, particularly the UCM management program, we propose the cross-unit hires summarized in Table 2.

Table 1. Summary of FTE Requests by the School of Engineering for the next three AYs.

Position	Graduate Research Program(s)[1]	Undergraduate Program(s)[2]
AY 2010-2011		
SoE-1. Computer Systems	EECS primary; MEAM, ES secondary	CSE
SoE-2. Energy Storage Technologies	MEAM primary; BEST, ES secondary	ME
SoE-3. Energy Materials	BEST primary; MEAM, ES secondary	BioE/MSE/ME
SoE-4. Physiological Modeling	BEST primary; MEAM secondary	BioE/MSE/ME
SoE-5. Stochastic Modeling	MEAM primary; ES secondary	ME/EnvE
SoE-LPSoE-1. EECS Lect.[3]	NA	CSE
SoE-LPSoE-2. Fundamentals Lect.	NA	ENGR
SoE-LPSoE-3. EECS Lect.	NA	CSE

[1] Recommended search committee to include primary (chair) and secondary graduate group or institute representations.
[2] Undergraduate teaching assignments will be in areas of greatest need at the time of the hire.
[3] A candidate for SoE-LPSoE 1 is currently under consideration.

	AY 2011-2012	
SoE-6. Computer Science Theory **SoE-7. Air Pollution Modeling** **SoE-8. Mechatronics** **SoE-9. Ecological Engineering**	EECS primary ES primary, MEAM secondary MEAM primary, EECS secondary ES primary, BEST secondary	CSE ME/EnvE ME/CSE EnvE
SoE-LPSoE-4. Lab/Design Lect. **SoE-LPSoE-5. Fundamentals Lect.**	NA NA	ENGR ENGR
	AY 2012-2013	
SoE 10. Intelligent & Adaptive Control **SoE 11. Environmental Biotechnology** **SoE 12. Computational Materials** **SoE 13. Biosensor Development** **SoE 14. Medical Imaging**	EECS primary, MEAM secondary ES primary, BEST secondary BEST primary, MEAM secondary BEST primary, EECS secondary BEST primary, EECS secondary	CSE/ME BioE/EnvE MSE/BioE/MEAM BioE/CSE/EnvE BioE/CSE

Table 2. Proposed cross-unit positions for the upcoming three AYs.

Position	Graduate Research Program(s)	Undergraduate Program(s)
	AY 2010-2011	
Cross 1. Information Management **Cross 2. Natural Resource Management** **Cross 3. Sustainable Building**	EECS, SNRI, UCMERI, QSB, Mgmt ES, SNRI, UCMERI, Mgmt ES, MEAM, BEST, Mgmt	CSE/Mgmt EnvE/ESS/Mgmt MSE/ME/EnvE
	AY 2011-2012	
Cross 4. Virtual Environments **Cross 5. Technology Management** **Cross 6. Media Arts & Technology**	EECS, SCS EECS, BEST, QSB EECS, CIS, World Cultures	CSE/Cog Science Engr/Mgmt CSE, Arts

3. Summary of Goals

A visualization of the milestone goals outlined in this Strategic Plan is presented in Figure 5. It is evident in reviewing this milestone chart, that the primary goal that must be achieved by the School of Engineering is growing the faculty. Unfortunately, the lack of research/office/instructional in the near term severely restricts faculty growth. Thus, the highest priority, both in the near-term and long-term, for the School of Engineering as well as the campus in general, must be to obtain additional research and instructional space to grow the faculty and the emerging student population.

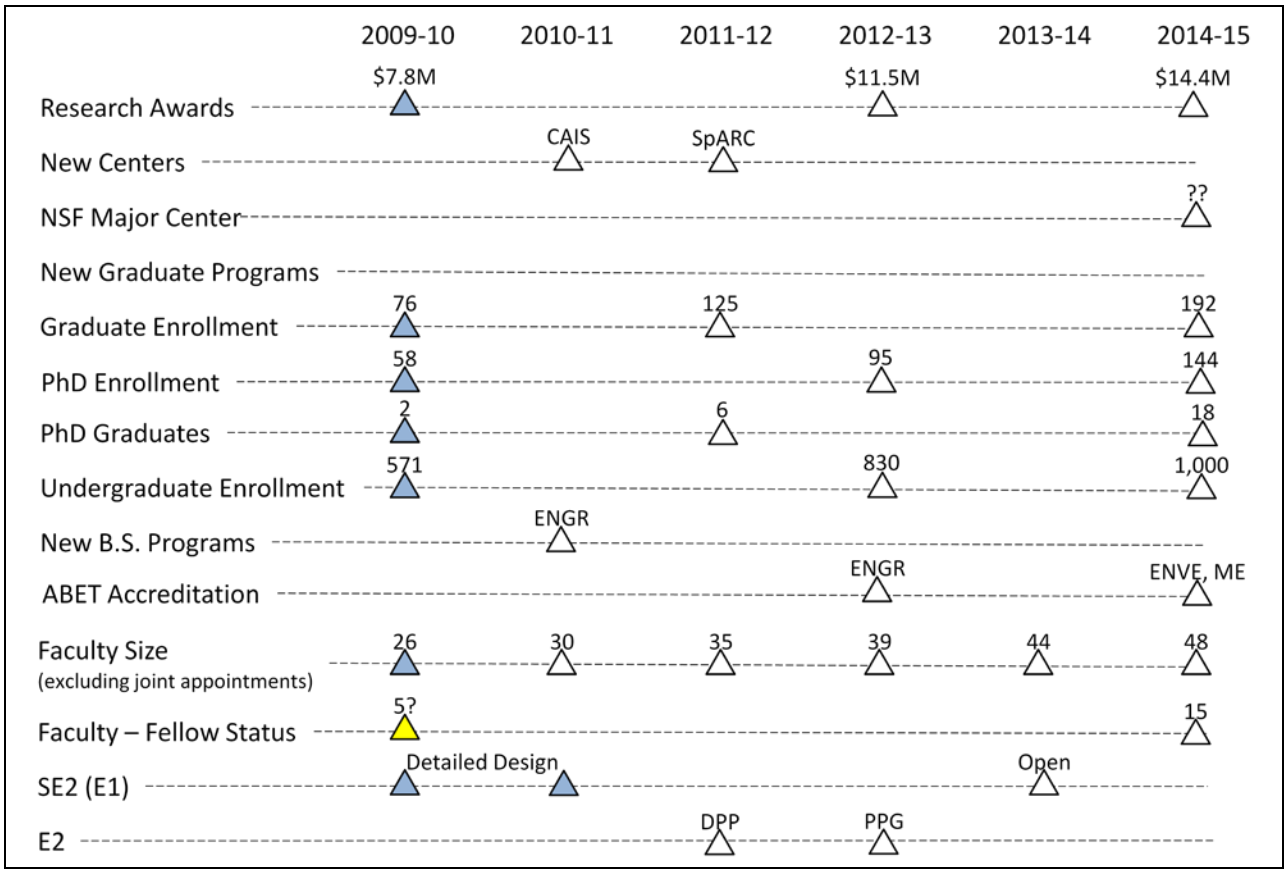

Figure 5. Milestone Goal Timeline for the School of Engineering

Appendix: Program-Specific Vision, Goals, and Rationale for FTE Requests

Electrical Engineering and Computer Science (EECS)

EECS Overview - The EECS faculty offer a popular undergraduate major in Computer Science & Engineering (CSE), as well as graduate degrees under the EECS and ***Cognitive & Information Science (CIS)*** program. EECS faculty members have diverse research interests with areas of investigation in artificial intelligence, computational neuroscience, computer animation and graphics, computer vision, machine learning, speech processing, robotics, and distributed networked systems.

These research themes frequently share a focus on ***intelligent systems***, and this focus has been consciously adopted by the group to build research excellence in a specific intellectual area. The EECS faculty regularly collaborates with colleagues in other fields across the UCM campus, contributing to interdisciplinary work in computational biology, environmental systems, and cognitive science. Indeed, the group has a strong bond to the CIS program, with several funded research projects spanning this cross-campus gap. The EECS program is critical to the success of UCM, playing a central role in implementing the campus' strategic focus on "Cognitive Science and Intelligent Systems", as highlighted in its *Strategic Academic Vision* document.

EECS Teaching Programs – The undergraduate CSE major is designed to provide students with both breadth and depth in the exciting and rapidly expanding fields of: *Computer Science* - the study of computation, including algorithms and data structures, and *Computer Engineering* - including hardware, software and network architecture. CSE is the 4th largest major on campus with an enrollment of 161 in AY 2009-2010). Given awareness of and demand for this major, undergraduate enrollment is expected to continue to grow as long as space and faculty are added to the program. From this perspective, it will soon become important to examine the tradeoff between increase in enrollment and selectivity for this program.

EECS Goals

EECS Research Goals - The EECS group has identified two main research goals, which it will pursue over the course of **t**he next five years:

- **Achieve High Levels of Research Productivity -** The EECS group seeks means to enable their faculty to achieve levels of research productivity comparable to researchers at other leading research universities. To assess progress toward this goal, counts of peer-reviewed journal publications and peer-reviewed conference publications.
- **Receive International Recognition as a Leader in "Intelligent Systems" -** Anecdotal accounts have already been reported of members of the broader academic computer science community recognizing UCM's strength in "intelligent systems". Our goal is to be recognized as an international leader in this field.

These goals may be refined over the course of the next five years, particularly with regard to how progress is evaluated. In an effort to both increase research productivity and receive international attention, the EECS group has adopted two more immediate goals. First is establishing the *Center for Autonomous and Interactive Systems (CAIS)*. This UCM Centralized Research Unit (CRU) has recently been proposed by EECS faculty members Stefano Carpin and Marcelo Kallmann. The center will coordinate shared resources and facilitate interdisciplinary research activities involving intelligent

systems. The EECS faculty expects to establish CAIS formally as a UCM CRU before the end of the 2010–2011 academic year. Second, EECS faculty member Shawn Newsam is actively developing the *Spatial Analysis Research Center (SpARC)* as a CRU. SpARC is a highly interdisciplinary focus that encompasses faculty from SSHA, NS, and other engineering faculty (Environmental).

EECS Teaching Goals - One of the leading goals of the EECS program is the **establishment of a CCGA approved EECS graduate program** and corresponding graduate group. There are a number of obstacles that must be overcome to accomplish this goal, including:

- The number of EECS research faculty must be increased to achieve a critical mass. At minimum, the group is expected to need 11–12 faculty members. If the current open senior position search is successful, and one new faculty position is created for EECS in each of the next three years, this minimal number can be reached by the end of the 2012–2013 AY.
- The number of senior EECS research faculty must be increased. Currently, the EECS faculty includes only one tenured member, and that individual has a heavy administrative burden (i.e., he is the Chancellor of UCM). Between the filling of a currently open senior position and the expectation of a number of successful promotions in the years to come, it is expected that at least a third of the EECS faculty will be senior by the end of the 2012–2013 AY.
- A curriculum of core graduate courses must be designed and regularly taught. These courses must span the fundamental topics central to a graduate education in EECS. The shaping of this curriculum is already underway. The recruitment of additional tenure-track faculty will be needed to ensure that these courses are offered on a regular basis, however. If planned requests for new EECS faculty positions are met, and if hiring for these positions is successful, a graduate curriculum of this kind could be ready by the 2012–2013 AY.
- A comprehensive CCGA proposal must be prepared. Given the additional faculty resources that will be requested, it is expected that the EECS faculty will have adequate time to prepare this proposal over the 2012–2013 AY.

In summary, successfully preparing a viable CCGA proposal by the end of the 2012–2013 academic year is a reasonable goal, but meeting this goal will require the allocation of additional faculty positions to EECS, at least one junior tenure-track position per year, as described later in this document.

The EECS **undergraduate CSE degree program** is currently established and has already produced graduates. With continued support for 2–3 EECS lecturers, and the creation of at least one additional tenure-track position, there are adequate labor resources to offer the current complete CSE curriculum. The EECS faculty has identified a number of important ways to improve the current curriculum, however, and these improvements will be needed to produce an undergraduate CSE program of international stature. The EECS faculty has identified the following goals with respect to undergraduate education:

- To modify the CSE curriculum, and augment the set of courses regularly offered, so as to produce an undergraduate training experience that is comparable in quality to those offered at our sister campuses.
- To continue to plan for a degree program in *Electrical Engineering (EE)*, beginning with an EE emphasis area with the CSE degree program, and (given adequate resources) to begin to implement this emphasis area

The quality of an undergraduate program is difficult to measure objectively. One might be tempted to use common university rankings, such as those provided by *U.S. News & World Report*, to evaluate such a program, but these rankings are often misleading. An alternative is to seek formal accreditation through an educational accreditation agency, such as ABET. The accreditation process is resource-demanding, however, and many leading computer science programs in the world do not seek accreditation. Thus, while ABET accreditation may eventually be sought, particularly if an electrical engineering major is

introduced, there are *no* plans to seek such accreditation during the upcoming five years. Lacking such an accreditation process, the EECS faculty could engage in a self-study activity, including the solicitation of input from distinguished faculty at our sister campuses, to formally evaluate progress toward a quality CSE degree program.

Priorities - The achievement of many of these goals depends upon the successful recruitment of new tenure track faculty members. The goals will be met naturally as newly hired faculty members do the jobs that they were hired to do. Still, situations may arise in which these goals are competing for resources or are otherwise at odds with each other. In preparation for these contentious situations, the EECS faculty has prioritized these goals as follows:

1.1.1.1. The establishment of a CCGA approved EECS graduate program.
1.1.1.2. Meeting our research goals.
1.1.1.3. Improving the curriculum for the CSE major, and complete the planning for an EE major.

EECS Current Academic Resources - The EECS group currently consists of 7.5 tenure-track faculty members and 2 lecturers. Of the tenure-track faculty, only one is tenured, and that individual has substantial administrative responsibilities (i.e., he is Chancellor of UCM). One member of the EECS faculty has a split appointment with SSHA, providing 0.5 FTE to EECS. Lecturers play a critical role in providing lower division computer programming classes, including classes for CSE majors (CSE 30/31), classes for all engineering majors (CSE 20/21), and even a class for students in other schools (CSE 5).

EECS Current Academic Resources – The current EECS group consists of 6.5 assistant professors. One faculty position and one LPSoE are being searched during AY 2009-10 in EECS. The EECS program currently occupies offices (converted to dry lab space) and 1 dry lab suite in Science and Engineering I.

EECS Envisioned Program by 2020 – We envision that the EECS program will comprise 13-15 ladder faculty members and 3-4 lecturers by 2020. The number of undergraduate (CSE, and potentially EE majors) will be around 300. We expect to have 50-60 graduate students in EECS program.

EECS Resource Requirements 2010 – 2015 – More facilities are needed for the EECS program to maintain its standard in teaching quality and research excellence as enrollments grow, and to develop an undergraduate EE program. Appropriate space allocation (dry lab) will be necessary for the recruiting of additional faculty members.

EECS Academic Resources Request (FTEs)

A five year plan has been fabricated for the hiring of new EECS faculty. That plan involves the following positions:

- **Computer Systems (SoE-1)**. During the 2010–2011 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Systems**. The successful candidate for this position will conduct research related to the design and analysis of complex computer systems. Potential research areas include, but are not limited to: computer architecture, distributed sensing and monitoring, mobile computing, networking, operating systems, privacy and security, & ubiquitous computing. This position is critical for establishing international respect as a leading computer science program, as any strong computer science program will be expected to include a solid foundation in systems. Furthermore, this new faculty member is needed if a reasonable range of foundational graduate program core classes are to be offered on a regular basis. Such courses will be needed to produce a viable CCGA proposal. In addition to supporting EECS program needs, this position will likely produce fruitful cross-campus collaborations, though the nature of these collaborations is difficult to predict, given the ubiquity of complex computer systems in virtually every contemporary field of

inquiry. While laboratory space needs can vary widely among computer systems researchers, candidates who focus on software solutions are expected to require relatively small labs.

- **CSE Lecturer Team (SoE-LPSoE-1, SoE-LPSoE-3).** Lecturers are needed to cover lower division EECS classes, serving CSE majors, all engineering majors, and students from other schools. It may not be necessary to allocate any new positions to fill this need, as at least 2 Lecturers are currently employed in support of the EECS program. Indeed, a Lecturer with Potential Security of Employment (LPSoE) position was previously created, and we are currently attempting to fill that position. Should the current efforts fail, the EECS group recommends that such a position be re-advertised and filled promptly, supplying an individual who can manage all of the lower division CSE courses while teaching several of them. An additional 1 to 2 Lecturers will be needed to cover the remaining lower division courses. These positions should be made relatively permanent (i.e., LPSoE) in AY 2010-11 and 2011-12, at the latest, as we are extremely vulnerable in this area given the large number of students required to take these courses and the difficulties associated with rapidly identifying temporary lecturers in this area.

- **Computer Science Theory (SoE-6)**. During the AY 2011–2012, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Science Theory**. The successful candidate for this position will conduct research in the mathematical foundations of computation. Potential research areas include, but are not limited to: computational complexity, computational game theory, computational geometry, computational learning theory, cryptography, networking theory, numeric optimization, & numerical analysis. This position is critical for establishing international respect as a leading computer science program, as our current faculty lacks a theoretician. This hire will also be expected to contribute to the EECS graduate program core curriculum, providing students with a graduate level survey of computer science theory. Contributions are also expected to the CSE undergraduate degree program, strengthening this program by providing automata theory, complexity theory, and other foundational courses.

- **Intelligent & Adaptive Control (SoE 10)**. During the 2012–2013 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Intelligent & Adaptive Control**. The successful candidate for this position will conduct research on the design and analysis of control systems, making use of methods from artificial intelligence, control theory, cybernetics, machine learning, and/or robotics. Potential application areas include, but are not limited to: active sensing, environmental control, intelligent transportation systems, mechatronics, power management, & robotics. This position is important for building the EECS program's reputation in "intelligent systems". This hire will also be expected to contribute to the set of EECS graduate courses, speeding preparations for a CCGA proposal submission. Note that this position also will contribute to the campus-wide focus on "Cognitive Science and Intelligent Systems", as highlighted in the *Strategic Academic Vision* of the University of California, Merced. Finally, since the field of control theory traditionally spans computer science, electrical engineering, and mechanical engineering, there is good reason to expect this position to additionally support the mechanical engineering programs in the School of Engineering.

- **Senior EECS FTEs.** During the 2013–2014 and 2014–2015 academic years, the EECS group proposes returning to efforts to recruit senior faculty members in EECS. Considering the difficulty that UCM has had in attracting senior EECS faculty, it is considered unwise to unnecessarily restrict the research focus of this position. Instead, any strong senior EECS researcher who can demonstrate synergy with established EECS faculty would be considered.

Strengths commensurate with developing the EE emphasis area within the CSE program, and eventually the EE degree program, would be particularly attractive at this point.

EECS Interdisciplinary and Cross-School FTE Requests

In addition to positions focusing on EECS priorities, the EECS group suggests a number of interdisciplinary, potentially cross-school, positions, including:

- **Information Management (Cross 1).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Information Management**. This position would involve research into database systems, decision support systems, automated information retrieval, and/or other technologies that are critical to modern Management Information Systems (MIS). The successful candidate would bring highly relevant technological expertise to UCM's evolving business management program, while offering core computer science knowledge to CSE majors. The creation of this position could substantially increase the employment prospects of UCM graduates, as database design and related skills continue to be in extremely high demand. Also, opportunities for industrial funding of research are expected to be (relatively) abundant in this domain.
- **Virtual Environments (Cross 4).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Virtual Environments**. The successful candidate for this position would conduct research on tools and applications for virtual reality systems, constructing digital "worlds" and facilitating seamless and fruitful interactions between these virtual spaces and human users. Application areas include, but are not limited to: computer game design, educational and training software, digital heritage, and social networking. This interdisciplinary domain lies at the intersection of fields like computer graphics and animation, human-computer interaction, human perception and motor control, human communication (including both natural language and gestural communication), and the humanities. This position would build on existing collaborations between faculty in EECS, faculty in Cognitive & Information Science, and other faculty in the School of Social Sciences, Humanities, and Arts (SSHA). With the help of this additional faculty position, these cross-campus research collaborations could quickly evolve into high-profile, innovative, and unique interdisciplinary programs, providing students with various backgrounds hands-on training in this rapidly growing field. With regard to EECS programs, this position could contribute to a "computer games" track in the CSE major, which would be expected to swell the ranks of undergraduates pursuing that degree.
- **Media Arts & Technology (Cross 6)**. The EECS group proposes the creation of a new interdisciplinary faculty position at the Associate Professor level focusing on **Media Arts & Technology**. The successful candidate for this position would develop and/or use innovative technologies in the service of artistic expression. The basis for such a program already exists in EECS, with two faculty members conducting research in related areas (3D modeling, computer graphics, computer animation, image-processing, digital libraries, multimedia). This position could seed programs in media arts and technology — programs that could easily become very popular at both the undergraduate and graduate levels. UCM's proximity to the San Francisco Bay Area, which has a tradition of art and technology interaction, would provide an additional stimulus for such programs. The space requirements for this position are expected to include modest dry lab space for a research studio and space for a motion-capture system, which could be shared among several of the faculty.

EECS Space and Special Equipment Requests

The EECS short- and long-term space needs will be fulfilled by existing dry lab space in Science & Engineering 1 and proposed dry/computational space in Science & Engineering 2. No special equipment is needed at this time.

Bioengineering

Bioengineering Overview - Bioengineering is a highly interdisciplinary field in which the techniques, devices, materials and resourcefulness of engineers are used to address problems in biology and healthcare; and lessons from biology are used to inspire design and inform progress in engineering. During the past 40 years, this synergy between biology and engineering has led to a wide range of implantable materials, diagnostic devices, sensors and molecular characterization techniques, and it has produced tools that greatly expedited the sequencing of the human genome. Along with these practical innovations has come a rapidly increasing need for personnel with the necessary hybrid skills to capitalize on them; undergraduate bioengineering programs have proliferated alongside the continued growth of bioengineering research.

The current bioengineering faculty members are affiliated with the **BEST** and **QSB** graduate programs. The faculty constitutes a strong research core which, with a few additions, can develop into a nationally competitive research cluster. The current faculty members have a wide range of expertise in physiological engineering, tissue engineering, regenerative medicine, biophysics and etc. The BioE faculty is committed to expand the research scope in the major to complement the research area of the current faculty.

The undergraduate major in **Bioengineering (BioE)** is designed to provide students with both breadth and depth in two exciting and rapidly expanding fields: tissue engineering and nano-bioengineering. The nano-bioengineering track reflects the strong synergy that exists between the "nano" and "bio" themes in engineering and science. The name also highlights an initial focus on things molecular, supramolecular, cellular and material, which will allow the program to draw efficiently on the talents of the biologists, chemists, physicists and other UC Merced faculty in basic engineering and science programs.

BioE Teaching Programs – Currently BioE program has only three faculty members. It is extremely difficult to deliver a major and a graduate program (BEST) with such few people. A consolidation effort has been made to prioritize the class offering in BioE. The plan will reduce the total required credits and incorporate electives from other areas (e.g., Mechanical and Materials Science Engineering) to maintain their undergraduate major while continuing to develop their graduate research program.

BioE Goals

BioE Research Goals – The research goal for BioE program is to maintain high level of federal and national funding as well as to publish peer-reviewed research articles in reputational journals.

BioE Teaching Goals – Bioengineering is a field including expertise in areas such as drug delivery, tissue engineering, medical imaging, physiological modeling, molecular engineering, biomechanics, bioinstrumentation and medical device developments. With sufficient faculty available, more diverse courses can be offered to undergraduate and graduate students in order to provide a comprehensive and broad bioengineering education experience. The teaching goals will be the program learning outcomes of the BIOE major reflect seven of UC Merced's eight guiding principles of general education.

BioE Current Academic Resources – One full professor and two assistant professors. BioE program currently has wet lab around 1.5 suites in SE1 building.

BioE Envisioned Program by 2020 – We envision BioE Program will have 7 to 9 faculty members. The number of undergraduate program will be around 150 to 200. We expect to have 20 to 25 graduate students in the BEST program.

BioE Resource Requirements 2010 – 2015 – More faculty members (3 more) are needed for BioE program to maintain its standard in teaching quality and research excellence. Appropriate space allocation (both wet and dry lab) will be beneficial for the recruiting of these additional faculty members.

BioE Academic (FTEs) Requests

To deliver the BIOE undergraduate program, 26 program specific credits have to be offered. These credits do not include engineering fundamentals courses, service learning, freshman seminars, or graduate courses. They also do not allow for multiple offerings of any course in an academic year.

BIOE has currently only 3 existing faculty positions that cannot realistically deliver 26 BIOE related credits (lecture and laboratory courses) in the foreseeable future. Using a model in which a faculty member would typically offer one fundamental/core course, one specialist/upper division course or one graduate course in a year (plus a freshman seminar and/or mentor a service learning team), it is clear that BIOE does not have the minimum number of faculty FTEs to deliver the major. In addition, BIOE is part of BEST (Biological Engineering and Small-scale Technology) graduate group and has to cover two required graduate courses and sufficient advanced elective classes (3-5) for BEST students.

Given the current limitation due to the economical recession, a minimum of three FTE are urgently needed as identified by the faculty in BIOE (listed in the priority order):

- **Physiological Modeling (SoE-4) -** We have been experiencing unprecedented advances into the complex nature of biological systems in recent years. Current advances in biology, genomics, proteomics, cellular level modeling methods, simulation capabilities, new technologies for imaging and measuring biological phenomena and molecular level interfacial characterization tools present the engineering community with unique opportunities to advance the understanding of these biological or even ecological systems to deliver desired functions. Currently the lack of involvement of engineering has hindered the complete understanding of the complex biological systems. Furthermore, there is a need to understand how the desired or additional functionality can eventually be accomplished and integrated over larger scales and complexities from cellular, organism to ecosystem level. Systematic modeling incorporating various engineering concepts such as optimization, database management, control and network formation based on large body of experimental results would lead to complete understanding of the non-linear nature of biological systems. Being an interdisciplinary field between engineering and biology, BioE has a strategic advantage in engineering to address this unique challenge and opportunity.

  Current the faculty members in bioengineering at UCM are experimentally oriented researchers. Modeling expertise at multiple levels is needed to tackle more complex biological projects. This requested multiple-scale modeling position will be at junior (assistant professor) level. This faculty member is expected to collaborate with the current faculty members to link various research areas to study specific biological/physiological problems from system point of view. This position will develop quantitative modeling and simulation methods that faithfully represent the complexity of biological/ physiological systems based on experimental data and deal creatively with the hierarchical and nonlinear nature of living systems. This position will integrative knowledge from various research fields to serve a focal point for faculty members from NS, ME and BIOE to collaborate on projects that cannot be addressed from the view point of a single discipline.

- **Recombinant Sensor Development (SoE 13) –** Recombinant protein sensor development has made tremendous progress in recent years. Various protein sensors that report wide range of physiological and biochemical information inside cells have been created. These protein sensors exhibit many different spectral characteristics depending on the need of the application. The area of recombinant sensor development is, by nature, cross disciplinary in that it employs cell culture methods combined with appropriate organic chemistry, biophysics, molecular biology, genetic

engineering, non-linear optics as well as nano-bioengineering. Moreover, this sensors can be genetically engineered in animals or gene delivered by electroporation or adenoviral transfection.

The Recombinant Sensor Development position could also compliment and synergize with the research of a number of faculty in the areas of Biophysics, Physiological Engineering, Stem Cells, Vascular Tissue Engineering, Nanotechnology, and Microfluidics/Microchip design. We expect that this faculty hire would contribute to our growing graduate program in BEST and Quantitative and Systems Biology Depending the particular area of research, this faculty position could possibly contribute to helping build a Stem Cell Clean Room Facility at UCM. We propose this position to be appointed at senior level (Associate or above).

- **Medical Imaging (SoE 14) -** Recent developments in optical/imaging techniques (such as ultrasound, MRI, PET, CT or IR imaging) clearly indicate the enormous potential of Medical Imaging in clinical applications. The imaging sciences are in the midst of a profound revolution that stems from new and fundamental advances in imaging, tissue engineering, biophysics, physiology and molecular and cellular biology. This is due in large part to the new technology and quantitative approaches developed in the disciplines of chemistry, physics and engineering. Due to its highly multidisciplinary nature, Medical Imaging technology presents a unique opportunity for Engineering at UCM. Our unique campus environment is an ideal location to cultivate Medical Imaging technology. This research area will apply tools in optics, physical chemistry, physics, computer sciences, electronics, nanotechnology and analytical chemistry for medical applications. The development of such technology enables many bioengineering research and clinical applications. Currently, there is no faculty with medical imaging background in BioE program. This proposed new hire will expand the research capacity and course diversity in our program. Medical Imaging research area represents an outstanding opportunity to involve faculty members in natural sciences, optical physics, bioengineering, materials science and engineering, mechanical and electrical engineering/computer sciences in a cross-disciplinary project.

  This position would compliment and synergize with the research of a number of faculty in many areas of research. Therefore, this position compliments the growing needs for graduate programs such as BEST or Quantitative and Systems Biology. It is proposed that this position will be designated at the rank of full professor.

BEST Interdisciplinary and Cross-School FTE Requests - none

BEST Space and Special Equipment Requests – none

Environmental Engineering

EnvE Overview - The San Joaquin Valley has experienced substantial population growth and with it the scarcity of water and deterioration of air quality. Today, the San Joaquin Valley harbors the most polluted air in the United States causing adverse health effects particularly among children and the elderly. Most lakes are gone, rivers have dried up and water diverted from the Sierra Mountains has been channeled into a vast agricultural irrigation system and drinking water supply for the nearby and distant urbanized centers. With climate warming, less and less rain is expected to fall in the mountains, already causing great distress in the Valley. Consequently, there is a great need to research stressors of environmental systems in the Sierra Nevada/San Joaquin Valley and to develop engineering as well as social and policy solutions to restore and maintain the beauty and natural resources of this part of California. Today, California faces challenges of how to sustain and restore natural systems as these stressors – climate change and drought, air pollution, intense agricultural production and population growth – put ever-increasing demands on both the San Joaquin Valley and Sierra Nevada ecosystems.

Environmental engineers and hydrologists within the Environmental Systems graduate program are distinguished from other environmental professionals through their focus on problem solving, design and implementation of technological or management systems. Environmental engineers search for creative and economical ways to use resources efficiently, limit the release of residuals into the environment, develop sensitive techniques to track pollutants once released and find effective methods to remediate spoiled resources. They serve as the vital link between scientific discovery, technological development and the societal need for protecting human health and ecological integrity. In the coming decades, environmental engineers will increasingly be called upon to address broader issues of environmental sustainability by minimizing the release of residuals through altered production processes and choice of materials; by capturing the resource value of wastes through recovery, recycling and reuse; and by managing natural resources to meet competing societal objectives.

Environmental Teaching Programs - The undergraduate major in ***Environmental Engineering (EnvE)*** prepares students for careers in both industry and government agencies concerned with managing water, energy, public health and the environment. The program also provides an excellent foundation for further study in Earth science, engineering, business, management, law and public health. The curriculum provides students with a quantitative understanding of the physical, chemical and biological principles that control air, water and habitat quality and sustainability on Earth, along with expertise in the design, development, implementation and assessment of engineering solutions to environmental problems. The program emphasizes a highly interdisciplinary approach to environmental engineering, combining a strong theoretical foundation with field studies, laboratory experiments and computations. Core courses within the major provide students with a firm foundation in the physical and life sciences and the ways that they apply to energy, hydrology, air and water quality issues.

In addition to serving its majors, the EnvE program provides a large service course for SSHA in terms of EnvE 10 The Environment in Crisis (Gen Ed science and laboratory units for non-science and engineering majors). The program also offers an upper division writing-intensive environmental policy course, EnvE 118 Global Change, which may be modified in the near future to serve as an acceptable substitute for CORE 100.

The ***Environmental Systems (ES)*** graduate program is one of the first and truly interdisciplinary graduate programs jointly with the School of Natural Science (SNS). The program offers individualized, research-based courses of study leading to the M.S. and Ph.D. degrees and is the first and only graduate program at UCM that achieved UC system approval. Through the interdisciplinary ES graduate group, ENVE is affiliated with the Sierra Nevada Research Institute (SNRI), the powerhouse for ecological and environmental research geared towards sustainability of the Sierra Nevada and San Joaquin Valley.

EnvE Research Programs - Environmental engineering graduate research is an integral and complementary part of the interdisciplinary environmental systems program at UC Merced administrated jointly by faculty from the School of Engineering and School of Natural Science. The role of environmental engineering is to connect and translate research into workable environmental engineering solution. Environmental engineering has three main focus areas:

Hydrology - Hydrology focuses on the sources, balance and use of water in both natural and managed environments, including precipitation, mountain snowpack, river runoff, vegetation, water use and groundwater. Both the physical and chemical aspects of the water cycle are included. Water resources are experiencing unprecedented stresses, owing shifts in temperature and precipitation patterns associated with climate change, as well as shifts in land use and land cover in response to growing populations.

Water quality - The water quality area focuses on engineering solutions to water and waste issues, including measurement technology, water quality assessments, treatment systems and remediation of contaminated waters. Physical, chemical and biological aspects are included.

Air Pollution - This focus area investigates solutions to air quality in a regional setting. Air pollution focuses on issues arising from primary emissions within different regions of the United States. Recent

areas of research included: Pittsburgh, Baltimore, and the San Joaquin Valley and its precursor airflow corridors. A key focus is on particulate matter released from primary direct emission point and fugitive sources as well as the atmospheric chemical gas-to-particle conversion added by photochemistry.

S**ustainable Energy -** Current research focuses solutions to energy problems, both regionally and globally. Solar energy research includes the development of medium-temperature solar thermal collectors and a project to initiate the development of a novel cost-effective concentrating photovoltaic system.

Environmental Policy - Policy effect of climate change on wildfires and effect of emission trading systems due to interaction between environmental policies and industry activities.

Environmental Geographical Information System - Application of geospatial techniques in solving large-scale ecological and geographical problems, with emphasis on the effects of invasive species, climate change, and human disturbance on terrestrial ecosystems.

EnvE Goals

1. Grow Research by Focused Investment in Faculty Hires in Key Areas - Similarly to all academic programs at a growing new university that has been hit by this economical depression, the environmental engineering program growth is delayed, resulting in reduced research synergism in key areas that have to overcome in order multiply the impact of the current research endeavors.

2. Obtain ABET accreditation for EnvE Undergraduate Program by 2015 - The growth of our undergraduate program as well as the quality of students is substantially reduced because the program is not ABET-accredited. To achieve the level of breath and depth needed for our environmental program to pass the accreditation hurdle as well as to serve our ES graduate program and conduct world class research, additional faculty are urgently needed that will fill key gaps in expertise and research. As soon as the environmental engineering program is accredited, more and better prepared students will join our program that would otherwise not come given the professional implications of having an undergraduate engineering degree from a not accredited institution.

3. Enhance interdisciplinary and cross-disciplinary research initiatives - The graduate program, ES, environmental engineering faculty are associated with is truly cutting across disciplines, including SNS and SSH. The ES program is highly link with research and academic activities under the umbrella of SNRI. Already several EnvE faculty are partners in the UC Merced Energy Research Institute (MERI). The Health Science Research Institute (HSRI) was founded in 2009 and is expected to involve faculty members across many disciplines, including EnvE. O thers are associated with the UC Merced Spatial Analysis and Research Center. As the university grows in faculty numbers, diversity, capabilities, and space, more cross-disciplinary research initiatives will natural follow. Here, the metric of success will be measured by (a) faculty linkage and number of interdisciplinary research that otherwise could not have been obtained, and (b) total competitive research funding of these centers and initiatives.

4. Maintain high-level of research productivity - Scholarly productivity is a key outcome measure together with national and international reputations of our faculty researchers. To fuel further high level of research productivity, potential research links that are currently not available due to the missing expertise have to be filled with strategic faculty hires.

5. Develop Civil and Sustainability Engineering - The world is changing quickly. Already, with the global challenges of climate change, population growth, and diminishing resources, the need emerges to face these challenges and develop new sustainable technology, housing, materials, transportation systems, and energy systems. To face these challenges, civil engineers with a deep conviction towards sustainability have to be educated, providing the SoE at UCM with a great potential of building an undergraduate program in civil/sustainability engineering. To have a viable Civil engineering undergraduate program, at least three focus areas are needed. Here at UC Merced, we already have environmental engineering and hydrology. What is needed to complete a viable undergraduate program is hires in the areas of sustainable structures, building materials, and transportation systems.

ENVE Outcome Metrics

3.1. Research Assessment

- Funding increase
- Funded and unfunded graduate research projects
- Graduate degree production increase
- Number of publications in peer reviewed journals and journal impact factor

3.2. Education Assessment

- Substantial enrollment increase (comparably staffed Civil & Environmental Engineering programs nationwide are roughly double the size of the current Environmental Engineering program).
- The EnvE program assessment plan includes continual course and program level assessment vehicles culminating in a periodic self-evaluation and review by the Accreditation Board for Engineering and Technology (ABET).
- Number of undergraduate students participating in research.
- Number of doctorial students and graduation rates.
- Number of woman, minority and U.S. citizen graduate applicants.

EnvE Current Academic Resources – Six full professor (2 of which have full administrative appointments), one associate professor, and four assistant professors (2 of which have 0.5 appointments in SoE), for a total count of 7 FTE. This group occupies wet and dry lab research space in SE 1.

EnvE Resource Requirements 2010 – 2015 – In the short term, two more faculty members (ecological engineering, air pollution modeling) would greatly assist the EnvE program as it moves toward ABET accreditation and would also better position the EnvE and Environmental System group to compete for interdicisplinary research projects. Several other faculty lines shared with the management program efforts would also help to initiate the sustainability effort discussed below. Appropriate space allocation (both we and dry lab) will be beneficial for the recruiting of these additional faculty members.

EnvE Envisioned Program by 2020 – We envision that EnvE program (by then, the Civil & Sustainability Engineering) will have 10-12 faculty members (including split appointments). The number of undergraduate program will be around 150-200. We expect to have 60-80 graduate students in the ES program.

ENVE Resources Requirements 2010 – 2015 – Critical academic resource requests are based on (1) need to obtain critical faculty numbers to achieve ABET accreditation, (2) continued build up of research capacity in existing research areas, and (3) responding to global challenges, sustainability engineering faculty is needed to respond to novel research needs and societal demands.

ENVE Academic Resources (FTEs) Request - For the next 5 plus years, environmental engineering group has two areas of need: (1) filling gaps that currently limit the teaching and research, and (2) expand into sustainable engineering/civil engineering. Given the limited space and resources available for the next years due to the recession, the priority has been placed on filling gaps in our existing research and teaching programs and delay the buildup of sustainable engineering until 2015. The top four priorities of FTE positions for 2010-13 are as follows:

- **Ecological Engineering or Ecohydrology (SoE-9) -** We recommend an assistant or associate level search for a faculty member who uses engineering principles to design **sustainable systems that integrate human activities with the natural environment**, with particular emphasis on the linkage between hydrologic and ecological systems. Possible areas of research emphasis include interactions among hydrologic, biogeochemical, physiological, and soil processes; hydrologic

ecosystem services, integrating water quality, water cycling; spatial analysis and scaling. Use of remote sensing, field-based measurements, laboratory experiments and modeling are all of interest. As a discipline, ecohydrology addresses the bi-directional regulation of hydrologic and ecological processes, e.g., the flow regime and pollutant levels of water in wetlands regulate the species and the populations that live in the ecosystem, while ecological processes in the wetland regulate the timing and magnitude of water and nutrient fluxes through the system. Ecological engineering involves the design, construction, restoration and management of aquatic and terrestrial ecosystems that have value to both humans and the environment, using principles from engineering, ecology, economics, and natural sciences. The extensive and large-scale ecosystem restoration efforts planned in the Central Valley provide excellent opportunities for both natural laboratories, and research support through applications partnerships with local landowners and conservation entities. Similar efforts are being carried out across the Western U.S. This position would have collaborative opportunities and synergy with Campbell, Bales, Conklin, Harmon, Guo in SoE and Aguilar, Dayrat, Keepers, O'Day, Traina in SoNS.

- **Air Pollution Modeling, Management and Control (SoE-7) -** We recommend an assistant or associate professor position, preferably someone with both a management and technology focus in the area of air quality engineering. A background in mechanical engineering is desirable. This position could focus on engineering design of systems, technology for air pollution control, or modeling and impacts of air pollution. California's Central Valley offers an excellent natural laboratory for research to devise air pollution control systems. Organic and inorganic particulates, persistent organic pollutants, and precursor gases for ozone formation are produced during routine agricultural practices and weekday commutes. These pollutants are lofted into the atmosphere to interact with other chemicals or microbes and are eventually deposited in the respiratory systems of humans and animals, as well as on plant leaves. The resulting effects on human and ecosystem health are devastating. A significant air pollution-related research effort aimed at the understanding and mitigating the escalating air quality problems in the Central Valley, Sierra Nevada, and elsewhere has already been initiated in the Environmental Systems graduate group. This new position could also be helpful in understanding the effects of air quality on climate and of climate policy on air quality. This position is central to our developing strength in the air pollution area, and is an excellent complement to research by Rogge, Traina, Westerling.
- **Environmental Biotechnology (SoE 11) -** We recommend an assistant or associate professor position who has extensive experience in urban and agricultural wastewater treatment, advanced treatment techniques, remediation, and expertise in toxicology. This person could also contribute to environmental bioengineering. The San Joaquin Valley is one of the fastest growing areas within the US and likewise harbors the most intensive agricultural industry in the Nation. Consequently, not only the quantity of water is an issue, but also the quality of water for households, crops growing and animal husbandry in large concentrated animal feeding operations. A great portion of the wastewater produced during agricultural activities is more or less released to the environment with little or no treatment.

ENVE Cross-School FTE Requests

- **Natural resource management** (**Cross 2**) **-** It is recommended that a tenured faculty member at the full or associate professor level be hired in this area. It is expected that this person would help lead the planning for a natural resources management track within the proposed management program and eventual School of Management. A research emphasis on water, forest, or range would complement existing faculty and help fill an important niche in the UC system. This person could also contribute to planning for a Center for Spatial Analysis that is being investigated by faculty in SoE and SSHA, contribute to developing a Geography degree at UCM, and contribute to refocusing of the Earth Systems Science degree in the School of Natural

Sciences. At the graduate level, a number of discussions have taken place around starting a program in Public Lands Management, with linkages to the NPS, USFS and other land-management agencies; and this person could also anchor that program. This position should complement Hart, who has some expertise in this area, having been on the faculty in natural resource programs for 19 years before coming to UCM; Hull, who has 20 years experience in cultural resource management, and potentially UCM's World Heritage program.

Materials Science and Engineering

Materials Science and Engineering (MSE) applies fundamental principles of physics and chemistry to designing materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical and other properties. Increasingly, innovative materials are being developed with the benefit of lessons that have been learned from nature. Examples include armor based on the structure of abalone shells and rats' teeth, optical materials that owe a debt to sea urchin spines and peacock feathers, high-performance ballistic fibers modeled on spider silk, self-cleaning surfaces copied from lotus leaves, and strong, reusable adhesives that emulate the behavior of gecko feet. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall cost of the ingredients and processes used to produce particular materials, the effects of the environment on materials, the effects of materials and materials processing on the environment, and characterization of materials structure and properties. Because MSE embraces skills from physics, chemistry, mathematics and biology, it is especially appealing to anyone who enjoys interdisciplinary studies and who seeks to apply such knowledge to solving practical engineering problems.

Energy and sustainability have both been identified as leading research priorities for the School of Engineering and the UC Merced campus, while plans are underway to consolidate the SOE undergraduate curriculum to offer a more streamlined set of courses at the undergraduate level and expand course offerings at the graduate level. Strategic planning for MSE is focused on 1) building critical materials expertise into the energy and sustainability research themes of UC Merced, and on 2) supporting instructional programs *across SOE* and *the campus* at the undergraduate and graduate levels.

Energy and Sustainability Materials Research - Rising industrialization of developing countries in response to economic globalization since the late 1980s and population growth have contributed greatly to an unsustainable demand for energy and raw materials for manufacturing. China, in particular, is on track to become the top manufacturing nation in the world by 2020, and by some estimates has already become the world's second largest economy after the United States. This manufacturing capacity, initially spurred by export demand, is increasingly geared towards meeting the internal demands of a rising middle class in a nation in excess of 1.3 billion people.

Among the plethora of possibilities for materials research in energy and sustainability that exist, some key areas that are synergistic with present efforts by other disciplines in SOE and across campus have been identified for development within MSE over the next 5-10 years. These include 1) energy materials, 2) sustainable manufacturing, and 3) sustainable building.

Energy Materials - Although energy materials research has many disciplines that contribute to it, the relationship between structure-properties-processing-application is a special focus of Materials Science and Engineering that gives it a strong engineering design component that is particularly relevant to the energy industry where many new technologies have not been adopted due to cost, processing, maintenance or other engineering constraints. Tto leverage the existing strength of UC Merced in non-imaging solar optics and other energy conversion technologies involving high temperature processes, as well as in nanotechnology, we propose to focus faculty hires in the areas of high temperature materials (relevant to receiver materials for high-temperature solar concentrators and solid-oxide fuel cells), nano-enabled energy technologies, and modeling of processing pathways for the synthesis of new metastable energy materials. The first two areas are experimental in nature, but have only modest dry laboratory

space needs due to our ability to leverage existing shared resources in nanofabrication and characterization. The third area is theoretical in nature and only requires computational resources that are available through shared faculty computer clusters on campus or national computational facilities.

MSE at UC Merced already has a primary research thrust in energy materials, however at present there are only 3.4 faculty in MSE (one faculty member, Christopher Viney, has administrative responsibilities as the Vice-Provost for Undergraduate Education and as the Dean of College One). Jennifer Lu studies the synthesis of carbon nanotubes and other nanostructures and nanomaterial-based composites for photovoltaic , battery, and energy-scavenging applications. Lilian Davila models the structure of silicates to understand and predict their properties, and her results have been applied to studying diffusion in 17 silica zeolites (applicable to sequestration of nuclear waste) using computer simulations and thermochemistry data, failure mechanisms of optical lenses at the National Ignition Facility at LLNL (nuclear fusion studies), and silica nanowires (hydrogen and energy storage, biological and chemical sensing with NEMS). Christopher Viney's research fits into the broad concept of energy materials and sustainability, in that bioinspired materials guide us towards efficient, sustainable use of matter and energy through environmental benign processing routes. Valerie Leppert specializes in materials characterization in the electron microscope, which is pertinent to all fields of energy materials research.

Sustainable Manufacturing - Sustainable Manufacturing seeks long-term alternative technologies, processes, materials, chemicals, and/or products so as to reduce pollution and waste, and create sustainable solutions. Its practice requires expertise in environmental regulations, recycling, life-cycle assessment, economic analysis, green chemistry and toxicology. Sustainable Manufacturing practice is rapidly becoming a necessity for companies engaged in manufacturing and several programs have recently begun cropping up around the country to meet industrial demand for training in this emerging field. Since the field is just developing, there is an opportunity at UC Merced to create a competitive research program in Sustainable Manufacturing that leverages the Sierra Nevada Research Institute and existing research and instructional programs in Environmental Systems, Biological Engineering and Small-Scale Technologies, Mechanical Engineering and Applied Mechanics, Computer Science and Quantitative Systems Biology, as well as the nascent School of Management.

To build a sustainable manufacturing program, expertise is needed in <u>life cycle and cost-benefit analysis of materials and manufacturing processes</u>, and <u>modeling of synthesis routes (often bio- or geo-inspired) to new metastable materials that reduce the use of energy and rare metals</u>. Both areas of research are computational in nature and have modest space and resource needs that can be met by shared faculty computer clusters or national computational facilities.

Sustainable Building - Sustainable building is an emerging area of interest for resource conservation, with a growing number of government agencies offering incentives for its practice. In addition, sustainable building is one of two research areas for the FY2010 Emerging Frontiers in Research and Innovation (EFRI) research program funded by the National Science Foundation. (The EFRI program was established by the Directorate for Engineering at NSF to focus on important emerging areas of research in a timely manner.) Green building materials are an important component of sustainable building practices that offer reduced construction costs, reduced maintenance and replacement costs over the life of the building, energy conservation, improved occupant health and productivity, and lower costs due to flexibility in design for specific occupants. The research emphases described above for sustainable manufacturing and energy materials can also contribute to a sustainable building focus in MSE. For example, a faculty with expertise in material lifecycle and cost-benefit analysis can contribute analysis of the resource efficiency of proposed green materials, while expertise in energy materials can contribute to the identification and development of cost-effective methods of conserving or harvesting energy in buildings. In addition, we would like to <u>build expertise in structural materials with MSE</u> to further the development of new green building materials that reduce the use of nonrenewable resources and environmental degradation. This position can be computational in nature or requiring only modest dry laboratory space due to shared materials synthesis and characterization equipment in MSE.

MSE Support of Instructional Programs - The 3.4 faculty allocated to Materials Science and Engineering have designed an efficient curriculum with five required MSE courses for undergraduate MSE students that allows the program to still make a significant contribution to several instructional programs in engineering and across campus.

In additions to serving their major and the BEST graduate program, the MSE faculty is making extensive contributions to engineering as a whole and general education. With consolidation of the undergraduate engineering curriculum in order to offer an ABET accredited General Engineering degree with specialist tracks and further streamlining of courses for the MSE major, it is expected that contributions to programs outside of MSE and the BEST graduate program will increase. Only two courses (MSE-111 and MSE-119), each offered every two years, will exclusively serve MSE majors in the future (this represents 1/7 of the MSE teaching capacity each year). Every other course offered by MSE will satisfy requirements for engineering students in other majors or in the general engineering program. MSE-111 is needed for the BEST graduate program, because graduate students for BEST are drawn from diverse disciplines and need some training in materials processing via the graduate cross-listed course for MSE-111, BEST-211 (CRF to be submitted to GRC). MSE-119, with a focus on modeling of mechanical properties, may additionally be of interest to other majors. MSE faculty will continue to contribute to General Education.

Outcome Metrics

Resources Requirements

Academic resource requests for MSE are based on the discipline's contribution to energy and sustainability research themes at UC Merced, its contribution to instructional programs across SOE and general education, its undergraduate and graduate teaching needs, and its contribution to student recruitment and retention through the COINS undergraduate research program (described above).

MSE Academic Resources (FTE) requests

- **Energy Materials (SoE-3) -** We are requesting an FTE at the Junior/Senior level to be housed in MSE for High Temperature Energy Materials, specifically ceramic materials, as priority for Year 1. This person will contribute to research efforts in energy conversion technologies (e.g. receiver materials for solar concentrators and solid oxide fuel cells) and secondarily, to a possible future program in sustainable building. He or she can also contribute to MSE, Engineering, and General Education instructional responsibilities as detailed in MSE's 5 year strategic plan. This position (the only experimental one that MSE is requesting over the next 3 years) has modest dry laboratory space needs and start-up costs due to shared characterization facilities (DTA, DSC, AFM, XRD, TEM, SEM). The only major experimental need is likely to be for high and mid temperature furnaces for synthesis and processing that can be accommodated on laboratory benches and venting to the hood exhaust system (this equipment does not need to be placed in a hood, it only requires hook-up to the hood ventilation system). Space needs and start-up costs are detailed in the SOE FTE request table.
- **MSE-6: Computational Materials (SoE 12) -** An FTE in computational materials at the Junior/Senior level, centered on modeling of metastable materials processing is requested as a priority in Year 3. This hire would contribute to ongoing efforts in energy and sustainability through the design of new materials for energy and replacement materials for manufacturing/building sustainability. Modeling assists the development of new materials through identifying efficacious metastable pathways for materials synthesis and processing that may be inspired by nature, as well as identifying new processing techniques that can be used to improve the recyclability of materials (pressure fabrication of hard plastics vs. thermosetting that allows recycling of hard plastics, for example). There are also collaborative opportunities with cognitive science that explore the use of materials visualization for materials teaching and

learning. Since this is a computations position no experimental laboratory space is needed (only space to house computers and researchers). Start-up costs are minimal, with shared computer clusters or national computational facilities available. Specific space needs and start up costs are detailed in the SOE FTE request table.

- **Sustainable Manufacturing Management (Cross 3)-** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow the establishment of a Sustainable Manufacturing Management program (described in more detail in the 5 year strategic plan) that can leverage existing courses across multiple instructional programs. This leadership position requires a tenured faculty member at the full or associate professor level. Appropriate disciplinary backgrounds for this position include industrial engineering, engineering economics, management and/or economics, environmental engineering, or materials engineering. A research emphasis on lifecycle and/or cost-benefit analysis would complement existing faculty expertise in the Schools of Engineering and Natural Sciences. The ideal candidate would have a proven track record in connecting engineering economic analysis to research in environmental systems, toxicology, or materials engineering, as well as the social science and policy aspects of sustainable manufacturing. The space and start-up needs for this position are modest, as it is theoretical in nature. Specific needs are detailed in the SOE FTE request table.

MSE Cross-School FTE Requests

- **Technology Management (Cross 5) -** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow establishment of a Technology Management program that can leverage existing courses across multiple instructional programs in Engineering and Natural Sciences.

Mechanical Engineering

Overview – The Mechanical Engineering faculty at UCM are affiliated primarily with the **Mechanical Engineering and Applied Mathematics** (**MEAM**), but several ME faculty are also affiliated with the BEST, and ES graduate programs. The ME faculty are dedicated to the education of a new generation of mechanics researchers, applied mathematicians and/or researchers of ME-related areas who aim to master the fundamentals of the mechanical sciences (which include disciplines such as continuum mechanics, rheology, fluid mechanics, heat and mass transfer, energy conversion, etc.) while being exposed to the forefront of research techniques, methodologies and equipment to solve problems that are relevant to modern society (green energy, mechanical modeling and synthesis, robotics and mechatronics, control systems, etc.).

Mission Statement - The mission of the MEAM program at UC Merced is to provide a modern, comprehensive, and interdisciplinary educational experience to its students with the objective of preparing them for successful careers in the current and dynamically changing professional environment. To achieve this mission, the MEAM program strives to accomplish the following educational objectives:

Program Educational Objectives

1. To provide a solid background on the pertinent mathematical, physical, chemical and engineering concepts that make up the foundations of the broad disciplines of mechanical engineering and applied mechanics, as well as on their closely associated fields;

2. To provide our students with the knowledge to correctly apply natural laws to the creative formulation and solution of engineering problems through the use of analytical, computational and experimental techniques;
3. To expand the reach of research in mechanical engineering and applied mechanics to non-traditional areas by continually seeking to incorporate new methodologies and research findings to our graduate curriculum.

Research

Mechanical Engineering and Applied Mechanics represent two distinctive but overlapping research areas that together form some of the most fundamental pillars of the academic enterprise. While the various disciplines that compose the field of Applied Mechanics are associated with rigorous and rapidly developing branches of human thought, Mechanical Engineering is currently undergoing a fundamental transformation at several distinct levels. At the design level, computer aided engineering and fast prototyping automated tools are revolutionizing the way new products are conceptualized, evaluated and deployed into the market. At a more fundamental level, computational methods that are based on judicious use of advanced concepts in Applied Mechanics (including stochastic evolutionary methods, uncertainty analysis, artificial cognition, etc.) have expanded the portfolio of research methodologies much beyond the usual designer-based experience. Today, Mechanical Engineering is evolving into a discipline where more emphasis is placed on teaching a machine how to design, other than using the machine to optimize a pre-selected design. In other words, instead of using the engineering methodology to optimize a pre-existing concept, MEAM research is transitioning to a new paradigm where only the goals and constraints of the object are known to the designer, and a stochastic algorithm uses a variety of advanced computational methods to explore the complete space of solutions that satisfy the goals and constraints of the problem at hand.

The MEAM group at UC Merced emphasizes this new approach to Mechanical Engineering, and therefore is unique among all UC campuses in placing a much higher emphasis on advanced computational methods. Formed in August of 2007, the MEAM group is composed of eleven faculty members from various disciplines, including Mechanical Engineering, Electrical Engineering, Physics, Applied Mathematics and Computer Science and Engineering.

3.3. **Research Themes of MEAM Program -** As mentioned above, there are many exciting research opportunities within the context of the MEAM program, and we have prioritized research areas that would better complement and add value to the overall research and educational mission of UC Merced. The chosen research themes also add a unique flavor to our program not only within the UC system, but also in comparison to other programs in the nation. The MEAM program will initially focus on two major themes, which are described below.

Energy Systems (I)— Mechanical engineering is a core discipline for the development of energy conversion technologies, and the MEAM program at UC Merced is well poised to take the lead on the renewable energy initiative in our campus. Professors Winston, Sun, Coimbra, and Diaz have all established track records in research funding in the energy research area. There is very strong synergy between the MEAM graduate program and the Merced Energy Research Institute (MERI), as well as with UC CITRIS (Center for Information Technology Research in the Interest of Society) and the new CITRIS initiative C-GRACE (CITRIS Global Research Alliance for Climate and Energy). Within the Energy Systems theme, the main areas of activities of the MEAM program include: solar concentrators, solar availability mapping, renewable fuel conversion, fuel cell technology, concentrator controls, direct solar conversion, and solar power applications to environmental health monitoring. The MEAM program has several overlapping research projects with other graduate groups within the energy systems theme, including Environmental Systems (ES) and Electrical Engineering and Computer Science (EECS). The MEAM faculty has been very successful in attracting sizeable research grants in this area.

In the next five years, we would like to build a strong focus on energy research, and shall explore the research topics including solar energy, wind energy, building efficiency, building energy sensor network, and energy storage technologies.

Biologically Inspired Technologies (II) — Although one of the primary goals of this MEAM research theme is in the development of advanced computational methodology, there is important synergy with experimental methods in bio-controls, mechatronics, multi-scale material properties, and complex fluids that will enable the maturation of this area into a new paradigm of engineering design. A strong computational component on novel genotype optimization methods will allow us to explore bio-inspired solutions beyond the traditional bio-mimetic approach. However, it is the concurrent and parallel experimental development of advanced materials (and the associated understanding of complex constitutive relations) that will enable the development of a full spectrum of engineering solutions for complex problems for engineered materials (as opposed to biological materials). An important component of the MEAM strategic plan is to build critical mass in this research theme. There is a very good opportunity for future collaboration between several graduate programs at UC Merced in this area, including Biological Engineering and Small Technologies (BEST), Electrical Engineering and Computer Science (EECS), Quantitative and Systems Biology (QSB), and Applied Mathematics (AM).

The two research themes above reflect a sensible compromise between depth, breadth, impact and quality of MEAM research. Equally relevant is our effort to combine the needs of the very popular undergraduate program in Mechanical Engineering with the development of a strong research program in MEAM.

Synergistic Growth with ME Undergraduate Program - The mechanical engineering (ME) undergraduate major was launched during Fall 2006 accepting only freshman students. The plan was to start accepting transfer students only in the Fall 2008. However, a large number of current upper division students at UC Merced have approached ME faculty or the engineering student counselors to explore the possibility of transferring to the ME major before they complete their degree. By now, ME has become one of the most popular engineering majors at UC Merced. In Fall 2009, we had 176 ME students, the largest group among all the majors in Engineering, with only five faculty. ME also has currently the largest student-to-faculty ratio in the SoE by a large margin.

To evolve into a top ME program, it is absolutely necessary to develop a strong and comprehensive foundation in key areas, with a sufficient number of faculty to build a modern program with state-of-the-art research infrastructure. In addition, because ME is a key component of any modern engineering academic program in serving key and foundational needs for many engineering sub-disciplines. Delaying the hiring of ME faculty will dramatically constrain the growth of our engineering program and could significantly impair the image and reputation of the ME program and the School of Engineering as a whole.

Currently, ME provides service to other majors by teaching a number of engineering fundamentals courses that include: ENGR 57 (Dynamics), ENGR 151 (Strength of Materials), ENGR 130 (Thermodynamics), ENGR 135 (Heat Transfer), and others. This situation increases dramatically the teaching load of ME faculty.

From the outset, there was a concerted effort to provide a seamless experience to SOE undergraduate students interested in pursuing post-graduate education in the MEAM program. The MEAM program offers research opportunities for students interested in projects at the interface between Complex Analysis, Mechanics, Manufacturing, Bio-Inspired Engineering, Applied Computational Sciences, Mechatronics, Advanced Materials, Energy Conversion, and Controls. Due to the interdisciplinary nature of the topics covered in MEAM courses, a number of these courses serve graduate students from many different disciplines. This also increases the teaching load of ME/MEAM faculty. For instance, in the

past the following courses were populated by graduate students from other programs: ME 135/ES 235 (Heat Transfer), MEAM 201 (Advanced Dynamics), ME 210 (Linear Controls), and MEAM 251/ES 237 Viscous Flows.

There are currently five FTE positions filled in mechanical engineering (listed here in order of hiring): Professor Diaz, Professor Coimbra, Professor Sun, Professor Modest and Professor Ma. The expertise of the current faculty covers a relatively unbalanced portion of the overall research area in Mechanical Engineering and Applied Mechanics since 4 out of the 5 faculty hired have main expertise in Thermofluids, and only one faculty (Prof. Sun) has expertise on Solid Mechanics.

Outcome Metrics

Resources Requirements - For the next five years, a total of ten desired positions have been identified and described below in descending level of priority for both the ME and the MEAM programs):

1) Computational Engineering (I and II)
2) Energy Storage Technologies (I)
3) Mechatronics (I and II)
4) Buildings Energy Efficiency (I)
5) Nonlinear Analysis (I and II)
6) Bio-Controls (II)
7) Bio-Inspired Mechanics (II)
8) Computational Fluid Dynamics (I and II)
9) Turbulence (I and II)
10) Complex Systems (I and II)

In addition, four instructors will be needed to cover the engineering fundamentals and capstone design.

For AY 2010-2013, the program is requesting ***three lecturers*** **(SoE-LPSoE-2, SoE-LPSoE-4, SoE-LPSoE-5)**. Two will concentrate on the engineering fundamentals (ENGR) courses that serve all programs in the SOE, and the other on ME electives that may serve BIOE, ES, ME, MSE and CSE students. The final lecturer will help faculty to develop and deliver the capstone and other design-related courses.

The top three priorities of regular faculty FTE positions for 2010-13 are as follows:

- **Computational Engineering with emphasis on Stochastic Optimization (SoE-5) -** This senior/junior position is an important and strategic area of research in ME. It will cover, but will not be limited to, development of numerical schemes to treat problems in structural, thermal-fluids and energy systems. It can relate to parallel computing and high performance algorithm development applied to engineering problems. The undergraduate program in Mechanical Engineering will benefit with courses such as FEA and CAE. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.
- **Energy Storage Technologies including Turbulence Modeling (SoE-2) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, design and analysis of energy storage devices, thermal fluids, turbulence, and high temperature mechanics of materials. The undergraduate program in Mechanical Engineering will benefit with courses such as strength of materials, and the capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Material Science, Computer Science and Engineering, and Applied Mathematics.

- **Mechatronics (SoE-8) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, dynamics, control systems, and sensor network and optimization with an emphasis on applications to building energy efficiency. The undergraduate ME program will benefit with courses such as dynamics, vibration and control, and capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.

Resource Needs for MEAM and ME Programs

There is a minimum number of specialized faculty members required to deliver a comprehensive program such as Mechanical Engineering in parallel to a successful graduate program in MEAM. Although we are falling short of the projected need for FTEs, an even more pressing problem is space allocation for both instructional and research use. The ME/MEAM faculty believe that the instructional laboratory allocation to ME-lead classes is insufficient for achieving success in the accreditation process with ABET.

Core Facilities - Both the MEAM research program and the ME instructional program need adequate lab space and machine shop support to exist. The current machine shop is not supported at a level that will allow Capstone Design and MEAM research programs. This limitation will severely impact the ability of the ME program to be ABET accredited in the coming years. All ME faculty members, in collaboration with the SOE staff, have been actively involved in extracting the most out of the limited instructional lab space available to deliver the ME classes. However, even considering the best use of the instructional labs (which include rotating schedules, sharing of the labs by several different disciplines, and modular educational benches that are put aside after use) it is very clear that the currently available space will not withstand ABET scrutiny. The same is true with the machine shop support.

The MEAM needs in terms of space include extra 5,000 sf laboratory space beyond what is available now for ME faculty at the SE building, of which about 2,000 sf need to be “damp” lab space. Given our emphasis on computational methods, this need is rather modest in comparison to other graduate programs, but it is critical for us in order to attract the few experimentalists needed for reaching critical mass in both energy systems and bio-inspired technologies.

Appendix 1: **Requested FTEs, Year 1 of 3-year Plan, AY 2010-2011**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Systems	Junior/Senior	CSE	ME	EECS	MEAM/ES	$200k-300k	400-800 sq ft dry	
1	Energy Storage Technologies	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Energy Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Contribute to MERI (high T materials, energy harvesting, catalysis) - existing materials characterization resources can be leveraged to bring down the cost of the start-up package
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	SoE-LPSOE-1	EECS Lecturer[1]	EECS					office	
1	SoE-LPSOE-2	Fundamentals Lecturer	ENGR					office	
1	SoE-LPSOE-3	EECS Lecturer	EECS					office	

[1]A candidate for SoE-LPSoE 1 is currently under consideration.

Appendix 1: **Requested FTEs, Year 2 of 3-year Plan, AY 2011-2012**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Science Theory	Junior/Senior	CSE	Applied Math	EECS	Applied Math	$150-250k	400 sq ft students office	
1	Air Pollution Modeling, Management, & Control	Junior/Senior	ME or ENVE	Management	ES	ME	$150-250K	400-800 sq ft	Possible use of GIS & computer cluster facility
1	Mechatronics	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Ecological Engineering	Junior/Senior	BioE	ENVE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	Possible use of GIS & computer cluster facility
1	SoE-LPSOE-4	Lab/Design Lecturer	ENGR					office	
1	SoE-LPSOE-5	Fundamentals Lecturer	ENGR					office	

Appendix 1: **Requested FTEs, Year 3 of 3-year Plan, AY 2012-2013**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Intelligent & Adaptive Control	Junior/Senior	CSE	ME	EECS	MEAM	$100-200k	400-800 sq ft dry	
1	Environmental Biotechnology	Junior/Senior	ENVE	BioE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	
1	Computational Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Computational - modeling of metastable materials processing/materials properties - ties to MERI and cognitive science (materials visualization for learning/research)
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Recombinant Sensor Development	Senior	BioE		BEST	EECS	$250-$350K	office	
1	Medical Imaging	Senior	Bio		BEST	EECS	$250-$350K	office	

Appendix 1: Requested Cross-unit FTEs, Year 1 of 3-year Plan, AY 2010-2011

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Information Management	Junior/Senior	CSE	Management	EECS		$100-200k	400 sq ft dry	fills need for databases knowledge in CSE while providing engineering expertise to management program
1	Natural Resource Management	Junior/Senior	Management, ENVE, ES	Management, ENVE, ES	ES	SCS	$200-300K	800-1,000 sq ft	Possible use of GIS & computer cluster facility
1	Sustainable Building/ Manufacturing Management	Junior/Senior	Management	MSE/ME/ ENVE/BioE	BEST	MEAM/ES	$150K	250-500 sq ft	Economic Modeling - Primarily Computational - Lifecycle and Cost Benefit Analysis of Green Manufacturing - Contribute to development of management program and possible engineering economics or management program..

Appendix 1: Requested Cross-unit FTEs, Year 2 of 3-year Plan, AY 2011-2012

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Virtual Environments	Junior/Senior	CSE	Cognitive Science	EECS	Cognitive Science & Information Systems	$200-300k	400-800 sq ft dry	could contribute to interdisciplinary program in computer game design
1	Technology Management	Junior/Senior	Management	MSE/ME BioE	BEST	MEAM BioE	$150K	250-500 sq ft	Management of Intellectual Property - Contribute to development of management program and possible engineering economics or management program.
1	Media Arts & Technology	Junior/Senior	EECS	CIS/World Cultures	EECS	World Cultures/ Art	$100K	250-500 sq ft	

Appendix 2: **Majors and Graduate Group**

Name	Established or Planned Start Date	Number of Majors (08-09)[1,2]	Student Credit Hours (08-09)[2]	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Environmental Engineering	Established	51	524	8.0 FTE Bales, Campbell, Chen (0.5),Conklin, Harmon, Guo, Rogge, Westerling(0.5), Wright		
Computer Science & Engineering	Established	152	1661	6.5 FTE Carpin, Carreira, Cerpa, Kallmann, Newsam, Noelle(0.5), Yang	1 LPSOE 1 EECS Senior/Junior	
Bioengineering	Established	104	951	3 FTE Chin, Escobar, McCloskey	1 Bioengineering	
Mechanical Engineering	Established	121	1257	5 FTE Coimbra, Diaz, Modest, Ma, Sun		
Material Science Engineering	Established	16	140	3.4 Davila, Leppert, Lu, Viney (40% Eng)		

[1]Undecided Engineering = 49
[2] Data Source: Institutional Planning & Analysis Office

Appendix 3: **Future Space Needs**

	Position	Primary Major	Office Location	Offices needed	Theoretical/ Experimental	Research Space Location	Research Space (sq ft)	
2010-11							**Dry**	**Wet**
SoE-1	Computer Systems	EECS	Campus	1	Theoretical	Campus	600	
SoE-2	Energy Storage Technology	ME	Campus	1	Theoretical/Experi	Campus	400	
SoE-3	Energy Materials	MSE	Campus	1	Theoretical/Experi	Campus	400	
SoE-4	Physiological Modeling	BioE	Campus	1	Theoretical	Campus	400	
SoE-5	Stochastic Modeling	ME	Campus	1	Theoretical	Campus	400	
SoE-LPSOE1	EECS Lecturer	EECS	Campus	1				
SoE-LPSOE2	Fundamentals Lecturer	ENGR	Campus	1				
SoE-LPSOE3	EECS Lecturer	EECS	Campus	1				
2011-12								
SoE-6	Computer Science Theory	EECS	Campus	1	Theoretical	Campus	400	
SoE-7	Air Pollution Modeling	ME/ENVE	Campus	1	Theoretical/Experi	Campus	600	
SoE-8	Mechatronics	ME	Campus	1	Theoretical	Campus	400	400
SoE-9	Ecological Engineering	BioE	Campus	1	Theoretical/Experi	Campus	400	
SoE-LPSOE4	Lab/Design Lecturer	ENGR	Campus	1				
SoE-LPSOE5	Fundamentals Lecturer	ENGR	Campus	1				
2012-13								
SoE-10	Intelligent & Adaptive Control	EECS	Campus	1	Theoretical	Campus	600	
SoE-11	Environmental Biotechnology	ENVE	Campus	1	Theoretical/Experi	Campus	300	700
SoE-12	Computational Materials	MSE	Campus	1	Theoretical	Campus	400	
SoE-13	Biosensor Development	BioE	Campus	1	Theoretical/Experi	Campus	-	-
SoE-14	Medical Imaging	BioE	Campus	1	Theoretical/Experi	Campus	-	-
Total Research Space needed							5,300	1,100
Total Office Space needed				19				
Space already allocated to ENGR				7			1,500	1,100
Space Need				12			3,800	0

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School of Natural Sciences
Office of the Dean

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April 2, 2010

TO: Keith Alley, Executive Vice Chancellor and Provost

FROM: Maria Pallavicini, Dean, School of Natural Sciences MP

RE: School of Natural Sciences, 2011-2013 Strategic Plan

Attached please find the Strategic Plan for the School of Natural Sciences. The plan was approved by a vote by the Natural Sciences faculty on April 1, 2010. The vote tally is as follows:

29 Approved
1 Disapproved
1 Abstained (dean)

Appendix 1: **Table of Requested FTEs Year 1 of 3-year plan**
AY 2010-2011

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Applied Mathematics	Assistant	Applied Math		Applied Math		$250K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Biostatistics	Open	Biological Sciences	Applied Math	QSB	Applied Math / Env. Systems	$350-450K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Ecology	Full	Earth Systems Science	Biological Sciences	ES	QSB	$550K	Office + 900-1,000 sq ft wet/dry lab	Castle – in bldg 1201 suite 1300
1	Experimental or theoretical physicst[2]	Assistant	Physics	Biological Sciences	Chem / Physics	QSB	$500-$600K	Office + 900 sq ft if experimental	Exp. SE1–353 Theor. SE1-377
1	Molecular Biology	Full/Open[3]	Biological Sciences		QSB		$500 – 600K	Office + 600-800 sq ft lab	SE1 – 353
1	Organic Chemistry	Assistant	Chemistry		Chemistry/Physics	QSB	$600 - $700 K	Office + 600 - 800 sq ft lab	SE1 - 353

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes Social Sciences and Management Building opens by fall, 2011.

[2] Experimental or theoretical physicist, depending on AY 09-10 hire, possible emphasis Biophysics. If 09-10 hire is theoretical, then 2010 hire would be experimental or vice versa

[3] Rank dependent upon current ('09-'10) searches

Appendix 1: **Table of Requested FTEs Year 2 of 3-year plan**
AY 2011 - 2012

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Applied Mathematics	Open	Applied Math		Applied Math		$250K	Office & research group space	Academic Surge Building,COB[1] or Castle
1	Cell Biology	Assistant	Biology		QSB		$500K	Office + 800-1000 sq ft wet lab	Castle bldg 1201 suite 1300
1	LPSOE	LPSOE	Biological Sciences		QSB		$ 20K	Office	Academic Surge Building, or COB[1]
1	LPSOE	LPSOE	Physics		Chemistry / Physics		$ 20K	Office	Academic Surge Building, or COB[1]
1	Materials Chemistry	Assistant	Chemistry		Chemistry / Physics	Best? QSB? EnvSyst	$500K – 700K	Office & 600 – 800 sq ft lab	Castle – in bldg 1200 or SE1-361[2]

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes that Social Sciences and Management Building opens by fall, 2011.
[2] Placement assumes current research lab occupants are willing / able to accommodate new hire in the lab.

Appendix 1**: Table of Requested FTEs Year 3 of 3-year plan**
AY 2012-2013

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Computational/Mathematical Systems Biology	Open	Biology		QSB	Applied Math	$300- $350K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Evolutionary Biology	Full	Biological Sciences		QSB		$300 – 500K	Office + 600 sq ft wet lab	Castle facility, bldg 1201 suite 1300 or SE1-301[2]
1	Physics Experimentalist	Assistant	Physics		Chemistry / Physics		$ 600K	Office & research group space	Castle 1200, suite 151
1	Theoretical Chemistry	Full	Chemistry		Chemistry / Physics	QSB, Applied Math, EECS	$350 – 400K	Office & 200 – 400 sq ft computer/ student offices	Academic Surge Building, COB[1] or Castle
1	Faculty encouraged to request inter-disciplinary hire through Provost / campus process								

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes that Social Sciences and Management Building opens by fall, 2011.

This table was approved by a vote of the School of Natural Sciences faculty on April 1, 2010.

Notes: This table should reflect school priorities, although it is possible that multiple positions will be assigned to the same priority level. Additional considerations such as opportunity hires, spousal hires, diversity issues, should be noted where relevant, with further description in the text of the plan.

SNS 2010 - 2013

Majors and Graduate Groups: Current and Proposed SNS Hires

Name	Established or Planned Start Date	Number of Majors (Fall 09)	Student Credit Hours (Fall 08)*	Student Credit hours by senate members (Fall 08)	Student Credit Hours (spring 09)*	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Applied Math	06-07	57	3,607	416	3,358	1,139	20	8.0	Applied Mathematics (Junior)	**2011**
								Harish Bhat		Applied Math (Assistant)
								Francois Blanchette		**2012**
								Boaz Ilan		Applied Math (Open)
								Arnold Kim		**2013**
								Yue Lei		
								Roummel Marcia		
								Michael Sprague		
								Mayya Tokman		
Biological Sciences	05-06	771	3,768	1,888	5,122	2,255	47 (QSB)	18.0	Physiology (open)	**2011**
								Andres Aguilar	*Interdisciplinary Public Health / Epi (FTE will be in SSHA)*	Biostatistics (Open)
								David Ardell		Molecular Bio (Full/Open)
								Keith Alley (0%)		**2012**
								Miriam Barlow		Cell Biology (Assistant)
								Michael Beman (50%)		LPSOE
								Jinah Choi		**2013**
								Mike Cleary		Computational / Mathematical Systems Biology (Open)
								Michael Colvin		Evolutionary Biology (Full)
								Michael Dawson		
								Benoit Dayrat		
								Caroline Frank		
								Henry Forman (50%)		
								Marcos Garcia-Ojeda		
								Steve Hart (50%)		
								Andy LiWang (50%)		
								Patti LiWang (50%)		
								Jennifer Manilay		
								Monica Medina		
								Rudy Ortiz		
								Nestor Oviedo		
								Maria Pallavicini (0%)		
								David Ojcius (50%)		
								Jason Raymond		

SNS 2010 - 2013

Majors and Graduate Groups: Current and Proposed SNS Hires

Name	Established or Planned Start Date	Number of Majors (Fall 09)	Student Credit Hours (Fall 08)*	Student Credit hours by senate members (Fall 08)	Student Credit Hours (spring 09)*	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Chemistry	06-07	104	2,496	850	2,004	1,168	13	7.5	Computational Chemistry (Junior)	**2011**
								Henry Forman (50%)		Organic Chem (Assistant)
								Anne Kelley		**2012**
								David Kelley		Materials Chemistry (Assistant)
								Andy LiWang (50%)		**2013**
								Patti LiWang (50%)		Theoretical Chemistry (Full)
								Eric Menke		
								Matt Meyer		
								Meng Lin Tsao		
								Tao Ye		
Earth Systems Science / IB	05-06	28	222	201	56	38	32 (ES)	5		**2011**
								Michael Beman (50%)		Ecology (Full)
								Asmeret Berhe		**2012**
								Teamrat Ghezzehei		
								Steve Hart (50%)		**2013**
								Lara Kueppers		*request inter-disciplinary hire*
								Peggy O'Day		
								Sam Traina (0%)		
Physics	06-07	37	1,753	801	1,615	839	17	8.0	Theoretical or Experimental Physics (senior)	**2011**
								Raymond Chiao (50%)		Experimental or theoretical physicist (Open)
								Sayantani Ghosh		**2012**
								Ajay Gopinathan		LPSOE
								Linda Hirst		**2013**
								Kevin Mitchell		Experimental or theoretical physicist (Open)
								Michael Scheibner		
								Jay Sharping		
								Lin Tian		
								Roland Winston (50%)		
SNS Und		46						46.5 total faculty		

* credit hours EXCLUDE include Math 5 and Chem 1

Appendix 3: **SNS Future Space Needs (Office & Research)**

Future SNS Faculty

	Faculty	Discipline	Office location	# Offices Needed	Theoretical / Experimental	Lab Space location		Research space (sq ft)	
2010-2011						Dry	Wet	Dry	Wet
7/2011	Applied Math	Applied Math	Campus	1	Theoretical	Campus		200	
7/2011	Biostatistics	Biology	Campus	1	Theoretical	Campus		200	
7/2011	Ecology	Earth Systems	Needed at Castle	1	Experimental		Castle Bldg 1201, Suite 1300		1000
7/2011	Molecular Biology	Biology	Campus	1	Experimental		SE1 353		800
7/2011	Organic Chemistry	Chemistry	Campus	1	Experimental		SE1 - 353		800
7/2011	Physics Exp.or theory	Physics	Campus	1	Theoretical / Exp		SE1 377 or 353[1]	500	800
2011-2012									
7/2012	Applied Math	Applied Math	Campus	1	Theoretical	Campus		200	
7/2012	Cell Biology	Biology	Needed at Castle	1	Experimental		Castle Bldg 1201, Suite 1300		1000
7/2012	LPSOE	Biology	Campus	1				0	
7/2012	LPSOE	Physics	Campus	1				0	
7/2012	Materials Chemistry	Chemistry	Needed at Castle	1	Experimental		Castle Bldg 1200, Suite 22 or SE1-361[2]		1000
2012-2013									
7/2013	Comp / Mathematical Systems Biology	Biology	Campus	1	Theoretical	Campus		200	
7/2013	Evolution Bio	Biology	May need at Castle	1	Experimental		SE1 301 or Castle 1201, Suite 1300[2]		1000
7/2013	Exper or Theor. Physics	Physics	Needed at Castle	1	Experimental		Castle Suite 1200 Suite 151		1000
7/2013	Theoretical Chemistry	Chemistry	Campus	1	Theoretical	Campus		200	
TOTAL offices needed				15					
TOTAL research space needed						5	8	1500	7400
Totals already allocated to school				0		0	3	500	2400
Unmet Need				15		5	5	1000	5000

(4-5 at Castle)

[1] Experimental or theoretical physicist, depending on AY 09-10 hire. If 09-10 hire is theoretical, then 2010 hire would be experimental or vice versa.

[2] Placement assumes current research lab occupants are willing/ able to accommodate new hire in the campus lab.

SNS 3-year FTE Plan
Position Descriptions AY 2011 - 2013

Applied Math - Year 01 (Assistant); Year 02 (Open)
Seeking mathematicians with expertise in modeling, applied analysis, scientific computing, or related areas. Some particular areas of interest include Computational Mathematics, Fluid Mechanics, Nonlinear Waves, Dynamical Systems and Inverse Problems. Special attention will be paid to applicants participating in interdisciplinary research, who could contribute to one or more of the campus research initiatives in Natural Sciences, Engineering and/or Social Sciences, including the Sierra Nevada Research Institute.

Biological Sciences - Year 02 (LPSOE)
A Lecturer with Potential Security of Employment (LPSOE) in Biological Sciences closely parallels that of an Assistant Professor on track for tenure, but with an emphasis on undergraduate education. The successful candidate will be an outstanding teacher, who wishes to have a permanent, full-time instructional position. This position will involve: Teaching Biological Science courses, with an emphasis on lower-division courses; Coordinating various aspects of the undergraduate instructional program including oversight of instructional staff; training teaching assistants; and participating in education-related committees, student recruitment and outreach, and efforts to secure extramural funding for education program development.

Biostatistics - Year 01 (Open)
Fills an urgent undergraduate and graduate teaching and research collaborative need, and Molecular Biology. It is envisioned that the Biostatistics job posting will emphasize statistical modeling and inference. Depending on the research profile, a successful biostatistician hire will contribute to research in QSB, ES, SNRI, HSRI, and/or AM.

Cell Biology - Year 02 (Assistant)
The field of Cell Biology covers both prokaryotic and eukaryotic cells from conventional (Drosophila, mouse) model and novel model organisms, and investigates cellular processes such as energy transformation, organelle synthesis, transport, division, membrane structure and function, differentiation, migration and cell death. Cell biology research that synergizes with or expands or leverages existing programs will help to build depth in targeted areas identified for excellence in the quantitative systems graduate program strategic plan. Faculty would be expected to participate in teaching in the existing Biological Sciences major and the quantitative systems graduate program.

Computational/Mathematical Systems Biology - Year 03 (Open)
Computational structural biology identifies a critical research area complementary to existing biological modeling competence here. OR **Mathematical Systems Biology** which envisions whole-cell simulation approach complementary or strengthening to that existing in QSB, along the lines of mesoscopic or spatially-explicit stochastic dynamics of parameterized biochemical systems, ideally of systems of experimental interest of other faculty.

Ecology - Year 01 (Full)
We seek an outstanding individual with research interests and expertise in any ecological field that complement those of the existing UC Merced faculty. We welcome applicants using experimental, field, computational, and/or theoretical approaches and working at population to global scales. This individual would strengthen and complement our growing interdisciplinary research cohort in the area of ecology and ecosystem science. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science (ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to teaching general education courses in ESS and BIO, the successful applicant may also contribute to the teaching of required, lower division courses in BIO (i.e., BIO 1 and 2). The successful candidate could also teach (or share teaching responsibilities with current faculty) the existing course BIO/ESS 148 (Fundamentals of Ecology), as well as the catalog-listed, but never offered courses BIO 145 (Introduction to Population and Community Ecology), ESS 128 (Theoretical Ecology), and ESS 180 (Field Methods in Earth Systems). Other upper division courses in different areas of ecology, global change, and biocomplexity in the environment could also be developed and delivered. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate group, but may also contribute to the Quantitative and Systems Biology graduate program depending on their interests. The successful candidate would contribute graduate courses in areas of ecology related to their research specialty.

Evolutionary Biology - Year 03 (Full)
We are searching for an outstanding individual with research expertise in a field of evolutionary biology that complements and coalesces the talents of the existing faculty at UC Merced. Considering the central role of evolution in the biological sciences, pure and applied, we seek an individual with broad vision who can engage evolutionary biology with related disciplines (particularly in environmental and organismal systems) thus building an innovative program. The recruit will bring distinction and help establish an internationally visible program identifiable from our highly respected sister campuses and in line with UC Merced's Strategic Vision. We particularly recognize the large contributions made in evolutionary biology through theoretical advances and their interplay with empiricism, the latter of which is already diverse and strong at UC Merced. In emphasizing theoretical contributions in the search, we prefer not to exclude completely experimentalists who are transformational leaders of the highest standing; our goal is to hire the best candidate to advance evolutionary biology and enhance its application in the sustainability of human and environmental systems. The successful candidate is anticipated to contribute to undergraduate teaching primarily in Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track (e.g. BIO141 Evolution), and may also teach in Applied Mathematics (MATH) or Earth Systems Science (ESS), teaching existing and/or developing new courses that meet the missions stated above. The successful applicant will also share teaching responsibilities for QSB 247 Advanced Ecology and Evolution with current faculty.

Experimental or Theoretical Physics - Year 01 & Year 03 (Rank depends on 2010 hire**)**
These two positions are for experimental and/or theoretical physicists, with the break down between experiment and theory dependent on the outcome of the current Physics search and the availability of space and startup funds. However, at least one of these two positions should be experimental to maintain an effective balance between theory and experiment in the Physics

program. These positions will target the three Physics emphasis areas of biological physics (including soft condensed matter), hard condensed matter, and AMO (atomic, molecular, and optical) physics. The specific area of each hire will be dependent on the outcome of this year's search, with the general strategy being to maintain a balance among these three areas.

Materials Chemist - Year 02 (Assistant)
This position was originally approved and searched last year at open rank (to start in Fall 2009). Several excellent candidates were identified, but one junior and two senior offers were made and declined and the search has not been reinstated. A materials chemist, broadly defined, is still the chemistry group's second priority. However, given the current limitations in both laboratory space and startup funds we consider it unlikely that a search at a tenured level will be successful, so we propose this position at the Assistant Professor level only. This hire could have research interests in inorganic and/or organic materials, with an emphasis on either synthesis or characterization. We would seek someone whose research interests are complementary to those of our current faculty to broaden and diversify our research programs in materials chemistry. Any materials chemist could teach general chemistry (CHEM 2 and 10, and the planned honors versions of these courses), materials chemistry lab (CHEM 147), and a variety of other core and elective undergraduate and graduate courses depending on research area. Most materials chemists will require some wet lab facilities and some instrumentation space, with the exact mix being determined by the specifics of the research. The laboratory can probably be located on campus as long as certain space-intensive or fume hood-intensive research specialties are excluded.

Molecular Biology - Year 01(Full/Open - Rank depends on current search)
Will give specific preference to those working on RNA-dependent mechanisms, epigenetic mechanisms, or both. The candidate may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced. It is envisioned that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced.

Organic Chemist - Year 01 (Assistant)
This position was originally approved and searched last year (intended to start in Fall 2009) but the search was cancelled at mid-year because of budgetary constraints and has not been reinstated. An organic chemist is still the chemistry group's top priority. We currently have only two organic chemists and we need at least two more to support the organic emphasis of the chemistry graduate program. We are requesting only one search focused in this area during the next three years; however, because of the paucity of appropriate laboratory space (organic chemists tend to require large numbers of fume hoods, for example). Organic is typically the most popular subfield of chemistry among domestic graduate applicants and strengthening our program in this area would make a major contribution toward building our graduate program in general. We also have a severe need for teaching assistants for our organic chemistry courses that are taken by large numbers of students outside the major, positions that generally cannot be filled by graduate students from other programs. The proposed hire could have research interests in either bioorganic chemistry or organic materials. Any organic chemist could teach the large undergraduate core organic courses (CHEM 8, currently being taught by biochemists, and

CHEM 100) and one or more of the core graduate organic courses (CHEM 200, 201, and 202), as well as upper-division electives and more specialized graduate courses. An organic chemist will require a wet lab, space that was presumably available when this position was originally searched last year. Additional fume hoods may have to be added to existing lab space. If the person needs to use NMR on a regular basis, as most organic chemists do, either the laboratory space would have to be located at Castle or a suitable NMR would have to be installed on campus.

Physics - Year 02 (LPSOE)
A Lecturer with Potential Security of Employment (LPSOE) in Physics closely parallels that of an Assistant Professor on track for tenure, but with an emphasis on undergraduate education. The successful candidate will be an outstanding teacher, who wishes to have a permanent, full-time instructional position. This position will involve teaching Physics courses, with an emphasis on lower-division courses; coordinating various aspects of the undergraduate instructional program including oversight of instructional staff; training teaching assistants and participating in education-related committees, student recruitment and outreach, and efforts to secure extramural funding for education program development.

Theoretical Chemist - Year 03 (Full)
Most chemistry programs have several theoretical chemists, and building strength in this area makes sense for UC Merced at this time given our severely limited laboratory facilities. We are currently attempting to hire our first theoretical chemist at the Assistant Professor rank. We would like to add a second person, ideally at a tenured rank, who could provide mentorship to the junior faculty member in this field and help attract graduate students with interests in theory and computation. Most theoretical chemists consider themselves physical chemists, but some who work on organic reactions consider themselves organic chemists. A theoretical chemist has the potential to establish strong collaborations with other UC Merced chemistry faculty, faculty in other areas (biology, physics, materials science), and faculty at other institutions. This person could teach undergraduate core courses in general chemistry (CHEM 2 and 10, and the planned honors versions), physical chemistry (CHEM 112 and 113), and possibly organic (CHEM 8 and 100), one or more of the graduate core courses (likely CHEM 212 and/or 213), and various undergraduate and graduate electives. A theoretical chemist requires minimal space—an office, a small amount of space for computational facilities, and some office space for students and post-doctoral fellows.

Applied Mathematical Sciences

Faculty providing input to the this portion of the School Strategic Plan include Harish Bhat, François Blanchette, Boaz Ilan, Arnold Kim, Roummel Marcia, Michael Sprague, Mayya Tokman, and Lei Yue.

Overview - Mathematics is a subject of great depth and beauty. Mathematics is also crucial for developing new theories in natural sciences, engineering and social sciences. The application of mathematics to other disciplines is a particularly rich area for research and education.

Applied mathematical science involves the use of analytical and computational mathematics to solve real-world problems. Its core is comprised of modeling, analysis and scientific computing. Using these tools, applied mathematical scientists study a broad spectrum of problems across a number of disciplines. In fact, applied mathematicians are connected more closely through their shared approach and attitude toward interdisciplinary research rather than a shared interest in any particular set of problems. An explicit goal of applied mathematical sciences is to contribute significantly to other disciplines and foster interdisciplinary and multidisciplinary research and education. The absence of disciplinary barriers at UC Merced is an ideal environment for multidisciplinary research and education. Hence, UC Merced has an excellent opportunity to develop top-notch academic programs in applied mathematical science. Because applied mathematical scientists contribute to other disciplines through their research, the development of applied mathematical sciences contributes to the growth of other programs.

Research - Applied mathematicians are inherently interdisciplinary. They must be well trained in fundamentals of mathematics to model, analyze and compute solutions to real-world problems. Applied mathematics research is usually assessed through two criteria: (1) sophistication of the mathematics used and (2) novelty and importance of the application. A strong group of applied mathematicians can be a great asset to any number of scientific and engineering programs within the university where they can provide the theoretical/quantitative support or foundation.

We do not seek to build a program comprised of a specific set of sub-fields. Instead, we seek to build a stellar program comprised of world-renowned researchers, who contribute to the applied mathematical sciences program and a number of other programs at UC Merced. Hence, the over-arching theme encompassing the research of the Faculty is mathematics applied to real-world phenomena. This brings applied mathematicians together with the intent to contribute to other programs of study on campus. There are many opportunities at UC Merced for interdisciplinary research under this research theme. There are several large funding sources for applied

mathematics research and education. Federal sources provide funding for both education and research programs. The current faculty members (8 + 1 in progress) are well are on their way toward developing a strong research and teaching program including undergraduates, graduate students and postdoctoral researchers.

Although the current faculty members have deep expertise in the applied mathematical sciences and breadth across several disciplines, new faculty hires are needed to deepen the base of expertise and broaden the range of application areas. For example, we are seeking new hires in stochastic modeling, mathematical biology, mathematical economics and atmospheric science, among others, to forge new links with economics and management, environmental systems, the Sierra Nevada Research Institute, the Merced Energy Research Institute (MERI), and the developing Systems Biology Institute.

Teaching – Mathematics courses are absolutely critical to nearly all of the majors at UC Merced. All applied mathematics faculty contribute to delivering undergraduate and graduate curricula. New faculty hires are needed to deliver and support the curricula as the demand due to our growing student population increases (see academic programs section). At present, 54 students have declared Applied Mathematical Sciences as their major. In addition, Applied Mathematics courses accounted for a total of approximately 5,900 hours taught in Fall 2009 alone. This large number is due to the fact that all the undergraduate students in the School of Natural Sciences and the vast majority the students in the School of Engineering are required to enroll in math courses, especially during their freshman and sophomore years. This situation is not limited to lower division courses. Upper division and graduate courses serve a number of other programs such as physics and engineering. This large number of enrollments requires a sufficient number of faculty members to maintain a low student-to-faculty ratio in these classes. Due to the fiscal crisis, in AY '09-'10 major teaching concessions were enacted, including the enlargement of class sizes by 50% and increasing the number of sections that Teaching Assistants are assigned from 2 to 3 sections at a 49% appointment. If these concessions are to stay they will have negative consequences on our ability to efficiently deliver the curriculum as well as our ability to recruit graduate students and faculty. Furthermore, the effective teaching of mathematics courses is best achieved by individuals, who have both rigorous training in the subject and use the methods being taught in their research. Being an active user is an invaluable asset in conveying the "why one should care" when discussing seemingly abstract mathematical concepts. Therefore, the delivery of the mathematics curricula requires dedicated faculty support.

Cross-disciplinary and Cross-School Linkages - The applied mathematics faculty is dedicated to interdisciplinary applied mathematical science, which seeks to build linkages across disciplines and schools. The Faculty is already involved with other programs on campus. Graduate Studies in Applied Mathematics is highly interdisciplinary; the Core faculty is comprised of 8 Natural Sciences faculty, and its

Affiliate faculty is comprised of four members from School of Engineering, two from Social Sciences Humanities and Arts faculty, and two from Natural Sciences. We seek to strengthen current linkages and to form new ties with other programs. In particular, we are interested in forming new linkages with colleagues in electrical engineering, mechanical engineering, computer science and engineering, life sciences, environmental systems, economics and management.

Historically, applied mathematicians have worked closely with researchers in physical sciences and engineering. Physical sciences and engineering have long adopted mathematical analysis and methods in their topics. At UC Merced we anticipate strong ties with physical sciences and engineering. Moreover, we anticipate more collaboration with researchers and students in the MERI as it continues to develop.

In addition to physical sciences and engineering, we anticipate that applied mathematical sciences will have an important role in the life-sciences program at UC Merced. Both the undergraduate major in Biological Sciences and the graduate program in Quantitative Systems Biology involve more quantitative reasoning and mathematical modeling than traditional biology programs. The applied mathematics faculty is working in collaboration with biology faculty to ensure the success of these objectives. In addition, we anticipate collaboration and look forward to involvement in the evolving Systems Biology Institute.

The area of collaboration between applied mathematics and environmental systems is rich with opportunities. In fact, several collaborations between applied math faculty and environmental systems have already begun. There are several top-notch applied mathematicians working in areas such as atmospheric science, geophysical fluid dynamics, porous media, geophysical remote sensing, and bio-statistics of ecological and environmental health. Hence, we will continue to foster collaborations and seek opportunities with future hires, which could participate actively in the Environmental Systems program and the Sierra Nevada Research Institute (SNRI). Particularly, we are supportive of a hire of an applied mathematician in the area of Atmospheric Science, who could interface between Applied Mathematical Sciences and SNRI.

There also exists potential to form collaborations with social science programs at UC Merced, most notably econometrics, management and public policy. These collaborations represent relatively new areas for applied mathematic science research. Nonetheless, the "open door" organizational structure at UC Merced facilitates exploring connections among colleagues that may become substantial collaborations in the future.

Resources – Faculty, lecturers/visiting assistant professors, space/facilities and computational administrative support are needed for academic success.

Faculty: At a bare minimum, 20 FTEs will be needed for the applied mathematical sciences program including the undergraduate and graduate academic programs. We propose a growth rate of hiring two applied mathematics faculty per year until that number is reached. Below is a table that shows this proposed growth beyond our current faculty and assuming that our searches are successful.

Table E1: Applied Math FTEs

	2009-2010	2010-2011	2011-2012	2012-2013
FTEs	**9***	**10****	**12**	**13**

* Included is Prof. Kevin Mitchell, who is a Core Member of Graduate Studies in Applied Mathematics

** Included is a current search for a Junior Faculty FTE.

Our top priority for AY '10-'11 is to hire world-class faculty, who can actively contribute to the development of Applied Mathematical Sciences. We are seeking mathematicians with expertise in modeling, applied analysis, scientific computing, or related areas. Some particular areas of interest include Computational Mathematics, Fluid Mechanics, Nonlinear Waves, Dynamical Systems and Inverse Problems. Special attention will be paid to applicants participating in interdisciplinary research, who could contribute to one or more of the campus research initiatives in Natural Sciences, Engineering and/or Social Sciences, including the Sierra Nevada Research Institute.

Lecturers and Visiting Assistant Professors: Currently, and in future years, the number of mathematics courses, in particular, the number of undergraduate service courses offered to students not majoring in applied mathematics, exceeds the teaching capacity of our FTEs. To fill this gap, we currently rely on 8 full-time Lecturers to teach lower-division courses. Lecturers are highly qualified teachers who take on a heavy teaching load and thus help ensure that our students are provided with the best possible education. We project that at least two or more additional Lecturers will be needed within the next three years to allow us to offer all of the required service courses.

In keeping with the research mission of the university, we propose the establishment of a Visiting Assistant Professor (VAP) position. The hired individual would help us provide high quality education, while contributing to our research program. The VAP position will also provide the means for other applied mathematics programs to recognize UC Merced as a place to nurture young applied mathematicians. Moreover, it provides UC Merced a means to attach its name onto young researchers going out to the academic job market.

Space and Facilities: Applied mathematicians do theoretical and computational research. Hence, new applied mathematics hires typically only need office space for their group. However, it should be noted that for applied mathematicians office space also doubles as "lab space": the office is where applied mathematicians spend nearly 100% of their research time. It is also where office hours are conducted. Therefore, it is essential for Applied Mathematical Sciences to have offices that are conducive for doing research, computing, and office hours. This includes office space for summer undergraduates, graduate students and postdoctoral fellows. Currently, our 19 graduate students (5 Masters and 14 Ph.D.) are occupying offices in the Academic Offices Building (the trailer). Over the next three years, we plan to have 20-30 graduate students. We expect all graduate students to serve as Teaching Assistants during the first and/or second semesters of their studies. Both Teaching Assistants and Graduate Research Students in Applied Mathematics will need access to a secure office or common space that is conducive for doing their research and holding office hours. The ability to offer adequate space is extremely important when recruiting both graduate students and faculty.

Because high-performance computing is a rich area for applied mathematical sciences research, planning is required for space, hardware-acquisition, and administration. Our faculty together with Professor Lara Kueppers has purchased a 66-node/264-processor parallel-computer cluster. This cluster will become an integral part of our graduate course MATH 233 "Scientific Computing." Sufficient space has been allocated for the cluster in the Science & Engineering building.

Undergraduate and graduate studies in applied mathematics also require open access to a computer lab for course work and research. Currently, our students have open access to the instructional computer lab in the Science and Engineering building. In the future, an open access workstation-based computer lab for graduate studies would best accommodate the computing needs of our graduate students, other students enrolled in our computational courses, and potentially other courses as well.

Computational Administrative Support: While faculty start-up funds have been used for building a modern parallel-computation cluster, long-term financial support for its administration is required. To this end, the School of Natural Sciences has hired two full-time system administrators, Philip Moose and Joseph Norris, to set up the databases and infrastructure for all academic programs. Faculty research grants and start-up funds are being used to help pay for approximately 10% of the system administrators' time. Having Information Technology people within the School of Natural Sciences dedicated to the support of the School's computing needs, including the administration of the computer cluster, has ensured an optimal use of our resources and will continue to benefit both our educational and research missions.

Strategic Plan for Biological/Biomedical Sciences at UC Merced

This portion of the School of Natural Sciences Strategic Plan covers the life sciences related to Biochemistry, Molecular and Cell Biology, and Biomedicine and was modified from last year's based on discussions at the planning group meeting on January 14, 2010. This year's plan strategically addresses the following critical goals for biology at UC Merced: adapting to space and start-up limitations affecting hiring for the foreseeable future, correcting a disproportionately large student/faculty ratio within the Biological Sciences major, filling teaching needs in both the Biology major and QSB graduate program, building the necessary expertise in the new Biological Sciences Research Institute and strengthening the short- and long-term research profiles of Biology/Biomedical Sciences at UC Merced.

Size and Growth of Biological/Biomedical Science at UC Merced

Biological Sciences is currently the largest major at UC Merced with approximately 770 undergraduate students and the Quantitative and Systems Biology graduate emphasis is the largest graduate group with 45 students (42 of whom are pursuing Ph.D. degrees). Projected undergraduate enrollment will be at least 1000 students in Fall 2010 and 1200 in Fall 2011. At that point the biology major will reach the capacity of its teaching lab facilities for the foreseeable future, which are already running at more than 100% of CPEC capacity. With currently about 17 faculty teaching in the Biomedical/Biological Sciences, we currently have about 45 undergraduates per faculty head which is much larger than biology programs on other campuses and all other science and engineering majors at UC Merced, and this ratio will exceed 50 students per faculty by fall 2011. This ratio is leading to disproportionate teaching loads for life sciences faculty and is crowding out needed graduate courses for life sciences graduate students. One partial solution to this problem, already underway by the Life Sciences Curriculum Committee, is to make Biology a more selective major with higher standards for admission to the major, progress-to-degree controls on student performance, and continued or increased emphasis on quantitative biology. However, even with such higher standards in place, additional faculty lines will be required to ensure equitable teaching loads to life sciences faculty and a good educational experience to life sciences graduate and undergraduate students. UC Merced distinguishes itself state-wide and nationally with its strong emphasis on quantitative skills in its Biology major and further development of this aspect will help address the swamping of our major while improving the competitiveness of our students after graduation.

Quantitative and Interdisciplinary Biology

Biology is on the brink of a fundamental transformation from a primarily "descriptive" study of individual components of biological systems, to a model- and high-throughput data-driven science yielding quantitative and predictive understanding. This so-called "systems" approach to biology is already dramatically changing how biological research is done, leading to new connections with the physical, mathematical, and computational sciences. This new biology offers the promise of a much more complete understanding of living systems and ultimately new treatments for complex diseases such as asthma, diabetes, and cancer.

This new biology is built on several themes: First, the acquisition of comprehensive, quantitative data sets on living systems, such as whole genome sequences, protein expression rates, on and off rates of protein modifications during signal transduction, and complete maps of metabolic and regulatory pathways. Second, the development of mathematical models for integrating and evaluating such data, with the goal of building models that can predict novel or unexpected properties of biological systems. Third, the recognition of the central role of evolution in studying and understanding organisms, pathways, genes, and disease. Finally, this "new biology" requires very close partnerships with the physical and mathematical sciences. This need for a highly multidisciplinary approach constitutes an important barrier to progress in quantitative systems biology; many universities have highly compartmentalized research programs and few undergraduate or graduate programs provide truly multidisciplinary training.

This provides UC Merced with an excellent opportunity to develop biological and biomedical sciences research and academic programs at the forefront of this field. The small size and lack of disciplinary barriers at UC Merced have already been fostering a number of multidisciplinary research programs (see below). Furthermore, this new biology will be greatly enabled by many of the other initial academic programs and research efforts at UC Merced, such as the Applied Mathematics, Earth Systems Science and Bioengineering programs, the Health Sciences Research Institute, the Sierra Nevada Research Institute, and the Center for Computational Biology.

Biological/Biomedical Sciences Research Programs

The biological and biomedical sciences at UC Merced encompass several research themes described below. Linking these themes is the strategy of using methods that integrate large data sets, such as genomic or proteomic data, or produce quantitative data at the single cell or even single molecule level. Another linking theme is the goal of quantitative characterization of biological processes with ultimate aim of predictive models.

Research Themes

Predictive Understanding of Cellular Interactions and Cell Fate Decisions

An ultimate goal of cell biology is to achieve a complete understanding of the biochemical pathways underlying cellular decisions, including developmental choices and response to outside stimuli. Research in cell biology at UC Merced spans a wide range of specific research topics, from the development of immune system cells, to the evolution of bacterial antibiotic resistance to symbiosis in marine systems. New research questions are being made accessible by technologies that allow comprehensive genomic, proteomic, and metabolomic characterization, in some cases down to the single cell level. A combination of experimental investigation using these new tools and computational modeling of the interacting pathways will provide data to determine the mechanisms of cellular responses to exogenous factors such as infection, oxidative stress, growth factors, as well as internal factors such as epigenetic state or cell age. This knowledge will allow the development of new therapies to treat diseases, including the potential of chemoprotective agents against inflammation and aging.

The understanding of cell signaling and cell fate decisions also has important biomedical applications because the ontogeny and maintenance of multicellular life depends on exquisitely complex developmental process in which undifferentiated stem cells give rise to specialized cell types. Understanding this process promises to provide new treatments for many complex disease states related to developmental failures. Moreover, because of their ability to generate new specialized cells, stem cells hold the potential to treat a vast array of health problems, including spinal cord injuries, Parkinson's disease, diabetes, and many others. Elucidating the complex mechanisms by which extrinsic and intrinsic signals determine the proliferation or differentiation of stem cells is inherently a systems-level challenge, and will require new technologies for collecting data on cell populations and individual cells, and new methods to build models of cell decision processes.

Complex Diseases

Complex diseases are defined as diseases that are influenced by the actions of multiple genes, their interactions with each other and with the environment. Examples include metabolic disease, cardiovascular disease, Alzheimer's disease, Crohn's disease, persistent infection, cancer, diabetes and asthma. These diseases can only be fully understood in multidisciplinary approaches that include: identifying communities with increased risk due to their genetic backgrounds, determining the environmental factors that increase disease risk and understanding the cellular and molecular mechanisms underlying the increased susceptibility that can offer possible treatments.

The Central Valley has a high rate of such diseases and provides a microcosm of the health challenges of the entire state and nation. A strong research program on complex disease would foster collaborations with healthcare providers in the Central Valley. Conversely, the local community would provide unique cohorts for studying strategies for treating or reducing the incidence of these diseases. This program would have strong synergies with emerging UC Merced programs in environmental science, psychology, sociology, and economics and would have many links to future health professional programs.

Quantitative, Computational and Systems Biology and Biomedicine

Across the nation, UC Merced has attracted attention with its early establishment of a Quantitative Systems Biology graduate group. It is widely recognized that the incredibly rapid and wide-spread development of high-throughput experimental technologies for sequencing, expression, genotyping, proteomics, phenotyping and more have instigated a new era that demands quantitative approaches to biology. The development of quantitative biology requires a quantitative mindset from all practitioners, from the experimentalist interested in testing and refining models through the adoption of high-dimensional techniques with ever-increasing experimental precision and accuracy, engagement with emerging public standards for data curation, and engagement with the theoreticians and computational biologists who complement the experimentalist with data analysis, simulation and data integration.

Computational biology is the scientific investigation of biological hypotheses by computer, through analysis, simulation, modeling, machine learning, and creative data integration. Its

orientation is the discovery and advancement of biological knowledge. Computational medicine is an allied field specifically applied to developments in health sciences. Although very powerful when allied with experimentalists and unpublished data, computational biology and medicine can be prosecuted independently of any experimental collaboration over the entire life cycle of scientific or medical research: from funding to discovery to high-impact publication. Although computational biology and medicine are cheaper and less resource-intensive than experimental biology and medical research, they share the most expensive cost with other modalities of research — that of human resources — while having unique needs more like those of mathematicians and theoreticians, of group and individual office space that encourage creative social discussions at some times and intense independent work at others.

Although different definitions of "systems biology" have been proposed, in modern parlance this field largely concerns whole cells and/or organisms or large systems within cells or organisms, at molecular resolution. More specifically Systems Biology measures, analyzes and integrates large, typically high throughput, biochemical, genetic and molecular biological data to model, simulate, and predict the state and dynamics of whole cells and organisms, or large parts thereof. The phenomena studied in systems biology are typically emergent characteristics of assemblies of many interacting parts. These emergent characteristics are properties of the assembly as a whole: like robustness, physiological adaptation, regeneration, and phenotypic plasticity. Systems Biology and Biomedicine encompass many modalities of science. The precepts and analysis of theoretical systems biology, the predictive simulation and modeling results of computational systems biology, high-dimensional non-parametric statistics, and the technical sophistication of whole cell measurements of gene expression, proteomics, metabolomics and molecular interactions of experimental systems biology, collaboratively combine to move whole cell- or organismal systems biology beyond descriptive science towards hypothesis-driven science. Systems biology has meaningful and productive interfaces with other subdisciplines of biology such as evolutionary biology, ecology, population biology, development, genetics and others.

FTE Requests and Justification

The attached table shows new FTE lines requested for Biology and Biomedicine over the next three years. Although some names of these proposed searches have been changed, this table of proposed FTE lines is very similar to those Biology/Biomedicine requested last year as explained below. What is different is a slight shift in prioritization towards computational and theoretical biology and biomedicine, which strategically addresses our space and start-up constraints, addresses teaching needs in the Biology major and in the QSB graduate group, and increases the quantitative and computational profile of Biology and Biomedicine at UC Merced, which in turn can help improve faculty-to-student ratios and reinforce the unique strength and reputation we are building on this campus in this area.

For AY 2010-2011, we have prioritized two areas that complement our existing research profile: Biostatistics, which fills an urgent undergraduate and graduate teaching and research collaborative need, and Molecular Biology. It is envisioned that the Biostatistics job posting will emphasize statistical modeling and inference. Depending on the research profile, a successful biostatistician hire will contribute to research in QSB, ES, SNRI, HSRI, and/or AM.

The Molecular Biology search will give specific preference to those working on RNA-dependent mechanisms, epigenetic mechanisms, or both. The candidate may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced. It is envisioned that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced.

RNA molecular biology and epigenetics are two areas that have profoundly impacted basic and applied biological and biomedical research in the last decade and will continue to do so for the next two decades at least. It is very important to UC Merced's research profile to expand and strengthen in these areas.

We have put a theoretical epidemiological modeling position as lower priority for this year, conditional on the outcome of the existing search in SSHA for the BSRI director. Our emphasis is epidemiological modeling of the spread of infectious disease and host-pathogen interactions over multiple scales of time and space. If the nature and outcome of the search in SSHA does not fulfill this very important strategic area, which would make very important contributions to QSB, BSRI and the Biology major, then we would make it a priority 1 in the subsequent year over genetic epidemiology.

In subsequent years, we identify Molecular Genetics (of gene regulation) as the highest priority experimental area to strengthen at UC Merced. Like the previous Molecular Biology position, this search should emphasize that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced. Also like the RNA molecular biologist search, the advertisement for this position will stress that candidates may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced (implicitly with the intention that one position could work on an infectious disease non-model organism and the other could work on a model organism). The Molecular Genetic search will give specific preference to those working on fundamental mechanisms of gene regulation, for example, in host-parasite interactions.

As a lower priority experimentalist we propose an applied systems biologist who uses proteomic techniques to address basic or applied questions in model organisms. All experimentalist FTE lines are strategically pitched to be able to use existing experimental resources at Castle like the Mass Spectrometric instrumentation and the Genomics Core Facility.

The theoretical FTE lines we have prioritized highest here include genetic epidemiology which refers to linkage and pedigree analysis, or the use of greatly expanding Human SNP data and statistical and computational models to discover and measure risk factors for complex genetic diseases. Further, we have renamed the "computational biochemist" proposed FTE lines to one in "computational structural biology" which identifies a critical research area complementary to existing biological modeling competence here. As a lower priority we list Mathematical Systems Biology which envisions whole-cell simulation approach complementary or strengthening to that existing in QSB, along the lines of mesoscopic or spatially-explicit stochastic dynamics of parameterized biochemical systems, ideally of systems of experimental interest of other faculty

here at UC Merced. All proposed theoreticians/computational biologists can make use of the core computing facilities already in place at the School of Natural Sciences, which includes two different cluster/grid computing systems and core support facilities for security and back-up, with plenty of room and capacity for expansion.

SCHOOL OF NATURAL SCIENCES—CHEMISTRY
Three-year hiring plan, 2011-2013

2011 (positions to be searched in 2010-2011)

Top priority: Organic chemist, assistant professor. This position was originally approved and searched last year (intended to start in Fall 2009) but the search was cancelled at mid-year because of budgetary constraints and has not been reinstated. An organic chemist is still the chemistry group's top priority. We currently have only two organic chemists and we need at least two more to support the organic emphasis of the chemistry graduate program. We are requesting only one search focused in this area during the next three years, however, because of the paucity of appropriate laboratory space (organic chemists tend to require large numbers of fume hoods, for example). Organic is typically the most popular subfield of chemistry among domestic graduate applicants and strengthening our program in this area would make a major contribution toward building our graduate program in general. We also have a severe need for teaching assistants for our organic chemistry courses that are taken by large numbers of students outside the major, positions that generally cannot be filled by graduate students from other programs. The proposed hire could have research interests in either bioorganic chemistry or organic materials. Any organic chemist could teach the large undergraduate core organic courses (CHEM 8, currently being taught by biochemists, and CHEM 100) and one or more of the core graduate organic courses (CHEM 200, 201, and 202), as well as upper-division electives and more specialized graduate courses. An organic chemist will require a wet lab, space that was presumably available when this position was originally searched last year. Additional fume hoods may have to be added to existing lab space. If the person needs to use NMR on a regular basis, as most organic chemists do, either the laboratory space would have to be located at Castle or a suitable NMR would have to be installed on campus.

Second priority: Materials chemist, assistant professor. This position was originally approved and searched last year at open rank (to start in Fall 2009). Several excellent candidates were identified, but one junior and two senior offers were made and declined and the search has not been reinstated. A materials chemist, broadly defined, is still the chemistry group's second priority. However, given the current limitations in both laboratory space and startup funds we consider it unlikely that a search at a tenured level will be successful, so we propose this position at the Assistant Professor level only. This hire could have research interests in inorganic and/or organic materials, with an emphasis on either synthesis or characterization. We would seek someone whose research interests are complementary to those of our current faculty to broaden and diversify our research programs in materials chemistry. Any materials chemist could teach general chemistry (CHEM 2 and 10, and the planned honors versions of these courses), materials chemistry lab (CHEM 147), and a variety of other core and elective undergraduate and graduate courses depending on research area. Most materials chemists will require some wet lab facilities and some instrumentation space, with the exact mix being determined by the specifics of the research. The laboratory can probably be located on campus as long as certain space-intensive or fume hood-intensive research specialties are excluded.

2012 (to be searched 2011-2012)

Theoretical chemist, open rank. Most chemistry programs have several theoretical chemists, and building strength in this area makes sense for UC Merced at this time given our severely limited laboratory facilities. We are currently attempting to hire our first theoretical chemist at the Assistant Professor rank. We would like to add a second person, ideally at a tenured rank, who could provide mentorship to the junior faculty member in this field and help attract graduate students with interests in theory and computation. Most theoretical chemists consider themselves physical chemists, but some who work on organic reactions consider themselves organic chemists. A theoretical chemist has the potential to establish strong collaborations with other UC Merced chemistry faculty, faculty in other areas (biology, physics, materials science), and faculty at other institutions. This person could teach undergraduate core courses in general chemistry (CHEM 2 and 10, and the planned honors versions), physical chemistry (CHEM 112 and 113), and possibly organic (CHEM 8 and 100), one or more of the graduate core courses (likely CHEM 212 and/or 213), and various undergraduate and graduate electives. A theoretical chemist requires minimal space—an office, a small amount of space for computational facilities, and some office space for students and postdoctorals.

2013 (to be searched 2012-2013)

Analytical chemist, open rank. This person could have research interests on either the biological side (*e.g*. ultrasensitive single molecule/assembly/cell measurements, biosensors, novel techniques for proteomics and genomics, high throughput screening techniques) or the materials side (*e.g*. electrochemistry, including photovoltaic, battery, and fuel cell research, or surface analysis). An analytical chemistry hire would provide a new, distinct research direction within the chemistry group that would complement current faculty who have some analytical flavor to their work (Tao Ye, Anne Kelley, and Erik Menke) and generally strengthen our research programs. As analytical chemists are in demand in many industrial sectors, analytical chemistry is a very popular area among both undergraduates and graduate students. The vast majority of people who get a B.S. in chemistry but don't go to graduate school end up doing analytical chemistry in industry, and it is a disservice to our undergraduates that we don't have a specialist in this area of chemistry. This hire would help us attract students while maintaining our overall focus on biological and materials applications. This person could teach a number of the core courses in the chemistry curriculum: our upper-division analytical course (CHEM 115), the physical/analytical lab (CHEM 114L), general chemistry (CHEM 2 and CHEM 10), and perhaps physical chemistry (CHEM 112 and 113), as well as upper-division electives and graduate courses beyond the bare minimum we currently have. Any analytical chemist will need laboratory facilities and the specific needs will vary widely with the person's research field, but analytical chemists tend to be somewhat less space- and resource-intensive than other experimental chemists. An analytical chemist has the potential to collaborate broadly with faculty in other disciplines including physics, biology, and engineering.

PROGRAMMATIC RESEARCH AREAS AND TEACHING

CHEMISTRY

Natural Science faculty providing input to this portion of the School's Strategic plan included Anne Kelley, David Kelley, Matt Meyer, Meng-Lin Tsao, Tao Ye, and Erik Menke.

Overview - Chemistry is often known as "the central science" because of the key position it occupies in modern science and engineering. Most phenomena in the biological and earth sciences can be described in terms of the chemical and physical behavior of atoms and molecules, and chemical principles also underlie much progress in medicine and engineering. In addition, chemical systems are fascinating and often beautiful in their own right. George Whitesides, in his 2007 Priestley Medal address, states that "Chemistry is now the natural home of many of the most engaging problems in fundamental science and of the problems in applied science about which society cares the most." Herein we give a few examples of how chemistry has had a profound impact on other fields of science and technology. Just a few years after the inception of UC Irvine, Sherwood Rowland and Mario Molina (Nobel Prize, 1995) used physical chemistry approaches to unravel the chemical mechanisms of ozone depletion. This discovery, which helped to pull us back from the brink of an environmental catastrophe, played no small part in catapulting Irvine to research powerhouse status. Chemistry plays an essential role in the development of nanoscience and technology due to chemists' expertise in understanding and controlling matter at the atomic and molecular scale. It is no coincidence that almost all the exciting nanomaterials, from quantum dots to carbon nanotubes to semiconductor nanowires, have been pioneered by chemists. The intimate connections between life sciences and chemistry result from the prowess of chemists at manipulating and measuring molecules, the building blocks of life. Recent examples include Bertozzi's chemical manipulation of oligosaccharides in biological systems, which opens up new avenues to understanding and regulating complex cell surfaces. Analytical chemists such as John Fenn (Nobel Prize, 2002), were responsible for developing mass spectrometric analyses of biological macromolecules, a cornerstone in proteomics. The advancement of single molecule spectroscopy by Sunney Xie, a molecular spectroscopist by training, has stirred much excitement in biophysics as it affords access to unprecedented details of life processes at the single molecule level.

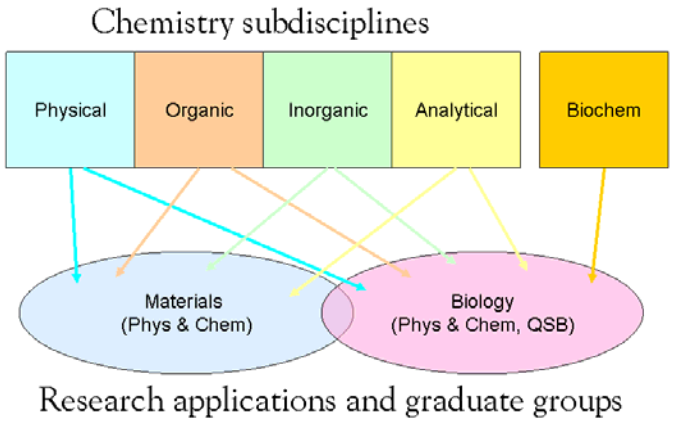
Because of the indispensible role of chemistry as a core discipline in science, one would be hard-pressed to think of any highly respected comprehensive research university that does not have a strong chemistry program that grants both bachelor's and Ph.D. degrees. Chemists may be classified according to their subdiscipline and/or by the nature of the problems on which they work. The four traditional subdisciplines of chemistry are organic, inorganic, physical, and analytical:

- Organic chemistry is the chemistry of carbon-based compounds. Organic chemists are concerned with synthesizing useful chemical compounds, developing new reactions to better achieve challenging syntheses, and determining the physical principles that are

responsible for chemical behavior. Organic chemists are actively engaged in the synthesis of new materials for energy harvesting and storage, the manipulation and understanding of biological processes, and the development of efficient and ecologically benign catalysts and reactions.

- Inorganic chemistry is the chemistry of chemical compounds that are not primarily carbon-based. Inorganic chemists determine the structures of inorganic molecules, study their reactions, and develop procedures for their synthesis. The fundamental principles are applied to problems in environmental chemistry, bioinorganic chemistry, and solid-state materials chemistry.
- Physical chemistry applies the fundamental laws of physics to understand the properties of chemical compounds and the basis of chemical reactivity. Physical chemists study the energetics of molecular and macroscopic processes, the dynamics of chemical reactions, quantum chemistry, and interactions of molecules with light (spectroscopy, photochemistry, and photophysics) using techniques that are experimental, theoretical, and/or computational.
- Analytical chemistry concerns the chemical analysis of substances. Analytical chemists develop instrumentation and methodologies to determine what chemical compounds are present in a sample and/or how much is present. Modern analytical chemistry is particularly concerned with very small systems, down to the single-molecule level, as well as applications to biology (proteomics, genomics) and environmental monitoring.

At UC Merced, we have the unique opportunity to build a modern chemistry program that combines disciplinary rigor and interdisciplinary reach. Ph.D.-level research in chemistry requires systematic training, and all four subdisciplines should be represented to some extent. Reflecting the expansive nature of chemical research and the interdisciplinary emphasis at UC Merced, the faculty have decided to focus our efforts on recruiting chemists working on problems in two broadly defined areas, biology and materials. The representation of traditional disciplines should not be viewed as an impediment to interdisciplinary research as we intend to recruit chemists who can bring novel chemical solutions and perspectives to materials and biology, just as the aforementioned prominent chemists have done. The figure below summarizes this scheme.



Biochemistry is a discipline closely allied with both chemistry and biology but distinct from both. Some universities have a combined department of chemistry and biochemistry while in others biochemistry is a separate department or is associated with another department. Currently biochemistry is associated with the biological sciences rather than the chemical sciences, but this arrangement may be revisited.

One faculty search is currently underway in theoretical/computational chemistry at the Assistant Professor level.

Materials Chemistry research

Materials Chemistry encompasses solid-state and polymer chemistry, both inorganic and organic, especially as directed to the development of materials with novel and/or useful optical, electrical, magnetic, catalytic, and mechanical properties. Materials chemists may be focused predominantly on synthesis (organic or inorganic chemistry) or characterization (analytical or physical chemistry). These areas offer the possibility of many different types of collaborations, both within UC Merced between Natural Sciences and Engineering and at other nearby institutions including Hewlett-Packard, LLNL, and possibly NASA/Ames in the near future. This type of research is very well funded and we expect it will continue to be well funded in the foreseeable future. In particular, materials chemistry will be key to advances in new energy sources. Potential research areas for future Materials Chemistry hires include:

- *organic electronics*: design, synthesis, and physical properties of materials for organic light-emitting diodes (OLEDs), thin film transistors, and liquid crystal displays
- *solar photovoltaics*: design, synthesis, and physical properties of materials for organic, inorganic, or hybrid solid-state devices and/or electrochemical cells
- *photonic materials*: design, fabrication, and properties of materials for frequency conversion of lasers, optical limiting materials, contrast agents in nonlinear optical imaging technologies, electro-optic modulation, and photonic bandgap crystals
- *batteries:* new materials to enable lightweight, high capacity, multiply rechargeable battery technology
- *heterogeneous catalysts*: solid-state materials that catalyze a variety of desired chemical reactions
- *structural materials:* design, synthesis, and characterization of new materials having desirable properties (light weight, high strength, environmentally benign, biocompatible, *etc*.)
- *"smart" materials*: synthesis, characterization, and engineering of materials that can respond adaptively and autonomously to changes in their condition or the environment
- *plasmonics*: materials for, and study of, phenomena based on the coupling of light to the plasma oscillations of conduction electrons in small metallic nanostructures, and their coupling to other materials

Biological Chemistry research

Much of the recent dramatic progress in the life sciences has been driven by quantitative approaches and a molecular-level understanding of complex biological systems. Experimental, computational and theoretical methods and techniques from chemistry have played a significant role in these advances. In addition, the flow of knowledge and inspiration runs both ways: challenges posed by specific biological problems are driving the development of new analytical tools, prompting advances in the physical and chemical sciences. Biological chemistry has undergone explosive growth in recent years as experimental and computational tools from the physical sciences have become widely applied to biological problems. Biological chemistry is explicitly interdisciplinary between the physical and life sciences, and there should be extensive opportunities for collaboration across these groups. In addition, at least some biological chemistry faculty are expected to have research interests that overlap engineering, particularly Bioengineering. The development of a strong presence in biological chemistry would position our school for center grants and other translational research initiatives. Biologically related chemistry is a large area of chemistry research that is well funded, largely by NIH but also through other agencies. Potential areas for future Biological Chemistry hires include:

- *Nucleic acid replication, damage and repair*
- *Novel modes for drug delivery*
- *Development of ultrasensitive bioanalytical techniques, particularly for single molecule/single assembly measurements and/or high throughput screening*
- *Single molecule studies of molecular motors, DNA/RNA dynamics, transcription factor binding/functioning, viral genome packaging, ion channel transport etc.*
- *Organized chemical systems that imitate the functioning of biological cells*
- *DNA and/or other biological macromolecules as scaffolds for fabrication of organized structures*
- *Protein folding*
- *Molecular recognition*
- *Novel uses of combinatorial techniques at the interface of chemistry and biology: aptamers, phage display, novel approaches to screening and combinatorial synthesis*
- *Atomistic modeling of biological systems (channels, membranes, receptors)*
- *Membranes and associated phenomena including fusion, exo/endocytosis, pore formation and functioning, lipid rafts*

Teaching – The Chemistry faculty have broad teaching responsibilities, including graduate students in the Physics and Chemistry Graduate Program and undergraduates majoring in chemical sciences. In addition, the chemistry faculty teaches preparatory lower division courses in chemistry for science and engineering majors, constituting a large service load for the campus.

Undergraduate - Chemical Sciences Major: In AY 2006, UC Merced began accepting majors into the B.S. degree program in the Chemical Sciences. Our first four graduates earned their degrees in Spring 2009. Chemical Sciences is now the second most popular major in Natural Sciences, with 103 students in the major. Our program is designed to meet the requirements for approval by the American Chemical Society, although such approval cannot be granted until we have graduated majors for four years and the campus itself has been accredited by WASC. Students who complete an approved curriculum may obtain a certified degree, a valuable credential which serves as national-level recognition. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. The UC Merced chemistry B.S. graduate will be well prepared to pursue a career in chemistry or an allied field.

Students pursuing a B.S. degree in Chemical Sciences have the opportunity to explore interdisciplinary areas within a degree program that is still focused on chemistry. Our B.S. degree in Chemical Sciences offers four emphasis tracks: Biological Chemistry, Environmental Chemistry, Materials Chemistry, and "pure" Chemistry. All four tracks share the same lower-division courses and some of the core upper-division courses. While some of the required and elective courses for the Biological, Environmental, and Materials tracks are offered by faculty in other disciplines in the Natural Sciences and Engineering, there are four lower-division and eight upper-division courses that must be taught by the chemistry group (not counting two cross-listed biochemistry courses which are taught by the biochemistry faculty). The lower-division courses, as well as second-semester organic chemistry (CHEM 100) and its lab, are each offered every semester in order to meet the needs of not only the chemistry majors but also the other Natural Sciences and Engineering students for whom these courses are required. The upper-division courses each need to be offered once each year. Therefore, a total of 16 undergraduate chemistry courses must be taught each year, requiring eight faculty FTE. While instructors can cover a few of the lower-division courses, the chemistry faculty feel strongly that non tenure-track faculty should only teach in Chem 1 and Chem 2, leaving a bare minimum of seven tenure-track faculty FTE to cover undergraduate teaching needs alone. In addition, all of our emphasis tracks require at least two units of research, and undergraduate research supervision is highly intensive of faculty time.

Graduate Programs: At present, Ph.D. programs in chemistry are administered under the umbrella "Interim Individual Graduate Program" that was put in place at UCM's inception. A combined Physics and Chemistry emphasis area currently involves 19 faculty (six chemistry, one biochemistry, seven physics, three engineering, and two with split appointments in physics and engineering). Separate courses of study are offered in Physics, Physical Chemistry, and Organic Chemistry; our 31 current graduate students include nine in physical chemistry, four in organic chemistry, and 18 in physics. Physics programs normally require more extensive graduate course work than chemistry programs, and we are currently taking advantage of this by having our physical chemistry students take some

of the physics graduate courses, particularly statistical mechanics. However, this combined graduate group is certainly not an ideal situation from the standpoint of either graduate student recruiting or graduate education, and we expect that when we apply for stand-alone graduate program status it will be as separate physics and chemistry Ph.D. programs. Even if we limit our course offerings to a bare minimum of two to four advanced courses in each of physical, organic, and analytical chemistry (recognizing that some students may take courses in more than one subdiscipline), eight to ten graduate chemistry courses would have to be offered each year, requiring four to five faculty FTE. This, combined with the undergraduate teaching requirements outlined above, leads to the conclusion that a faculty size of eleven to twelve is the absolute minimum required to offer undergraduate and graduate programs in chemistry. This conclusion is in keeping with data from the American Chemical Society showing that the smallest Ph.D.-granting chemistry departments in the U.S. have more than ten full-time faculty. Thus, much of this strategic plan is based on the facts that Merced's current IIGP is an interim program that will soon expire, and we need to be able to propose a graduate program in Chemistry at that time. This will involve broader coverage of the discipline and require at least five or six more faculty than we currently have.

Resources - Development of a stellar academic and research program in chemistry requires faculty, laboratory space for faculty, and shared core facilities.

Faculty: The chemistry group needs to grow to a minimum of eleven to twelve faculty in order to offer both the undergraduate major and a viable graduate program. The current faculty plus the one position being searched this year give us a total of seven; the four new positions requested over the next three years would bring us to eleven. At the undergraduate level, we would like to introduce some more specialized upper-division elective courses (several of which are currently approved but have never been offered because of lack of faculty), honors versions of general and organic chemistry, separate instrumental analysis and physical chemistry labs, and perhaps a physical chemistry course geared toward students with biological interests. At the graduate level, we also need to offer a broader range of courses and be able to offer all core graduate courses on an annual basis.

Summary of Proposed Chemistry Hires for the Next Three Years

Faculty	Research areas	Subdiscipline
Current	Kelley, A: materials	Physical/analytical
	Kelley, D: materials	Physical
	Ye, T: materials/bio	Physical/analytical
	Meyer, M: bio	Organic
	Tsao, ML: bio	Organic
	Menke, E; materials	Physical/analytical
2010-2011 (search underway)	Bio or materials	Theoretical (physical or organic)
2011-2012	Bio or materials	Organic
	Materials	Any subdiscipline
2012-2013	Bio or materials	Theoretical (physical or organic)
2013-2014	Bio or materials	Analytical

Whenever possible, all positions should be searched at open rank. We have no tenured faculty in any of the sub-disciplines except physical, and senior leadership in these areas is much needed. However, recruiting top-notch tenured faculty will be very challenging in view of the limited space and startup funds available. For that reason two of the four hires (those in areas that are likely to be most laboratory space intensive) are requested only at the Assistant Professor level.

Facilities and space: Laboratory research space poses a huge challenge. Competitive offers will require allocation of significant amounts of laboratory space. This is particularly true for senior-level candidates. There is a small amount of laboratory space left in SE 1 which we hope can be allocated to the organic and materials chemistry hires that were originally approved for searches last year, before the budget collapsed. Office space for students and postdocs for a theoretical chemistry hire could be accommodated in temporary buildings if necessary. The analytical chemistry hire may be able to be located in SE2 if that building is available on time; otherwise, additional space at Castle will likely be required.

Core Facilities: Many new chemistry hires will require the services of core facilities. Any organic chemist will require NMR, which we already have, but currently only at Castle. Many materials chemists will make use of our existing excellent electron microscopy facilities and the recently acquired powder x-ray diffractometer. Major core facilities that potential hires are likely to need, and that we do not currently have or do not have in working order, include clean room facilities, high quality mass spectrometry, single crystal and thin-film x-ray diffraction, and circular dichroism. Other instruments that are currently

in the laboratories of individual faculty members, but would be widely used and should be reproduced as core facilities develop, include a high quality UV-VIS-NIR and a fluorimeter.

ACADEMIC PROGRAMS

Undergraduate programs

Chemical Sciences - The Chemical Sciences major is designed to meet the requirements for approval by the American Chemical Society, although we cannot apply for approval until we have graduated majors for four years. Students who complete an approved curriculum may obtain a certified degree, a valuable credential which serves as national-level recognition for successfully completing a rigorous academic chemistry curriculum in an ACS-approved department. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. The UC Merced chemistry B.S. graduate will be well prepared to pursue a career in chemistry or an allied field. A basic chemistry program and three emphasis tracks in biological chemistry, environmental chemistry, and materials chemistry allow students to pursue interdisciplinary areas within a degree program that is still focused on chemistry.

A degree in the chemical sciences opens the door to a wide variety of careers in industry or government service, forensic chemistry in crime laboratories, commercial fields such as patent law and scientific writing, and high school science teaching. Many chemistry majors go on to graduate study to prepare for careers in teaching and/or research at the college or university level, or research positions in the chemical, pharmaceutical, electronics or other high-tech industries. A major in chemistry is also an excellent foundation for medical school or other careers in the health sciences.

Graduate Programs

Chemistry and Physics - At present, Ph.D. programs in physics and chemistry are administered under the umbrella "Interim Individual Graduate Program" that was put in place at UCM's inception. Graduate education within the group is currently divided into three tracks--Physics, Physical Chemistry, and Organic Chemistry--which have different preliminary exams and course work. Thus, students are educated and must demonstrate proficiency in a particular discipline, but have the opportunity to pursue research that spans disciplines if they so desire. This emphasis area currently involves 19 faculty and 31 graduate students, of whom seven have successfully advanced to candidacy for the Ph.D.

While interdisciplinary collaboration between physics and chemistry is in many cases natural and desirable, the primary mission of a graduate emphasis area or graduate group (unlike a research institute) is the education of graduate students. The disciplines of physics and chemistry have considerably different cultures and coursework needs in this regard, and we feel that our students would be best served by having separate programs in physics and chemistry. In addition, we have observed that most prospective students are looking for programs in physics or chemistry, not a joint program. Our ability to recruit excellent graduate

students would be enhanced by having two separate but closely interacting programs. Accordingly, we have been moving toward separating many of the functions of the group. When we finally have adequate faculty strength to do so, we will seek systemwide recognition as two separate stand-alone graduate groups, one in physics and one in chemistry. It is anticipated that at that time the chemistry graduate group will offer emphasis tracks in at least three of the four major subdisciplines of chemistry: physical, organic, and analytical.

SCHOOL OF NATURAL SCIENCES — Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences
Strategic Plan 2010-2013

4. Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences (ES/EEB/EHS)

Overview - Environmental Sciences and Integrative and Evolutionary Biology were established as initial areas of research and education excellence at UC Merced. Earth Systems Science (ESS) was designated as one of the first undergraduate majors in Natural Sciences (SNS), Environmental Engineering (ENVE) as a first major in the School of Engineering (SE), and the Environmental Systems (ES) graduate group as a joint SNS and SE graduate program awarding M.S. and Ph.D. degrees. In 2006, the Integrative Biology (IB) track (now Ecology and Evolutionary Biology) within the Biological Sciences (BIO) was approved for study of ecology and comparative and evolutionary biology. A revision of the ESS undergraduate major is underway, with the goal of strengthening the interdisciplinary nature of the major through cross-school faculty support to reflect the broad and diverse nature of environmental sciences. The Sierra Nevada Research Institute (SNRI) is a cross-school institute through which faculty, researchers, and students conduct basic and applied research on environmental issues, using the San Joaquin Valley and the Sierra Nevada as their outdoor laboratory. Existing research collaborations and coordinated teaching efforts between SNS and SE in this area, as well as recent successes in faculty recruitment in the School of Social Sciences, Humanities and Arts (SSHA) in the areas of environmental policy and economics emphasize our cross-school, interdisciplinary nature. Environmental Health Sciences, focusing on research at the intersection of environment and health, is an emerging area at UC Merced. Given the breadth of research and education encompassed in this area, a major challenge for program development is to identify and build strategic areas in which UC Merced can excel while providing sufficient program breath and depth to support undergraduate majors and graduate education. The following plan was developed based on previous years' plans and consideration of strategic plans from graduate groups, SNRI, and faculty from other schools with interests in environmental research.

Strategic Hires

The following two position descriptions are our planning group's top two priorities (in order) for the 2010-2013 period (see Table 1 for the complete list of desired hires over the next three years). These two positions arose from this plan after several discussions among planning group leads in the SNS made it clear that 2 of the 15 positions to be allocated to the SNS over the next three years would likely be within the ES/EEB/EHS planning area.

1) Ecology (open)

We seek an outstanding individual with research interests and expertise in any ecological field that complement those of the existing UC Merced faculty. We welcome applicants using experimental, field, computational, and/or theoretical approaches and working at population to global scales. This individual would strengthen and complement our growing interdisciplinary research cohort in the area of ecology and ecosystem science. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science

(ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to teaching general education courses in ESS and BIO, the successful applicant may also contribute to the teaching of required, lower division courses in BIO (i.e., BIO 1 and 2). The successful candidate could also teach (or share teaching responsibilities with current faculty) the existing course BIO/ESS 148 (Fundamentals of Ecology), as well as the catalog-listed, but never offered courses BIO 145 (Introduction to Population and Community Ecology), ESS 128 (Theoretical Ecology), and ESS 180 (Field Methods in Earth Systems). Other upper division courses in different areas of ecology, global change, and biocomplexity in the environment could also be developed and delivered. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate group, but may also contribute to the Quantitative and Systems Biology graduate program depending on their interests. The successful candidate would contribute graduate courses in areas of ecology related to their research specialty.

2) Ecosystem/Environmental Modeling (open)

We seek an outstanding individual with research interests and expertise in modeling of ecological or environmental systems. This strategic hire is intended to add research expertise in modeling that will serve as an integrator of current multi- and inter-disciplinary interests across environmental and ecological research areas. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science (ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to lower division courses in ESS, the successful candidate would be expected to develop new, upper division courses with a strong quantitative focus in topical areas such as “Quantitative Analysis of Global Environmental Problems,” or “Computer Simulation of Ecological and Environmental Systems,” or potentially courses related to quantitative spatial/temporal analysis and remote sensing. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate program, but may also contribute to the Quantitative and Systems Biology graduate group depending on their interests. The successful candidate may teach the existing (but never offered) Ecological Modeling (ES 228) course, as well as develop new graduate courses in their research specialty.

Research - A central philosophy of the environmental program area is an integrated approach to the study of physical, chemical, and biological processes in natural and engineered environments. Research and education components focus on the quantitative understanding of the Earth as coupled systems of atmosphere, hydrosphere, lithosphere, and biosphere, and of biological systems as shaped by evolution and the environment. These themes intersect with human and ecosystem health. Such integrated studies require a balance of disciplinary expertise and interdisciplinary connections. This requirement translates to a need for a large and diverse faculty assemblage - one that can support the multifaceted components of priority research themes and whose members will contribute to multiple majors and programs. Current SNS research areas include *Global Change Science*, *Climate and Watershed Resources*, *Biocomplexity and Evolution*, *Atmospheric Pollution and Health*, and the *Ecology of Infectious Disease*. Continued expansion of complementary faculty in SSHA and the future School of Management is viewed as an integral component of program development to address the human dimension of environmental systems, along with continued synergy with SE. The research themes are described in more detail below:

a. Environmental Sciences

***Climate and Watershed Resources* -** Water is a critical resource on our planet and an essential component of planetary function where it serves as a solvent, a transporter, and a reactant, as well as a basic requirement for life. From an anthropogenic perspective, water is a critical resource, for drinking water, agricultural and industrial use, energy production, and recreation, thus making it an important commodity. There is growing awareness that the combination of impending climate changes and increased human demand for water will soon collide, particularly in California and the western U.S. where high quality water is already a limited resource in many areas. UC Merced is well poised to have a signature impact on integrated science, engineering, and management issues related to water as a critical resource including relationships between climate change and the regional hydrologic and carbon cycles, fundamental understanding of molecular, chemical, and biochemical processes the impact water quality, and integration of basic research into water resource management, sustainable agricultural activities, and economic development in the Central Valley. This thematic area already has a strong component in SE and formed the initial core of the ES graduate group programs. We envision that a faculty group in SSHA with interests in economics, policy, law and social science related to the environment would strengthen cross-discipline research and education. Faculty in the School of Management would also play an important role in the development of interdisciplinary links in areas of environmental management, particularly related to water and biological resources. We support a proposed cross-school position in environmental management (Table 1 and 3). Growth in this thematic area requires additional faculty strength in SNS in Earth surface processes / ecohydrology, and in other areas noted in Table 3.

***Global Change Science* -** Ecosystems encompass living organisms and the abiotic environment they inhabit. The science of global change employs a genome- to ecosystem-level perspective to understand interactions among organisms and the environment with an emphasis on discovering the effects of climate change, land use, pollution, biodiversity loss and other environmental pressures on ecosystems. Research in this area examines both past environmental changes and their impact on evolution as well as modeling future global change scenarios. Global change science examines how these alterations influence the interactions among organisms, ecosystem processes, and other Earth System components such as oceans, the atmosphere, and soils. Both significant needs for new knowledge in stressed regional and global ecosystems and new research initiatives in this region make this a compelling opportunity for UC Merced. For example, the California Ecological Observing Network (CALEON) planning group has proposed the San Joaquin Valley and Southern Sierra as a focus for new research infrastructure. Extramural funding in global change research initiatives and environmental biology from NSF, EPA, DOE, NASA, USDA, and other agencies are currently on the order of $3 billion. We have begun to develop expertise in the area of global change science, with faculty in evolutionary and conservation genetics, ecosystem and fire ecology, and macroecology. In AY 2007-2008, we successfully recruited two new faculty in the ecology area, Stephen Hart (senior, started July 1, 2008) and J. Michael Beman (junior, started January 1, 2009), which has significantly strengthened research expertise in microbial ecology, ecosystem ecology, and biogeochemistry. Two additional faculty will joined NS in January 1, 2009: Asmeret Berhe (junior), working in

soil biogeochemistry and carbon cycling related to climates, and Teamrat Ghezzehei (junior), in the area of soil physics, hydrology, and multiphase flow (Table 2). These new faculty strengthen considerably our strategic efforts to establish internationally recognized research related to global change science, particularly at the interface between biological systems and physical sciences. In AY 2008-2009, we attempted to search for a senior faculty to fill the remaining position in Ecology carried over from AY 2007-2008. We advertised broadly in the area of ecology with the hope to fill strategic programmatic gaps. We had an excellent applicant pool, but the position was held at abeyance in the fall 2008 and the search ended. In our current plan this position remains the top priority of the group (see Table 1 and 3), but we would like to have an open search to increase our chances of a successful recruitment. Senior faculty applicants will still be preferred. The addition of new faculty in the area of ecology will strengthen expertise in environmental life sciences. In order to continue to develop a nationally and internationally competitive program grounded in both life and physical sciences, we need to continue to build complementary expertise in the area of Earth surface processes / ecohydrology (prioritized in the ES strategic plan as ecological engineering or ecohydrology; Table 3). Future positions in environmental management, conservation biology/evolutionary biology, theoretical biology, and others listed in Tables 1 and 3 would further strengthen the global change science research area.

Table 2: Current Environmental Science and Ecology and Evolutionary Biology Faculty FTEs across Graduate Groups and Schools

Current Faculty	School			Research Themes: SNS Faculty		
	SNS	SE	SSHA	Global Change	Bio-complexity Evolution	Climate, Water-sheds
ES	7	9	1	AA, AB, JB, LK, MD, SH, TG	AA, CF, MD, BD, JR MM	AB, JB, LK, PO, SH, ST, TG
QSB	17	5		AA, JB, MD, SH	AA, CF, DA, MB, MD, BD, MM, JR	JB, SH

* SNS Faculty: AA: Andres Aguilar; Asmeret Berhe: AB; BD: Benoît Dayrat; Carolin Frank: CF; David Ardell: DA; LK: Lara Kueppers; MB: Miriam Barlow; MD: Michael Dawson; MM: Monica Medina†; PO: Peggy O'Day†; JR: Jason Raymond; J. Michael Beman: JB; SH: Steve Hart†, ST: Sam Traina† (0% FTE); Teamrat Ghezzehei: TG. †denotes tenured faculty. Faculty contributing from SE and SSHA not listed.

b. Ecology and Evolutionary Biology

***Biocomplexity and Evolution* -** Biocomplexity research explores the emergence of self-organized, complex behaviors or structures from the interaction of many simple agents in the environment. Such emergent complexity is a hallmark of life, from the organization of molecules into cellular machinery, through the organization of cells into tissues, to the organization of individuals into communities. The study of biocomplexity in the environment requires novel approaches to understanding pattern and process across multiple temporal and spatial scales, and draws upon interdisciplinary efforts at the interface of biology, physics, chemistry, and mathematics. Biocomplexity in the Environment research is a Priority Area at the National Science Foundation, with over $35,000,000 currently allocated in grant funds for 2007. Additional potential funding sources in biocomplexity research include the National Institute of

Health, the Department of Energy, NASA, the James S. McDonnell Foundation, and the Moore Foundation. Biocomplexity research at UC Merced addresses a diverse range of questions relevant to integrative biology such as: What are the forces that shape the magnitude and diversity of life across multiple temporal and spatial scales? How do systems with living components respond and adapt to stress? Are adaptation and change predictable? How do organisms within and between populations interact and evolve? A core group of faculty in this research theme is developing at UC Merced (see Table 2) that is represented strongly in the QSB graduate group, and priorities in this area overlap with the other research themes in BIO, ES, and QSB. Further expertise in evolutionary biology, paleoecology, and theoretical biology will be required to adequately develop strength in this theme and to fulfill undergraduate and graduate teaching (Table 3). In addition, the requested positions in ecology and ecological modeling would also help solidify research in this area.

Table 3: Proposed SNS and Cross-Unit Faculty in Environmental Sciences and Ecology and Evolutionary Biology. See Table 1 for prioritized list over the next 3 years.

Faculty	Research Themes			
	Climate, Water-sheds	**Global Change**	**Bio-complexity Evolution**	**Fills coursework gaps***
AY 2011-2012				
Ecology†	x	x	x	BIO, ESS, ES, QSB
Atmospheric dynamics	x	x		BIO, ESS, ES
Environmental management++	x	x		ESS, MGMT, ES
AY 2012-2013				
Ecological or ecosystem modeling	x	x	x	BIO, ESS, ENVE, MGMT, ES, QSB
Environmental / Ecological biostatistics	x	x	x	BIO, ESS, ENVE, ES, QSB
Earth surface processes/ Ecohydrology	x	x		BIO, ESS, ENVE, ES, QSB
AY 2013-2014 and beyond				
Environmental health or epidemiology	x	x	x	BIO, ESS, ES, QSB
Conservation biology/evolutionary biology	x	x	x	BIO, ESS, MGMT, ES, QSB
Global change ecology / Paleoecology	x	x	x	BIO, ESS, ES, QSB
Theoretical biologist		x	x	BIO, ESS, ES, QSB
Physical/chemical oceanographer; ocean sediments	x	x		ESS, ES

† Carried over from unsuccessful search in AY07-08, AY08-09 (due to search cancellation).
¶May be cross-unit position with Engineering; may also contribute to Environmental Health Sciences.
++Cross-unit position in Management in this area is supported by EES faculty.
*BIO: Biological sciences; ESS: Earth systems science; ENVE: Environmental engineering; ES: Environmental systems; MGMT: Management; QSB: Quantitative systems biology.

c. Environmental Health Sciences

Earth is an ecosystem that houses more than one million different species whose complex interactions with each other and the environment shape the life and fate of its individual constituents and their progeny. These interactions are frequently manifested in symbiotic,

parasitic and, pathogenic relationships between species. Humans frequently degrade the environment, and this in turn affects their health and safety. The cost burden for health care associated with environmental toxins and infectious agents, the emergence of drug resistant pathogens, the economic impacts of pathogens on agriculture, the threat of bioterrorism, and the increasing need to ensure clean and safe air and water are some of the compelling examples of how fundamental research in *Environmental Health Sciences* directly connects to social, economic, and political impacts both locally and globally. UC Merced is uniquely positioned to develop a strong and interdisciplinary research program in *Environmental Health Sciences*, initially focused in two highly complementary areas: *Atmospheric Pollution and Health*, and the *Ecology of Infectious Disease*. UCM Faculty who are interested in this research focus or already engaged in this research, are listed in Table 4. Potential partners outside of UCM include biologists, geochemists, and biodefense researchers at LLNL, LBNL, and Los Alamos National Laboratory and UC-wide programs in toxicology.

Table 4: Current faculty FTEs who would contribute to the development of research in Environmental Health Sciences.

Current Faculty	School			Research Themes	
	SNS	SE	SSHA	Atmospheric Aerosols & Health	Ecology of Infectious Disease
ES	4	3	1	TW, YC, LK, VL, PO, WR	YC, AA, MD
QSB	7			HF, RO	AA, MB, MD, JC, DO

Faculty: AA: Andres Aguilar; MB: Miriam Barlow; YC: Yihsu Chen; JC: Jinah Choi; MD: Michael Dawson; HF: Henry Forman†; QG: Qinghua Guo; LK: Lara Kueppers; VL: Valerie Leppert†; PO: Peggy O'Day†; DO: David Ojcius†; RO: Rudy Ortiz; WR: Wolfgang Rogge†; TW: Tony Westerling. †denotes tenured faculty.

The Environmental Health Sciences program is unique in that it steps beyond a traditional biomedical and public health focus to examine fundamental, mechanistic questions from multiple angles, fully integrating genomic, biological, geochemical, physical, computational, and ecological tools into studies of toxins and pathogens that involve humans as well as other organisms. This initiative encompasses both research and education that intersects all three schools in a compelling interdisciplinary area and is expected to support new and existing undergraduate and graduate programs. It also complements existing and future SNS research areas in addition to the environmental research described above, including areas of Applied Math, Complex Disease States, and Microbiology and Immunology. The addition of faculty in relevant aspects of health management and policy through SSHA and/or the School of Management will contribute to the future development of a community-health-focused medical school and public health. Recommendations for FTEs are given in our overall planning area request for the next three years is shown in Table 1 and over a longer planning horizon in Table 5.

Atmospheric Pollution and Health - Air pollution in the Central Valley is a daily burden on human and ecosystem health and well-being. Organic and inorganic particulates, persistent

organic pollutants, and precursor gases for ozone formation are produced during routine agricultural practices and weekday commutes. These pollutants are lofted into the atmosphere to interact with other chemicals or microbes and are eventually deposited in the respiratory systems of humans and animals, as well as on plant leaves. The resulting effects on human and ecosystem health are devastating. A significant air pollution-related research effort aimed at the understanding and mitigating the escalating air quality problems in the Central Valley, Sierra Nevada, and elsewhere has already been initiated in the Environmental Systems graduate group. Two new air pollution hires (Wolfgang Rogge and a future junior position hire, both in SE) have added strength in measurement and analysis of atmospheric pollutants, and will contribute to research on human and ecological exposure. Strength in this research area can be built through the addition of FTEs in atmospheric dynamics, environmental toxicology, environmental epidemiology, and environmental microbiology, which will add to current expertise in pathophysiology (HF, RO), particle and surface chemistry (VL, PO), and land use-atmosphere interactions (LK; Table 4). UC Merced is well poised to conduct critically needed basic research in this area, as well as to developing solutions to these complex environmental and public health problems. This area would also benefit from the addition of faculty in atmospheric chemistry and environmental/ecological biostatistics.

Ecology of Infectious Disease **-** Infectious disease agents affect all living organisms, can have complex life histories involving multiple species, and can be specialists or generalists in terms of host preference. A better understanding of the ecological and socio-ecological determinants of transmission by vectors (e.g., insects, rodents, birds) or abiotic agents (e.g., dust, water, weather systems), the population dynamics of reservoir species, the transmission to humans or other hosts, or the cultural, social, behavioral, and economic dimensions of disease communication is needed. The interface between humans and both domestic and wild animals is a region rife with opportunity for emerging diseases – those that were not pathogenic in the original host, but are in the new host (e.g., Hantavirus, SARS). Evolution of infectious agents and their plant and animal hosts is also a critical component of research for understanding the ecology of infectious disease. UC Merced is uniquely positioned for research in this area, literally located in the transition zone between suburban, agricultural and natural ecosystems. Migratory birds use Central Valley agricultural fields as stopover points, and human migration supports the agricultural industry. Air pollution can make stressed organisms more susceptible to infection. Building strength in this research area requires the addition of FTEs in environmental/ecological biostatistics or epidemiology, environmental toxicology, environmental microbiology, and emerging zoonoses/immunology (Table 5) to complement initial expertise in evolution (MB, MD), cell level host-pathogen interactions (JC, DO), environmental epidemiology (YC), and population genetics (AA; Table 4).

Table 5: Proposed SNS and cross-unit faculty in Environmental Health Sciences

Faculty	Research Themes		
	Atmospheric Aerosols & Health	**Ecology of Infectious Disease**	**Fills coursework gaps***
AY 2011-2012			
Air pollution (SE)[††]	x		ESS, ENVE, ES
Atmospheric dynamics	x		BIO, ESS, ES
AY 2012-2013			
Environmental/Ecological biostatistics	x	x	BIO, ESS, ENVE, MGMT, ES, QSB
Ecological/Ecosystem modeling		x	BIO, ESS, MATH, ES, QSB
AY 2013-2014 and beyond			
Environmental Health or Epidemiology	x	x	BIO, ESS, ES, QSB
Atmospheric Chemistry	x		CHEM, ESS, ENVE, ES
Environmental toxicology	x	x	BIO, BIOCHEM, ESS, ES, QSB
Environmental Health Policy[++]	x		BIO, ESS, MGMT, ES
Emerging Zoonoses/Immunology		x	BIO, QSB
Eukaryotic Microbiology		x	BIO, ESS, ES, QSB
Mechanisms of Complex Disease[†]	x	x	BIO, QSB
Infectious Disease		x	BIO, QSB

[†] carried over from AY 2007-2008
[††] carried over from AY 2007-2008
[++]Cross-unit position in SSHA and/or Management in this area is supported by EES faculty.
* BIO: Biological sciences; BIOCHEM: Biochemistry; CHEM: Chemistry; ESS: Earth systems science; ENVE: Environmental engineering; ES: Environmental systems; MATH: Mathematics; MGMT: Management; QSB: Quantitative systems biology.

Teaching - Faculty in Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Science contribute to both Undergraduate and Graduate Programs.

Undergraduate Programs: SNS faculty members with interests in environmentally related research contribute primarily to undergraduate Biological Sciences (BIO) and Earth Systems

Science (ESS) majors. A number of SNS faculty with interests in *Biocomplexity and Evolution* form the core of the Ecology and Evolutionary Biology emphasis in BIO (Table 2), whereas SNS faculty shown in Table 2 in the *Climate/Watersheds* and *Global Change* areas and many faculty noted in Table 4, together with faculty from other schools, contribute to the ESS major. SNS Faculty indicated above contribute to other tracks in the current BIO major and to the Chemical Sciences major, particularly Biochemistry and Environmental Chemistry. Faculty contributions to multiple undergraduate majors is a strength for the school and valued by the faculty involved. However, faculty should be vested in the undergraduate majors to which they contribute.

Discussions are in progress regarding the feasibility of changing the ESS major to a cross-school major to enable faculty who teach the courses to have full participation in programmatic direction and student mentoring. This change would also enable the formulation of undergraduate tracks, minors, or new majors that intersect with Social Sciences and Management, with potential increases in student participation. Plans are in development for a separate Ecology and Evolutionary biology major, to be implemented when sufficient faculty are on-board to support the major. We foresee the diverse faculty who contribute to environmental research as those who will continue to contribute to a number of undergraduate majors in the future, rather than aligning strictly with a single major. From a student viewpoint, however, it is advantageous to clearly define the differences between majors such as ESS and EEB when the programs share courses and faculty. Evolution of these majors will include discussion and revisions to distinguish program content and educational objectives for the student. The faculty lines proposed above will contribute to existing undergraduate programs by filling programmatic course needs and assembling a critical mass of faculty to deliver the curriculum. Furthermore, additional of faculty in the *Environmental Health Sciences* will contribute to proposed development of undergraduate programs in Biochemistry and Microbiology and Immunology, as well as supporting current majors.

Graduate Programs: At the graduate level, the environmental faculty contribute primarily to the Environmental Systems (ES) and Quantitative and Systems Biology (QSB) graduate programs, currently the two largest and most successful graduate groups. For example, current extramural grants by members of the ES graduate group/SNRI faculty have brought more than $15M in research funds and equipment to UCM between 2003 and 2010. The proposed FTEs will contribute to strategic areas within the current graduate groups, as well as contribute to development of programmatic areas that may eventually spin-off to form new graduate groups.

Resources - Development of a stellar program in Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences requires resources in faculty, space and centralized core research facilities.

Faculty: A description of the types and proposed sequencing of faculty hires for each emphasis area is described above**.** The faculty hiring plan is derived from the need for balanced growth among the thematic areas described above, graduate and undergraduate teaching demands, identification of cross-school and cross-discipline hires that support multiple degree programs and research areas, and laboratory space limitations. As noted above, the interdisciplinary nature of environmental programmatic areas requires support from a breadth of faculty within SNS and among all of UCM's schools. The research initiatives we are pursuing and the graduate and

undergraduate degree programs associated with them span from "Natural Sciences-centric" to truly cross-school. Thus, long-range planning requires a university-wide view of programmatic development and needs. An immediate goal is to insure balance between SNS, SE, and SSHA/Management in thematic areas where complementary or cross-school hires can be made. We note, however, the difficulties associated with formal joint appointments for Assistant-level faculty. Given the likelihood of future junior faculty with cross-school research and teaching affinities, an explicit policy for evaluating and promoting interdisciplinary scholars should be established at UCM. Additional research support comes from the affiliation of adjunct researchers. There are presently two adjunct faculty (Duffy, Quinn) affiliated with the ES graduate group. Four additional government scientists have expressed interest in being involved with supervising graduate students, teaching, or being Co-PIs on grants. We expect to affiliate at least two more government scientists with the ES graduate group in the near future.

***Space and centralized facilities*:** The research encompassed within three broad environmental areas described above has prime opportunities for funding from a variety of government and foundation sources that span across physical, chemical, and biological sciences and engineering. Our strategic development is targeted to interdisciplinary areas where funding opportunities exist or are anticipated to increase. Programmatic growth relies on the availability of adequate space for research, graduate students, post-doctoral associates, and technical support staff for new and existing faculty as their individual research portfolios grow.

- Centralized instrumentation and computing facilities are critical to the success of the interdisciplinary research carried out in the area. Space and technical personnel support must be provided for these facilities to enable cutting edge research in a cost-effective way. Continued support for courses with field labs (which incur comparable or lower per student costs than courses with indoor labs) is critical for providing students with quality hands on research and educational opportunities.

  Several established centralized facilities figure prominently in the environmental program areas. The SNRI Wawona Field Station provides support for field-based research and learning across all research themes by housing field researchers, and by hosting field classes and workshops. SNRI is helping spearhead UCM's flagship Yosemite Leadership Program --- a partnership between the University of California, the National Park, and the largest privately owned business to develop tomorrow's thoughtful, ethical, and innovative leaders. The Environmental Analytical Laboratory (EAL, administered under SNRI) provides core analytical support for all research themes, including instrumentation for lab courses required in several majors (ESS, ENVE, CHEM). Likewise, the Imaging and Microscopy Facility (IMF) is a key support laboratory for multiple research themes and is used in several lab-based courses. The Genomic Core Facility (GCF) is the first centralized facility with genomics instrumentation to fulfill multiple needs of faculty in SNS and SE, with a foundation based on sequencing and microarray analysis equipment already available through faculty start-up funds. The GCF is essential for the success of research themes in Global Change, Biocomplexity and Evolution, and Ecology of Infectious Diseases. A collaborative scientific supercomputing cluster is under development using start-up funds, to be co-administered by Applied Mathematical Sciences and Environmental Systems faculty with support from the School of Natural Sciences. This computing facility will support research in the Climate and Watershed Resources and Global Change research themes. Core facilities in other program areas such as those supporting

chemical sciences would also be used by environmental faculty. ***A critical need for strengthening the Global Change and Biocomplexity and Evolution themes is a modern greenhouse facility and freshwater and seawater aquaria.*** University technical staff support for existing (i.e., EAL and the IMF) and new facilities is an essential feature of centralized facility success.

- Space and Facilities - Environmentally related faculty require a range of resources to support research that may encompass laboratory, field, and/or computational methods. Both junior and senior faculty will need adequate start-up packages, laboratory and office space, and institutional investment for equipment, both shared as noted above and individual. Anticipated space requirements for the priority hires over the next three years in the ES/EEB/EHS planning area are shown in Table 1.

  Over the longer term, each of the new faculty will require at least the CPEC average of ~700 square ft (assuming about 50% senior faculty), in addition to adequate space for centralized facilities that these faculty might use. With the possible exception of an epidemiologist or ecological biostatistician, new Environmental Health Sciences faculty require standard wet lab space with fume hoods, analytical instrumentation, and/or field equipment. New faculty in atmospheric chemistry and toxicology would likely take advantage of the Environmental Analytical Facility, and also the Imaging and Microscopy Facility or the Genomics Core lab, depending on their particular research. Depending on their research emphases, the Environmental Toxicologist, Emerging Zoonoses, and/or Animal Responses to Air Pollution researchers may need access to the vivarium or a biosafety level three (BSL3) facility (unless certain agents are avoided). Environmental Health Sciences faculty could also make use of core facilities under development by current QSB, ES, Applied Math, and Chemistry faculty. Anticipated use of existing UCM facilities by the ES/EEB/EHS priority hires over the next three years are shown in Table 1.

***Table 1. Environmental Sciences, Integrative and Evolutionary Biology, and Environmental Health Sciences* CAPRA table of requested FTEs**

Priority	Name of Position	Level†	Primary Major	Secondary Major	Primary Grad Group	Secondary Grad Group	Estimated startup	Estimated space	Special needs and strategic considerations
Year 1 (starting Fall 2011)									
1	Ecology	Open	BIO	ESS	QSB	ES	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL
2	Atmospheric dynamics	Open	ESS	Management	ES		$200 – 300K	Office + graduate student and computational workspace (400 sf)	Possible use of GIS facility, parallel computer cluster
2	Environmental management	Open	ESS	Management	ES	SCS	$200 – 300K	Office + graduate student space	Possible use of GIS or field facilities
Year 2 (starting Fall 2012)									
1	Ecological or ecosystem modeling	Open	ESS	BIO	ES	QSB	$200 – 300K	Office + graduate student and computational workspace (400 sf)	Possible use of GIS facility, parallel computer cluster
2	Environmental / Ecological biostatistics	Open	BIO	ESS	ES	QSB	$200 – 300K	Office + graduate student space	Possible use of GIS facility
2	Earth Surface processes/ Ecohydrology	Open	ESS	BIO	ES		$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL
Year 3 (starting Fall 2013)									
1	Environmental health or epidemiology	Open	BIO	ESS	QSB	ES	$300 – 500K	Office + 1,200 sf wet or 800 sf dry lab	Possible use of GIS facility, EAL
2	Conservation biology / Evolutionary biology	Open	BIO	ESS	ES	QSB	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS facility, EAL
2	Global change ecology / Paleoecology	Open	BIO	ESS	ES	QSB	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL

† All searches are designated as open because of the strong need of more senior faculty in all of these programmatic areas, and the low probability of successfully recruiting senior candidates in any of these positions.

Physics Strategic Plan

Physics is the study of the properties of nature at their most fundamental. It ranges from the study of the very tiniest pieces of matter and energy, including molecules, atoms, photons, and subatomic particles, to the study of the entire universe. Insights in physics have revolutionized our society. It is hard to imagine an area of science or engineering that has not been profoundly affected by fundamental developments in physics. One need only think of the harnessing of electricity, the invention of the transistor, and the discovery of the laser. The present strength in physics at Merced is centered on three broad areas of research, detailed below.

1. Atomic, Molecular, and Optical Physics

UC Merced is building a strong research emphasis in atomic, molecular, and optical (AMO) physics. Interest and developments in this field have surged in the last ten to fifteen years, primarily due to advanced experimental techniques. These developments have been recognized by several recent Nobel prizes: for ion trapping and atomic clocks (1989; Ramsey, Dehmelt, Paul), for atomic cooling and trapping techniques (1997; Chu, Cohen-Tannoudji, Phillips), for the creation of Bose-Einstein condensates (2001; Cornell, Ketterle, Wieman), and most recently for advances in quantum optics (2005; Glauber, Hall, Haensch).

The modern trend in AMO science is toward greater control over quantum systems such that quantum coherence is maintained and quantum processes can be resolved. This includes working at very low temperatures, at ultrashort time scales, and with very high spectroscopic precision. Modern techniques can now routinely address single atoms, single photons, and single qubits (the quantum analog of a bit).The technological implications for such precise control over the fundamental building blocks of ordinary matter are as yet unimagined, but the promise is great. By analogy, the laser, which in some sense is a “Bose-Einstein” condensate of photons, has impacted almost every area of technology and medicine. The program in AMO physics complements the research programs in condensed matter physics and chemistry.

Atomic, Molecular and Optical Physics Research

At present UC Merced has hired seven faculty whose research supports the general AMO theme: Roland Winston and Ray Chiao (both split between Natural Science and Engineering), Kevin Mitchell, Jay Sharping, Lin Tian, Michael Scheibner and

Sayantani Ghosh. Potential areas for future AMO hires, include, but are not limited to:

- *ultrafast optics*: pico-, femto-, and attosecond pulses, time-domain studies, wavepacket dynamics, high harmonic generation, photonic crystals and nanostructures for plasmonics and terahertz dynamics
- *attosecond physics*: fourth generation synchrotron sources, attosecond pulse generation, characterization, and applications
- *fundamental quantum processes and engineering*: quantum control, quantum computing and information theory
- *atomic cooling and trapping*: ultracold gases and plasmas, Bose-Einstein condensates, degenerate Fermi gases, superfluidity
- *precision measurement*: atomic clocks, ultrasensitive detectors, high precision spectroscopy, multi-photon microscopy
- *novel imaging techniques*: sub-diffraction fluorescence imaging, near-field imaging, etc.

Funding potential: Various government funding agencies support physics research, and AMO research in particular, with NSF being the largest sponsor of table-top AMO research. Furthermore, DOE funds several large national user facilities, including three that are strategically located with respect to UC Merced: Lawrence Livermore National Lab, Lawrence Berkeley National Lab, and the Stanford Linear Accelerator Center. Research is supported to a significant extent by the DOE and defense organizations (DARPA, ONR, AFOSR, ARO). In addition, optics research has historically benefited financially from its close connection to industry and industrial applications.

Cross-disciplinary and cross-school linkages

Expertise in AMO science has a natural connection to other present and potential University research programs. This is reflected in the fact that two of the AMO faculty have joint appointments between natural science and engineering. Specific connections include, but are not limited to:

a) The energy sciences program: Optics is of fundamental importance to solar energy collection.
b) Chemical physics/ physical chemistry: Current faculty rely heavily on lasers and other optical techniques. They could be well supported by additional expertise in optics and atomic physics.
c) The materials or nanoscience programs would benefit from advanced optical techniques. Also, many of the issues of quantum control, manipulation, computing, etc. are relevant to nanoscience just as they are to AMO science.
d) Computer science: Quantum computation and information processing synergizes naturally with computer science.
e) Biology and Earth systems science: Synergy could potentially arise in the areas of microscopy, advanced detector design, and optics.

2. Condensed Matter Physics

The Condensed Matter Physics program in Natural Science is a broad, interdisciplinary program focusing on "condensed" phases of matter. These phases range from simple solids and liquids to metallic and semiconductor nanomaterials to exotic condensed phases such as the superconducting phase exhibited by conduction electrons in certain materials, and the ferromagnetic and antiferromagnetic phases of spins on atomic lattices. The intellectual scope of this program is vast, and includes an understanding of the optical, electrical, mechanical, and transport properties of materials, encompassing the nano- to the macro-scale. Research in condensed matter can be harnessed to design new materials such as magnets, semiconductors, ferroelectrics, superconductors, polymers, and liquid crystals, used for applications in a wide variety of disciplines including efficient energy conversion, ultra-fast optics, quantum information processing, and structural materials, to name a few.

Condensed Matter Physics Research

The faculty participating in this program span the disciplines of solid state physics, nanoscale physics, soft matter physics, physical chemistry, surface science and materials characterization. Several specific areas that are at the forefront of modern condensed matter science are targeted. These include photonic materials, nano-scale electronics, quantum information and "smart" materials.

Photonic materials. "Photonics" may be broadly defined as the technology of generating and harnessing light and other forms of radiant energy. All photonic technologies rely on appropriate materials, which may be organic, inorganic, or composites. Materials that respond nonlinearly to light are used in frequency conversion of lasers, as optical limiting materials to protect eyes or optical sensors from laser pulses, and as contrast agents in nonlinear optical imaging technologies. Materials that change their optical properties in response to applied electric fields can be used to fabricate electro-optic modulators for electrical to optical conversion in fiber-optic communications. Photonic band-gap crystals, periodic dielectric structures that forbid propagation of a certain frequency range of light, have potential applications in ultra-low-threshold lasers, optical filters, polarizers, and waveguides. Metamaterials are those that exhibit novel optical properties leading to compact imaging systems and even "cloaking" devices. Research in this area is highly interdisciplinary and spans solid-state physics, surface science, optical physics, physical chemistry and applied mathematics.

Nanoscale electronics. " Nano-electronics" is poised to provide the next technological revolution in computer design. Moore's prediction of rapid miniaturization has already pushed commercial transistors well below 100 nm in size. Developing an in-depth understanding of the fundamental properties of nanoelectronic devices is of crucial importance because Nature behaves quite differently at the nanoscale, and

an extrapolation of our knowledge at larger dimensions is not possible. It is not prudent to invest a vast amount of time and effort to try to compete with the immense silicon industry. Instead, it is more attractive to look into nanoelectronic devices that could play a role complementary to the silicon technology, with a strong focus on exploring the possibilities of organic materials, for example in the form of single molecules or self-assembled molecular monolayers. Investigating the use of complex transition-metal oxides in nanoelectronic devices is another field worth exploring since these materials show a wide range of interesting characteristics, including strongly insulating behavior, high-temperature magnetism and superconductivity. Nanoelectronics is the field where physics, material science, chemistry and electrical engineering inevitably meet.

Quantum information science. The tremendous miniaturization of electronic devices has led to the point where the spatial scale has hit the atomic limit. In this regime, the quantum properties of matter dominate, which, at first glance, seems to compromise information processing and storage, since quantum states are unstable and are destroyed by the very act of making a measurement. However, this very fragility of quantum phenomena has the capability of revolutionizing the fields communication and computation. A quantum channel of information transfer is very secure, since any effort to eavesdrop leaves an imprint on the quantum state. Computation power is exponentially enhanced when using quantum bits instead of classical ones due to the property of entanglement, which adds immense parallel processing capabilities. Recently, quantum information processing has started influencing the agenda of condensed matter, and some of the implementable quantum bits which this field has contributed include superconducting structures (Josephson junctions), single-electron quantum dots and semiconductor photonic devices.

Photovoltaics. As the worldwide demand for energy increases, the need for renewable energy sources will become more and more urgent. Solar energy is the obvious answer, providing an unlimited, pollution-free energy source. Through the use of efficient photovoltaics, a relatively small amount of land area can in principle be used to meet the energy needs of the entire United States. For these reasons, research into more efficient and lower cost ways of turning the energy of sunlight directly into electrical energy is now, and will continue to be, an important field in the physical sciences. Photovoltaic devices can be grouped into two broad categories, each type having its advantages and disadvantages: solid state (semiconductor) devices, which may be organic, inorganic, or hybrid, and electrochemical cells.

The California Advanced Solar Technologies Institute (CAST). This year the California Advanced Solar Technologies Institute (CAST) was established at UC Merced, lead by physics faculty member Roland Winston and funded by a five year $2.25 million dollar grant from the UC Office of the President. CAST will serve as a platform for a variety of solar energy projects including development of novel photovoltaic devices, which convert sunlight into electricity, and thermal energy for cooling of

buildings, industry and other applications. In addition to speeding the commercialization of solar technologies, another of CAST's primary goals is to help train the next generation of solar energy researchers.

The areas described above are particularly attractive because they offer the possibility of many different types of collaborations, both within UC Merced and at other nearby institutions. Potential industrial collaborations could be found in nearby Palo Alto and the Bay Area. There are also collaborative opportunities with Lawrence Livermore National Laboratory (LLNL) through LLNL/UCM adjunct faculty. We also anticipate that collaborations and funding through NASA/Ames will be available in the near future.

Current faculty in this research area are:

- Roland Winston (solar energy, optics)
- Sayantani Ghosh (experimental condensed matter physics)
- Raymond Chiao (experimental condensed matter physics)
- Lin Tian (theoretical condensed matter physics and quantum information)
- Ajay Gopinathan (theoretical soft condensed matter physics and biophysics)
- Linda Hirst (Experimental soft condensed matter physics and biophysics)
- Michael Scheibner (Experimental condensed matter physics)

Other faculty across disciplines who could contribute include

- David Kelley (experimental chemical physics)
- Anne Kelley (experimental physical/analytical chemistry)
- Tao Ye (nanotechnology)
- Jennifer Lu (materials engineering)
- Valerie Leppert (materials engineering)

Given the necessarily diverse and fundamentally interdisciplinary nature of this group, and the desirability of building on and extending current strengths, we would like to see recruitment of new faculty in fields that encompass and bridge condensed matter physics, physical chemistry, and materials engineering. We need to recruit faculty with related but complementary research interests in order to build a program that can attract graduate students, offer modern and compelling programs for both undergraduate and graduate students, successfully compete for funding, and achieve national and international prominence in research. The condensed matter physics and senior nanoscale physics searches underway during the current academic year will result in new faculty who would contribute to this research area. It is assumed that these positions will be carried forward if we are unsuccessful at filling them this year.

Funding potential: The level of support available is a primary concern when considering programmatic initiatives. This type of research is very well funded and

we suspect will continue to be well funded in the foreseeable future. The Bush administration's American Competitiveness Initiative (ACI) commits to doubling, over 10 years, funding for research at key federal agencies that support physical science and engineering: NSF, DOE's Office of Science, and NIST. Part of the ACI is the Advanced Energy Initiative, which provides for a 22% increase in funding for clean-energy research at the DOE. The fields of solid-state physics, and materials science will be key to advances in new energy sources, and UCM could become a major player in a field in which few established universities yet have large, well developed programs.

Single-investigator or small collaborative group funding in this field is available from a number of different agencies and programs within these agencies. Examples include:

- NSF: programs in Physics and Materials Research divisions.
- AFOSR Broad Area Announcement (BAA): programs in Metallic Materials, Ceramic and Nonmetallic Materials, Quantum Electronic Solids, Semiconductor Materials, Surface and Interfacial Science.
- ARO BAA: programs in Condensed Matter Physics, Quantum Information Science, Surfaces and Catalysis, Electrochemistry and Advanced Energy Conversion, Materials Synthesis and Processing.
- ONR BAA: programs in Electronic Materials, Semiconductor Materials.
- DARPA: solicitation in Nano-Composite Optical Ceramics.
- DOE: Several programs in Basic Energy Sciences: Condensed Matter Physics, Materials and Engineering Physics.

3. Biological Physics

Experimental, computational and theoretical methods and techniques from Physics have played a major part in recent advances in our understanding of biological systems. Examples include cutting-edge imaging techniques that have provided snapshots of biological molecules and their complex assemblies in action and have also led to dramatic improvements in medical imaging. The ability to control matter at the smallest scales, using for example optical and magnetic tweezers, has allowed us to study and manipulate biological processes at the single molecule level. Theoretical and computational modeling are leading the way in our efforts to understand protein folding/misfolding, the functioning of molecular motors and enzymes, ion channels, membrane structure and dynamics as well as the dynamics of complex biochemical and neural networks. The result of advances in biological physics will be a better understanding of normal and pathological processes at both the molecular and systems level. Equally important, from a physics perspective, is that studies of biological systems that serve as paradigms of complex, self-assembling, non-equilibrium systems has led to new and interesting physics including emergent properties in dynamical networks, self-assembled, self-replicating systems, the thermodynamics of "active" systems and an atomistic

understanding of complex macromolecules. Biophysics is the most rapidly growing area in physics research attracting both seasoned physicists from several different subfields and large numbers of entering students.
To develop a state of the art research program in biophysics requires individuals who have had extensive training in doing biophysical research, hailing from either traditional physics subfields such as condensed matter, polymer or statistical physics or from more interdisciplinary backgrounds including specifically biophysics, materials or bioengineering.

Biological Physics Research

Current faculty in this research area are:

- Ajay Gopinathan (theoretical soft condensed matter physics and biophysics)
- Linda Hirst (Experimental soft condensed matter physics and biophysics)
- Jay Sharping (experimental biophotonics)

Other faculty across disciplines who could contribute include

- Mike Colvin (computational biology)
- Tao Ye (nanotechnology)
- Wei-Chun Chin (bioengineering)
- Ariel Escobar (bioengineering)
- Andy LiWang (biochemistry)
- Patti LiWang (biochemistry)

A core group of at least 6 biophysicists is needed to establish a strong competitive program. Broad areas of interest include biomaterials and biopolymers, membranes and associated phenomena, single cell studies of biomechanics including motility and mitosis, microfluidics with biological applications and protein folding. Several specific research fields are listed below that would allow us to attract the best available candidates with interests in these broad areas.

- Biocompatible organic materials as organ replacements and/or as scaffolds for cell growth (links to Materials program and to Bioengineering)
- Development of ultrasensitive bioanalytical techniques, particularly for single molecule/single assembly measurements and/or high throughput screening
- Single molecule studies of molecular motors, DNA/RNA dynamics, transcription factor binding/functioning, viral genome packaging, ion channel transport etc.
- DNA and/or other biological macromolecules as scaffolds for fabrication of organized structures (links to Materials program)
- Protein folding, experimental and computational methods that quantitatively determine protein structure and folding pathways

- Atomistic modeling of biological systems: channels, membranes, receptors, proteins, enzymes (links to CCB)
- System level studies of mitosis, morphogenesis, cellular motility, cytoskeletal dynamics, viral self-assembly, cellular hydrodynamics, chemotaxis and pattern formation. (links to Systems Biology)
- Membranes and associated phenomena including fusion, exo/endocytosis, pore formation and functioning, lipid rafts. Also biomedical applications of engineered membranes. (links to Materials and Bioengineeing).

It is to be noted that many of these areas will have a considerable overlap with research interests in Biochemistry and Molecular Biology. There is also a considerable overlap with the field of soft condensed matter physics in both expertise and methodology. We will seek to hire individuals to enhance this natural synergy and anticipate hiring both theorists and experimentalists in these fields.

Funding potential. Funding for biophysics is growing at an extremely rapid pace. The NSF provides substantial funding for fundamental research in physics including its interfacial areas with biology. Research more directed toward specific problems in the life sciences is supported by the NIH, and also to a significant extent by the DOE and defense organizations (ONR, AFOSR, ARO). Funding for research in biological physics is also available from private foundations (*e.g*. Packard, Hughes, Burroughs-Wellcome) and for-profit companies. Faculty with research interests in this area should have a variety of funding opportunities available to them, although all of these sources are highly competitive.

Cross-disciplinary and cross-school linkages

The fundamental principles of Physics form the foundation for all of modern science and engineering. While there remain exciting unsolved problems in pure physics there is increasing interest in the frontiers that lie at the intersection with other disciplines including the life sciences, earth and environmental sciences, and engineering. The Biological Physics program is explicitly interdisciplinary between the physical and life sciences, and there should be extensive opportunities for collaboration across these groups. In particular, Biological Physics faculty are expected to have research interests that overlap Biochemistry, Molecular Biology and engineering, particularly Bioengineering. Finally, this research area offers a natural interface with the proposed medical school. Interdisciplinary collaborative science is one of the few strengths that UC Merced can leverage as a research institution, and this strength should be fostered as a means of bolstering the resources and potential of both biological and physical science at UC Merced.

4. Astrophysics

Introduction

The University of California is a world leader in (observational) astronomy and (theoretical) astrophysics. The world's largest, W.M. Keck twin 10-m telescopes have been designed and built by UC in collaboration with Caltech, and a joint future 30-m telescope is well on its way. This unprecedented access of UC astronomers to the world's premier optical telescopes has also stimulated a vigorous development in several areas of theoretical and computational astrophysics. Thus there is a vibrant community of astronomers and astrophysicists in California, which also includes many researchers at federally funded laboratories as well as private organizations.

All of the well established UC campuses have used this unique access to facilities and expertise to develop first class astronomy and astrophysics research groups. We propose to begin such a research direction also on our campus. Our goals will be carefully chosen to leverage and augment physics research already conducted at UC Merced, while being realistic in scope. Our first consideration is what kind of 'flavor' of astronomy and astrophysics we believe would be optimal for UC Merced. Astrophysics can be broadly classified as: theoretical, observational instrumental, and experimental.

Experimental or laboratory astrophysics, typically aims to study the physics and chemistry of interstellar or interplanetary molecules and dust grain particles under extreme conditions (high vacuum, cold temp., UV/X-ray irradiation or high energy particles [Cosmic Rays]). Laboratory astrophysics groups require significant laboratory facilities. In California there are current successful groups at LLNL (Livermore) and NASA Ames (Mountain View) working in these areas. Instrumentation development for telescopes (imaging cameras, spectrographs, adaptive optics technology) is similarly a laboratory and engineering intensive endeavor This work is very well done at UC Santa Cruz and UCLA. Researchers in both these two fields, laboratory astrophysics and instrumentation, would require laboratory space comparable with other experimental physicists currently in the physics group.

Observational astrophysics (astronomy) has grown enormously in California, as well as nation wide and globally, thanks to the many new observatories on the ground and in space, and covering the entire spectrum from radio – infra-red –optical – X-ray – Gamma-ray wavelengths. Competition for observing time is fierce (oversubscription rates range from 4 – 10), and with it funding is equally limited. Successful observing proposals increasingly rely on demonstrable theoretical and analytical team work at the home institutions.

Theoretical astrophysicists study a broad range of phenomena, several of which have been well developed in California at UC, Caltech and Stanford, For example, cosmology, galaxy evolution, stellar evolution, extraterrestrial planet searches and Galactic Center (black hole) studies are well established research directions at several of the UC campuses. Below we describe an area of research that is presently less emphasized within UC, but which exploits several areas that uniquely suited to UC Merced

Proposed research direction

The above considerations suggest a specific direction for UC Merced for starting a modest astronomy and astrophysics (sub-)group that would be a natural fit: astrophysical research which is directed at studying the physics and chemistry of materials exposed to

the extreme conditions of space. The intellectual foundation of this program is to understand how the optical, electrical, mechanical, physical and chemical properties of large molecules and nanoparticles are modified by exposure to the harsh environment of space and how these changes, in turn, influence the origin and evolution of planets, stars, and galaxies in the Universe. In addition, the impact of these large molecules and nanoparticles on the emergence of life and space is a question which is now emerging as new field of research that can be successfully probed. Besides these fundamental science aspects, this program will also lead to a deeper understanding of materials and their properties on the nanoscale.

It is well established that large molecules and dust are ubiquitous and abundant components in the interstellar medium of galaxies and conversely play a major role in the evolution of the Universe. Mid infrared spectra of almost all objects show the tell tale signatures of large Polycyclic Aromatic Hydrocarbon molecules and nanograins. This is particularly true for regions of star and planet formation. These components dominate the opacity of these regions and hence control their observable spectral characteristics and thus whatever we can learn through remote observations. These species dominate the energy balance of the gas through the photo-electric effect – and hence its thermal properties such as pressure and temperature – as well as the ionization balance – and hence the coupling to prevalent magnetic fields. In addition, these species provide surfaces for active chemistry and influence in many ways the organic inventory of space, in particular in regions of star and planet formation.

This program will leverage the following strengths of UC Merced:

1) Close proximity to major, unique national laboratories – Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, and NASA Ames Research Center – that provide facilities and research environments for experiments on large molecules and nanograins under astrophysically relevant conditions. These include the analytical tools to study the properties of molecules and nanograins relevant to astronomers as well as providing energetic UV/X-ray and energetic particle environments which are so relevant to space. In addition, the Bay Area is home to several groups that study materials from sample return missions.

2) Direct access to the Keck observatory and its infrared instrumentation which provide prime observational opportunities to study the characteristics of large molecules and nanograins in space. In addition, access can be obtained to NASA's new orbital and space based initiatives in the infrared (The Stratospheric Observatory for Infrared Astronomy – SOFIA; and the 6.5-m James Webb Space Telescope) which makes this program very timely. Specifically, These observatories are geared towards probing the characteristics of large molecules and nanograins in regions of active star and planet formation in the here and now and all the way out through the era when most stars and galaxies were assembled.

3) The unique UC Merced research environment which is conducive to interdisciplinary studies where astronomers in the area of astrochemistry, astrophysics, and astrobiology

can work closely together with experts in physical chemistry, solid state physics and surface science, and materials sciences.

Scope of the program

To start a viable astronomy and astrophysics (sub-)group within physics at UC Merced would require the commitment, over the next few years, to hire a total of at least 3 faculty members in these fields. Fewer faculty would not be able to start a minor in astronomy and astrophysics and would only wet the appetite of prospective graduate students. These faculty would also benefit from close interactions with physics and engineering colleagues who have an open eye towards astronomy and astrophysics but who are firmly embedded within other disciplines, specifically in the areas of molecular physics, material sciences, Earth and planetary sciences, biochemistry and astrobiology, thus exploiting a truly interdisciplinary environment.

A physics minor in astronomy and astrophysics of the kind described above would provide graduate students at UC Merced with a unique research environment and learning experience that will poise them well for future careers of research in astronomy and astrophysics, (space-) materials sciences, NASA, national research laboratories, or aerospace industry.

If such a program would begin with the very near future, then current 'Recall Adjunct Professor of Research' Wil van Breugel could help jump start such a group by teaching an upper level observational astronomy class.

Space and Facilities Needs

In a well balanced department a three to one ratio between experimental physicists and theoretical physicists is typical. Thus, most physics hires should be experimentalists. Although the nature and configuration of the space required by different types of physicists is quite different, all of the experimentalists are likely to require an average of at least 1000 sq. ft. of lab space each, plus office space for the PI, postdocs, and graduate students. A junior experimental astrophysicist may not require as much space however as many of their experiments will take place remotely. We anticipate that theoretical/numerical astrophysicist will need just office space for themselves and group members. Established senior faculty will require more space than this. Start-up costs for experimentalists depend on specific research needs but typically fall in the $500k-$750k range for a junior hire and 700k-1.5M for a senior established hire.

Experimental condensed matter and AMO physicists sometimes need bench and fume hood space but typically have large pieces of specialized equipment such as cryostats, vacuum chambers, and laser-based setups on large optical tables. They often also have specialized requirements for the space in which these instruments are housed, such as high temperature stability, low vibration, isolation from sources of electrical noise, and light-tightness. Because of the specialized nature of the instrumentation it is often not possible for a single room to be shared by multiple investigators Experimental biophysicists tend to have research groups that require

a mixture of wet lab space, with fume hoods, and dry space for specialized instruments and depending on the specific field they may require access to core facilities for confocal microscopy, in-house x-ray diffraction, or lithography facilities. Theoretical and computational hires will require office space and computational facilities for the PI, postdocs, and graduate students.

Faculty Needs

At a bare minimum twelve FTEs will be needed to teach the core of the undergraduate and graduate physics curriculum, with more faculty needed to provide depth in our course offerings and to provide a critical mass for an effective research environment. To achieve this goal we require a hiring rate of at least two faculty per year. We currently have eight FTEs dedicated to teaching physics (Profs. Chiao and Winston at 0.5 FTE each and Profs. Mitchell, Ghosh, Gopinathan, Sharping, Hirst, Scheibner and Tian at 1 FTE each.)

Proposed Hiring priorities for 2011-2014

Here we propose a hiring plan for the next three years. The proposed positions are flexible depending on hiring outcomes for the preceeding years and represents a general guide on how the dept will grow over the next three years. The primary goals of this hiring plan are to cover teaching requirements for our major and graduate programs, to build current research strengths and to establish an astrophysics program with the goal of teaching a minor in astrophysics.

2011-2012

1. Biophysics and soft condensed matter experimental physicist.

This position seeks applicants who are trained in physics with research interests in either biophysics or soft condensed matter physics. Fields of interest include bio-molecular self-assembly, biological membranes, biopolymers, molecular motors, biological networks or the development of novel biophysical techniques. In soft matter physics areas of interest will be polymer physics, colloidal science, macromolecular assembly and liquid crystal science. We seek candidates whose research is complementary to the work of existing faculty in the School of Natural Sciences.

2. Atomic, Molecular and Optical (AMO) experimental Physicist.

This position seeks an experimental physicist trained in atomic and molecular or optical physics. The areas of research of interest include ultrafast optical

phenomena, attosecond studies, fundamental quantum processes and engineering, atomic cooling and trapping, precision measurement, and novel imaging techniques, quantum information in quantum many body systems and semiconductor photonics. New programs as well as research in areas complimentary to existing UC Merced faculty are welcome.

2012-2013

1) Astrophysics theoretical/numerical junior
2) AMO exp Junior

2013-2014

1) Condensed Matter Theory
2) Astrophysics (observational) junior

Summary of proposed physics faculty hires for the next five years

	2010-2011	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**
FTEs already hired	8	9	11	13	15
Active searches	1	2	2	2	2
Cumulative	9	11	13	15	17

School of Social Sciences, Humanities, and Arts Strategic Plan, AY 2010-11, 2011-12, and 2012-13.

Mark Aldenderfer, Dean
April 19, 2010

Summary of the plan

Positions requested:

AY 2010-11	11
AY 2011-12	9
AY 2012-13	9
Total	29 (EVC target 21)

Eleven Priority 1 positions rank-ordered for AY 2010-11

Nine Priority 1 positions recommended for AY 2011-12 and 2012-13 but **NOT** ranked ordered by priority

SSHA will engage in a revision of the strategic planning process for FTE in Fall 2010; therefore, we request that we be given permission to rank-order our choices for AY 2011-12 and 2012-13 based upon two criteria: what positions are actually allotted for AY 2010-11 and the results of the changes in our planning process.

Although no positions for the management major are included in the priority rankings, three positions are identified as priorities as a plan for the management major begins to emerge

Space is not a concern for any SSHA hiring scenario

No new majors are proposed in this plan

This plan was approved by a vote of the faculty that was completed on 19 April 2010:

Yes: 39
No: 0
Abstain: 3
Did not vote: 5

Document summary

This document consists of the following:

A description of the process by which the plan was created and the distinct logics by which it was developed;

The FTE requested for the three years of the planning period

An analysis of current and planned space requirements for SSHA

Strategic plans of each of the programs and graduate groups of SSHA

The appendices and tables requested by CAPRA (separate documents)

Appendices 1a, 1b, 1c: positions requested by AY

Appendix 2: Majors and grad groups{ proposed SSHA hires

Appendix 3: SSHA space requirements over the planning period

How the plan was developed

I learned about the deadline for the strategic plan documents shortly after arriving to Merced in early January. I requested from EVC and Provost Alley an extension of the deadline to submit the plan, and scheduled a faculty meeting for 26 January 2010 to discuss, among other things, my suggestions for the process through which SSHA would develop a strategic plan.

At that meeting, I recommended that the plan be developed jointly with the SSHA Executive Committee and myself. Although this recommendation was not voted upon, the faculty supported the process.

Consequently, I asked each of the groups within SSHA to submit to me their strategic plans and FTE requests by 15 February 2010. I asked them to develop their plans with strict attention to the guidelines outlined in the memo from EVC and Provost Alley and sent to the deans on 9 December 2009. This memo also contained the detailed requests by CAPRA as to formatting and content for the plans.

Based upon these program plans, including input from the graduate groups (ech plan is included in this document for your reference), I prepared a draft FTE request and presented it to the executive committee on 5 April 2010. It became clear during that meeting that there were very different opinions on how to best allocate FTE among the members of the Executive Committee. The debate and

discussion was spirited, difficult, but respectful. At the end of the meeting, an unhappy consensus was reached on the allocation of FTE requests for AY 2010-11. Although CAPRA has asked that we create a plan for three years, the Executive Committee determined that since we may not be granted the full number of FTE requested in AY 2010-11 (these now total 11), we would instead ask CAPRA to allow SSHA to revisit the next two academic years and re-evaluate our requests for AY 2011-12 and 2012-13 based on the positions awarded to us for AY 2010-11. Therefore, it was recommended by the committee that we list the positions for AY 2011-12 (9) and 2012-13 (9) in alphabetical order and indicate to CAPRA that these are all priority 1 positions. I should stress that this decision was reached by consensus by the committee members. SSHA is now asking for a total of 29 positions for the planning period, or eight more than the target requested by the provost. It was also agreed that we indicate to CAPRA and the administration that it is time to begin to engage in serious discussions about the Management program. As you may know, the Provost maintains a pool of at least three (unfunded) FTE designated for Management. Although these positions were not placed in the priority tables, we are asking CAPRA to consider releasing them as a SSHA-centric plan for Management begins to take emerge. Position descriptions for these are included in this document.

The amended plan was emailed to SSHA faculty on 9 April 2010, and was discussed extensively at a meeting of SSHA faculty (a voting meeting) on 12 April 2010. An email ballot was sent to all SSHA faculty on Tuesday,13 April 2010, and votes were to be in by 5PM on Monday, 19 April 2010. The results of the vote are: 39 yes, 0 no, 3 abstain, and 5 did not vote.

To improve the planning process, SSHA will engage in a review of its strate4gic plan and will discuss in depth a direction for SSHA during Fall 2010. This will provide needed context for the reassessment of SSHA priorities in the light of CAPRA recommendations and EVC FTE assignments and is consistent with the desire, as outlined above, to re-examine the priority ranking of positions in the light of these decisions.

Plan logics and plan evolution

It goes without saying that each and every SSHA major and program needs to grow. Unfortunately, fiscal realties make that impossible and thus, strategic thinking is required. In the development of the draft plan, I relied upon a number of assumptions and principles in making my selections.

NB: the term “program” here is meant to describe disciplinary offerings in general and is not meant to describe programs that listed within SSHA.

Draft plan logic as developed by the Dean

1) In the plan, I offered only those positions I deem Priority 1 using the CAPRA definition. There seemed little point in defining lower priorities in this exercise.

2) Within the Priority 1 category, my selection of requested FTE was based upon the following criteria: a) current and projected enrollment growth at the undergraduate level; b) my evaluation of program strength and coherence based upon the narratives sent to me as a part of this process. This also includes consideration of graduate education as offered to me by our two graduate groups; c) other factors, most notably whether a program has an opportunity to bring distinction to SSHA and UCM, how a program fits into interdisciplinary thinking at UCM, and finally, whether a program offers a potential for making a significant contribution to the Research Themes articulated in the 2009 Strategic Academic Vision of UCM. As dean, I am responsible for the growth and development of the school as an entirety.

NB: Thus, the draft plan was not strictly enrollment driven.

3) The draft plan did not include the Writing Program, which obtains its FTE through SSHA by an alternative process.

4) This plan made no specific request for hires in the Management major. I believe that Management should be housed within SSHA until it is ready to move forward as its own School, some time in the future. I cannot predict when and how these FTE will be released to SSHA.

5) The draft plan asked for 12 FTE in 2010-11, 10 in 2011-12, and nine in 2012-13, for a total of 31. Should we be reduced to the original 7-7-7 model proposed by the Provost in December 2009, I recommend that we revisit these lists on an annual basis, and I look forward to discussing just how this can be done. Again, given the uncertainty of the state budget, just how many of these positions we will get is unknown, but we should ask for what we need.

6) The draft plan did not come close to what SSHA faculty requested—that was a total of 52 FTE. I considered my draft to be a good faith compromise.

Compromise plan logic

The meeting of the Executive Committee was difficult primarily due to very different models of how FTE should be allocated. At t one extreme was a model that posits that all FTE should be allocated strictly by current and projected enrollment growth and the number of majors. This plan leaves nothing for those programs with lower enrollments, and rewards those programs that, at least in the minds of the advocates, have been doing the job requested of them: growing

their programs. Although the logic of the model is clear, it is of course the most selfish.

An intermediate model was proposed that argued strongly for enrollment growth as the primary criterion upon which FTE decisions should be made but offered the dean a proportion of the total number of FTE to be used for strategic hires. This approach recognizes a common good, but penalizes those programs that, in the eyes of the proposers, have not thought strategically about maximizing enrollment growth.

It should be obvious to CAPRA and the EVC that the strategic planning process as currently implemented at UCM (and as implemented historically by SSHA) is flawed and frankly, untenable. That this is the case is reflected by the outcome of the discussions of the Executive Committee: it took more than three hours to rank eleven positions for AY 2010-11 simply because of the incommensurate approaches to FTE allocation. No one was willing to rank the positions for the other two years although there is broad consensus that the positions listed are of strategic importance for SSHA. It is for these reasons that SSHA is asking that we be permitted to revise and review the priority rankings for AY 2011-12 and 2012-13 in the light of an attempt to create consensus on a SSHA-wide process for FTE allocation to be undertaken in Fall 2010.

The plan submitted is thus an unhappy compromise agreed upon by consensus by the Executive Committee and voted upon by the faculty. We need to do better.

Narrative of positions requested for the three years of the planning process

As noted above, the FTE request for AY 2010-11 is rank-ordered, while the other two years are not.

Positions requested, AY 2010-11
(These positions are ranked in order following the meeting of the SSHA Executive Committee)

Developmental Psychologist ; Psychology (Associate/Full) We intend to hire a senior (tenured) developmental psychologist with a focus in cognitive and/or social development in childhood (pre-adolescence). Within this broad focus, we will seek to recruit the best available candidate, but will give preference to researchers who complement and extend the existing areas of research expertise. High-priority additions would be someone with expertise in infancy or developmental neuroscience. More broadly, this position is intended to provide much-needed senior leadership and mentorship in the developmental area, which is currently without a tenured faculty member. This hire will require both laboratory space equivalent to the largest labs in the new Social Sciences and Management Building (e.g., 900 sf), and startup funds of about $150,000.

Regarding space, the anticipated developmental psychology hires would work with infants and children in laboratory settings. They need space for (a) interacting with the infant/child in a controlled environment, (b) observing those interactions through one way mirrors from a separate room, and (c) parents to wait for their infant/child in close proximity to the experimental room. Possible research strengths**:** cognitive development in infancy; developmental neuroscience; cognitive and/or social development in childhood. Possible teaching contributions: New undergraduate and graduate courses in area of specialization (e.g. infancy; neuroscience); PSY 130, Developmental Psychology; PSY 136, Cognitive Development. Possible research synergies**:** Strong synergies are expected with both current developmental faculty (Chouinard and Dunham). In particular, an emphasis in social and cognitive development will overlap with both, and a focus in infancy or developmental neuroscience will open new avenues for existing faculty and graduate students to extend their research interests to younger children or to neuroscientific methods, respectively.

Quantitative Psychologist; Psychology (Assistant) We intend to hire a quantitative psychologist with a solid background in statistical modeling. This hire will require both laboratory space equivalent to one of the smaller labs in the new Social Sciences and Management Building, and startup funds of about $80,000. This position will *expand our existing strengths* in Quantitative Psychology, and strengthen our ability to contribute to research in both Developmental and Quantitative Psychology. This hire will also teach one of our two required graduate statistics courses. Possible research strengths: longitudinal data analysis, multilevel modeling, categorical data analysis, structural equation modeling, item response theory, meta-analytic models. Possible teaching contributions: PSY 10, *Analysis of Psychological Data*; PSY 15, *Research Methods in Psychology*; PSY 105, *Advanced Research Methods in Psychology*; PSY 171, *Psychological Tests and Measurement*; PSY 190, *Topics in Psychology*; PSY 202A *Advanced Psychological Statistics I*; PSY 202B, *Advanced Psychological Statistics II*; PSY 202C, *Multivariate Methods*; PSY 205, *Measurement Theory and Psychometrics*; PSY 206, *Quantitative Methods for Reviewing Research*; PSY 207, *Linear Structural Modeling*; PSY 211, *Computer Programming for Social Sciences*; and PSY 212, *Special Problems in Psychological Statistics.* This hire may also develop new undergraduate and graduate courses, for example, *Multilevel Modeling* or *Longitudinal Data Analysis*. Possible research synergies: Direct synergies are with Shadish's research on meta-analysis and Vevea's research on meta-analysis and item response theory. However, this hire will benefit most of our faculty in Developmental and Health psychology where nested design requiring multilevel models, and longitudinal designs following children or patients over time, are common.

Cognitive Science and Technology; Cog Sci (Assistant/Associate) We intend to hire an applied cognitive scientist to *expand our existing strength* in technological and computational aspects of CIS, facilitate industry cooperation,

strengthen ties with Virtual Heritage/SSHA and CSE/SoE. Our last faculty recruitment effort (search began 2007-8) focused on a Cognitive Engineering hire. The search was nearly successful. A hiring case for a candidate with expertise in both human-computer interaction (HCI) and visual perception achieved majority faculty support when the position was "deferred" by administration in response to the economic crisis. Freezing this position has crippled our plans to steadily advance our curricula into cognitive science applications to technology, and adversely affected our undergraduates. Many students pursue the cognitive science major because they are interested in the development and use of technological applications, and more generally, applied cognitive science. For some, expertise in this area is key to employment opportunities. (Comparison point: UC Berkeley Cognitive Science majors often obtain jobs in industry, for instance, Google and Yahoo!) Our students continue to ask when COGS 128 (*Cognitive Engineering*) will finally be offered, and we hope to be able to meet their needs soon. Possible research strengths: Human-computer interaction, cognitive robotics, visualization, motor control, attentive user interfaces, virtual environments. Possible teaching contributions: *Cognitive Engineering* (UG), *Perception and Action* (UG), *Computational Modeling Foundations* (Grad), *Cognitive Robotics* (Grad). Possible research synergies: Matlocks' human-computer interaction, Maglio's work on service science and virtual environments, Kallmann's (CIS Affiliate) work on artificial intelligence, Newsam's (CIS Affiliate) work on pattern recognition, Noelle's work on computational neuroscience, Carpin's (CIS Affiliate) work on robotics and motion path planning, and Kello's work on computational neuroscience and virtual environments.

Public economics, Economics (Assistant): Public economics is the study of economic issues related to the public sector (i.e., government) and its relationship to the private sector. The scholar recruited for this position would likely study some aspect of the government's interaction with the private sector and his/her research would inform public policies relating to many potential aspects of the public economy. Given that government consumes about 25 percent of gross domestic product presently, the research theme in which the successful recruit would specialize is difficult to predict a priori. Depending on the pool put before the search committee, we might recruit a specialist in taxes and subsidies, saving behavior and Social Security, medical services related to Medicare and Medicaid, the structure and performance of government, inter-governmental relationships, debt policy, etc. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on the public sector. Possible teaching contributions: Introduction to Economics, Economic Statistics,

Econometrics, Public Economics, Public Finance, Political Economics, and Applied Research Methods – all at the undergraduate or graduate levels. Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant portions of the real economy that are not well covered by the current faculty, including the public sector. A public economist, depending on his/her research specialty, would complement our political economy strengths (Innes, Kantor, and Whalley) and our labor strengths (Neumann, Whalley, and Winder). Further, the successful recruit, again depending on his/her research, would bolster our expertise in management as this economist might be able to work with colleagues and students interested in government performance and decision-making. Finally, a public economist would be in a position to work with other social scientists interested in the political process, especially political scientists and sociologists interested in institutions and organizational behavior.

International Heritage. Policy and Management; World Heritage (Associate/full): World Heritage involves a multidisciplinary approach to the theory and practice of conservation, protection, management and communication of heritage. The complexity of this work requires a theoretical background in heritage (natural and cultural, tangible and intangible), interpretation, management and presentation, but also practical skills in the implementation of sustainable policies. In short WH studies reflect not just the sites involved, but also the tension between the programs of official organizations (such as UNESCO, ICOM, ICOMOS, etc.), their formal processes, and their final adaptation/implementation in different cultural contexts across the globe and diverse communities. This approach embraces ethical, social, anthropological, political, historical, environmental, economic and cultural issues. To build a program that integrates the theoretical/philosophical and the practical (reflected in the work of Professor Forte) we need to hire a scholar engaged with issues of heritage politics, policy or management with a strong international focus. This may include research on international policies and management, including legal and ethical issues, or study and analysis of preservation and conservation policy and an attitude to evaluate world heritage not just as a landscape, a monument or a site, but as a network of processes.

Quantitative methods; Sociology (Assistant) We intend to hire a sociologist with a strong background in quantitative techniques to add breadth and depth to our methodological skills and course offerings. This hire is likely to be relatively inexpensive, and require little or no lab space. While current sociological faculty have good quantitative skills, we would like to expand our skill set while also acquiring a faculty member who can teach graduate and undergraduate level statistics courses. Possible research strengths: advanced quantitative analytical techniques, possibly including time series analysis, multi-level modeling, or

network analysis. We anticipate that the hire's substantive area of research will fit well with one of our existing areas of strength in political sociology, inequality, or organizations and institutions. Possible teaching contributions: Soc 10 (undergraduate statistics); and may develop courses on graduate statistics, graduate regression analysis, advanced graduate research methods, and advanced undergraduate research methods. Possible research synergies: all of the sociology faculty use quantitative research methods, so having a faculty member with additional quantitative skills could potentially fit well with any and all of us. They also would be a good colleague and resource for the other quantitative social science faculty in SSHA, as well as potentially in the sciences. We plan on hiring someone who possesses these quantitative skills but also who fits will with our substantive areas of strength, including political sociology, inequality, or organizations and institutions.

Literature and Cultures/English and Creative Writing (Assistant): Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Moreover, such a scholar would support both the graduate group and would provide synergies with Professor Amussen in History, thus increasing the attractiveness of the graduate program; it could also lead to collaboration with the performing arts.

Political behavior; Political Science (Assistant) To hire a political scientist who conducts research on mass or elite political behavior, with a substantive focus on either U.S. or comparative politics. There is currently only one dedicated political behavior scholar on the UC Merced faculty, and thus this hire is necessary to bolster this key component of the Political Science Program. There are also significant potential synergies with Cognitive Science and Psychology. Possible research strengths: public opinion; elections; campaigns; voting behavior; political psychology/cognition; race, ethnicity, and politics; experimental methods; statistical modeling.. Possible teaching contributions: POLI 120 (Voting Behavior, Campaigns, and Elections), POLI 125 (Public Opinion), POLI 135 (Comparative Political Behavior), and relevant graduate courses. Possible research synergies: Nicholson (Political Science - public opinion and political psychology), Heit (Decision Sciences - reasoning and decision making), various psychology and cognitive science faculty.

Colonial American History (Full): Colonial America and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in

the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world; a senior hire will provide visibility for our program. This position would also be key in recruiting graduate students and building the graduate program.

Biological Anthropologist, Anthropology (Assistant Professor): Seeking a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology major.. Given the many needs of UCM to which a position in biological anthropology might contribute, the search is broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race.

Positions requested: AY 2011-12
(At the recommendation of the Executive Committee of SSHA, these positions are listed in alphabetical order by major discipline or program only, and are thus not ranked in order of preference).

Music studies; Arts, (GASP) (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[1] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

[1] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

Cognitive Neuroscience, Cog Sci (Assistant) We intend to hire a cognitive neuroscientist to *fill a gap in our coverage*, most likely using electrophysiological methods (EEG) to study the neural bases of cognition, broadly speaking. EEG methods are inexpensive and feasible relative to brain imaging, and hiring a cognitive neuroscientist trained in a cognitive science or psychology department would be far cheaper (particularly regarding start-up package) than hiring a similar individual trained in biology or related departments. Last year, a neuroscience candidate was recruited as a target of opportunity (UC Presidential Postdoc) through SoNS. The candidate was transferred to SSHA to be hired as part of the CIS faculty, but our offer was declined because the start-up package was much smaller than the candidate expected. A candidate with a cognitive science background would of course need sufficient lab space, but would have start-up expectations more in line with SSHA budget constraints. Possible research strengths: Learning, memory, motor system, attention. Possible teaching contributions: Potentially easing the teaching burden in the campus's most impacted major, Biology, this FTE could teach *Neuroscience* (UG), *Cognitive Neuroscience* (UG), and *Proseminar in Cognitive Neuroscience* (Grad). Possible research synergies: For this position, there is great potential for fruitful collaboration with the computational cognitive neuroscience work of Noelle (SoE/SSHA), as well as with the neural network and dynamic systems modeling work of Kello, Yoshimi, and Spivey (all SSHA).

Health economics; Economics (Open): We intend to hire an economist who studies the market for health care and/or the public policies surrounding the allocation of health care services. Health care in the U.S. presently accounts for about 15 percent of gross domestic product and, as we well know, is a source of significant political attention. Research in health economics is very broad, so it is difficult to predict a priori what type of specialist we might be able to attract. Depending on the pool put before the search committee, we might recruit a specialist in Medicare and Medicaid financing and usage, the short-term and long-term economic implications of health care access and usage, the market for medical services, etc. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on health care. Clearly, this area is an important one to add strength given the importance of health care to the economy and citizens' productivity. Possible teaching contributions: Introduction to Economics, Economic Statistics, Econometrics, Health Economics, and Applied Research Methods – all at the undergraduate or graduate levels. Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic

history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant portions of the real economy that are not well covered by the current faculty, including health. A health economist, depending on his/her research specialty, would complement our political economy strengths (Innes, Kantor, and Whalley) and our labor strengths (Neumann, Whalley, and Winder). Further, the successful recruit, again depending on his/her research, would bolster our expertise in management as this economist might be able to work with colleagues and students interested in health care financing or delivery. A health economist would be ideally suited to complement the growing strength at UC Merced in public health. The successful recruit could participate in Center for the Study of Health Disparities and the undergraduate Public Health minor. Such an affiliation would bring an economics perspective to a broadly interdisciplinary effort to understand the causes and consequences of health disparities

Mexican/Latin American History (18th-20th century); (Assistant): This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the Hispanic Studies cluster as well as the World Cultures graduate group as a whole.

Romantic/Victorian British Literature (Full/Associate): In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.

Comparative politics, Political Science (Assistant): To hire a political scientist whose research examines cross-national or cross-governmental variation in political institutions, behavior, or policy outcomes. Currently, there is only one member of the UC Merced Political Science faculty who has a dedicated focus in

the field of comparative politics (Haifeng Huang). This hire is necessary to bolster this important component of the program. Possible research strengths: Comparative political institutions (e.g., electoral systems, legislatures), comparative political behavior (e.g., comparative voting behavior, protest behavior), comparative public policy. Possible teaching contributions: POLI 3 (Intro. to Comparative Politics), POLI 130 (Comparative Political Institutions), POLI 135 (Comparative Political Behavior), POLI 140 (Democratization), and comparative graduate courses. Possible research synergies: Conrad (Political Science – interaction between domestic and international political institutions), Huang (Political Science – comparative political institutions), Trounstine (Political Science – comparative local political behavior and institutions), Almeida (Sociology – comparative social movements).

Developmental Psychologist: Psychology (Associate/Full): We intend to hire a senior (tenured) developmental psychologist with a focus in child and/or adolescent development. Within this broad focus, we will seek to recruit the best available candidate, but will give preference to researchers who complement and extend the areas of research expertise represented by the faculty at the time of this search (which cannot be exactly predicted because we anticipate having two new developmental faculty present at the point of this search, one at the assistant and one at the associate/full level). High-priority additions would be someone with expertise in infancy or developmental neuroscience. This hire will require both laboratory space equivalent to the largest labs in the new Social Sciences and Management Building (e.g., 900 sf), and startup funds of about $150,000. Regarding space, the anticipated developmental psychology hires would work with infants and children in laboratory settings. They need space for (a) interacting with the infant/child in a controlled environment, (b) observing those interactions through one way mirrors from a separate room, and (c) parents to wait for their infant/child in close proximity to the experimental room. Possible research strengths**:** cognitive development in infancy; developmental neuroscience; cognitive and/or social development in childhood; cognitive or social development in adolescence. Possible teaching contributions: New undergraduate and graduate courses in area of specialization (e.g. infancy; neuroscience; adolescent development); PSY 130, Developmental Psychology; PSY 136, Cognitive Development. Possible research synergies**:** Strong synergies are expected with both current developmental faculty (Chouinard and Dunham) and additional faculty hired before this search commences. In particular, an emphasis in social and cognitive development will overlap with both, and a focus in infancy or developmental neuroscience will open new avenues for existing faculty and graduate students to extend their research interests to younger children or to neuroscientific methods, respectively.

Health Psychologist; Psychology (Associate/Full) *Health psychology* deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health

psychology includes research into how behavior affects physical health as well as how physical health affects behavior.

Our priorities are to provide teaching and research expertise in salient areas of health psychology such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), (e) meta-analysis of effects in health psychology, (f) interactions between behavior and health over development in childhood (ages 0-20), and (g) etiology and prevention of behaviors associated with increased health risks (e.g., tobacco use, sexual risk behaviors, unhealthy diet). Interest in health issues prevalent in the Central Valley is of high priority within the aforementioned research areas.

A search at the senior level, based on our experience, usually generates a relatively small pool of outstanding candidates. This makes it unwise to highly focus the search on only one or a couple of these areas. Rather the best candidates overall matching our opportunities and needs need to be identified in this search. If otherwise equal candidates are available, the preference is to add strength in areas not yet covered by current faculty; yet this should be balanced with the benefits from adding faculty in already covered areas to build high recognition in a few focal areas. Opportunities for synergies with the COE Health Disparities and the Health Sciences Research Institute will of course be valued

The hire at the senior level is likely to be moderately expensive in terms of salary and start-up funds. Most all health psychologists need lab space, varying from damp lab space for use in collecting biological specimens from humans to desk space for data management and analysis by a cadre of assistants. Space needs would start at the size of a large lab (e.g., 650 sf) in the new Social Sciences and Management Building, and would expand proportional to any grant funding obtained; startup costs might be in the $150,000 range. <u>Possible research strength</u>: It is impossible to predict the research strengths this hire will bring, because, as explained above, searches at the senior level will necessarily be open across the broad range of aforementioned listed topics. Examples of strengths possibly represented with this hire can range from controlled experimental research with biological measurements to longitudinal survey research on national representative samples to randomized controlled trials of intervention strategies with patient populations to meta-analysis of existing research findings. Analytic strategies may also be as varied, including for example analysis of complex sampling design, longitudinal growth curve modeling, hierarchical linear modeling, structural equation modeling, neural network analysis, and traditional general linear model analysis <u>Possible teaching contribution</u>: Because actual expertise cannot be predicted the possible teaching contributions may be varied and include, for example, some set of the following *undergraduate courses*: Psy 1 Introduction to Psychology, Psy 10 Analysis of

Psychological Data, Psy 15 Research Methods in Psychology, Psy 105 Research Methods in Psychology, Psy 120 Physiological Psychology, Psy 131 Social Psychology, Psy 132 Personality, Psy 133 Abnormal Psychology, Psy 140 Clinical Psychology, Psy 145 Human Sexuality, Psy 146 Alcohol, Drugs and Behavior, Psy 147 Health Psychology, Psy 150 Psychological Perspectives on Cultural, Racial and Ethnic Diversity, Psy 190 Topics in Psychology, and new course(s) in some focused area of health psychology. It is also possible this hire can contribute to the newly approved Minor in Interdisciplinary Public Health. At the *graduate level*, we plan to expand the basic curriculum in health psychology to provide a solid foundation for those graduate students with this focus. We are especially interested if this hire can cover additional foundational courses such as Psy XXX Biological Basis for Health Psychology and Psy XXX Health Psychology Methods and Measures, in addition to seminars in the an area of expertise. Possible research synergies**:** Possibilities include: Hoyt's research into biobehavioral mechanisms related to chronic disease, Song's research into decision making regarding health risk behaviors, Wallander's research into quality of life and development during childhood, and Shadish's meta-analysis research in health psychology, plus whatever an expected new hire at the senior level for the fall 2010 will add. Moreover, we expect synergies with the activities in the COE on Health Disparities and Health Sciences Research Instititute.

Race/ethnicity or Immigration; Sociology (Open): We intend to hire a sociologist who studies race and ethnicity and/or immigration. This hire is likely to be relatively inexpensive, and require little or no lab space. Social inequality is one of the three substantive foci of our growing program, and we would like to expand our breadth with a race and ethnicity scholar, possibly one who studies immigration. Possible research strengths: Minority experiences in the labor market or other social institutions such as education; ethnic and racial identity formation; urban inequality; race and ethnicity and the life course; immigrant experiences; impact of immigration on individual health and well-being; immigration and family dynamics; immigration and economic outcomes. Possible teaching contributions: Soc 30 (Social Inequality), Soc 130 (Stratification), Soc 180 (Race and Ethnicity); and may develop additional upper division race and ethnicity courses, a course on the sociology of immigration, and graduate courses on race and ethnicity and/or immigration. Possible research synergies: Would fit well with Weffer's focus on race and urban inequality; Beattie and Hamilton's work on education and inequality; possible connections with Van Dyke and Almeida's work on political mobilization. This hire would also contribute to inter-disciplinary programs for which race and ethnicity are relevant, and could potentially contribute to the Chicano Studies Minor.

Positions requested: AY 2011-13
(At the recommendation of the Executive Committee of SSHA, these positions are listed in alphabetical order by major discipline or program only, and are thus not ranked in order of preference).

Pre-20th C Arts GASP (Open) Art history (due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

Sustainable Architecture , Arts, MAP (Assistant): Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

Industrial organization, Economics (Open: We intend to hire an economist who studies market structures and how firms interact with each other strategically in a competitive setting. Research in industrial organization (IO) is exceptionally broad, so it is difficult to predict a priori what type of specialist we might be able to attract. Depending on the pool put before the search committee, we might recruit a specialist in firm strategy and performance, pricing strategy, monopoly/oligopoly or other market imperfections, antitrust policy, and any of the numerous sector specialties. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on IO. Clearly, this area is an important one to add strength given the importance of markets and competition in developed economies. Possible teaching contributions: Introduction to Economics, Economic Statistics, Econometrics, Industrial Organization, Strategy, and Applied Research Methods – all at the undergraduate or graduate levels.

Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant areas of the discipline that are not well covered by the current faculty, including IO. An IO economist could complement our political economy strengths (Innes, Kantor, and Whalley) if s/he studied anti-trust policy or our labor strengths (Neumann, Whalley, and Winder) if s/he focused on how firms behave in input markets or the organization of the firm. Both Innes and Neumann have done research on the retail sector, which would form the basis for a strength in IO if they were able to add an IO specialist to the economics group. A recruit in IO would decidedly contribute to the management research and teaching programs, as this scholar would focus on the strategic aspects of firms' decision-making and relationships to competitors. Finally, again depending on the expertise of the recruit and of the aforementioned hires in public and health, all three might complement one another's expertise given that all would be concerned with the performance of important sectors of the real economy.

Colonial and Post-Colonial Literature in English (Open). This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.

Philosophy of Mind; Philosophy/Cog Sci (Assistant) We intend to hire a philosopher who will *fill a gap in our coverage* of the cognitive and information sciences, where we currently have only two faculty with relevant expertise. Recently, a great many philosophers of mind have begun synthesizing experimental findings from cognitive science and neuroscience, and applied results from robotics and artificial intelligence, to formulate and support their logical arguments for various theories of how the mind works. By hiring in the area of Philosophy of Mind, we simultaneously smooth out potholes in CIS's ability to teach enough courses in this important area and lay the groundwork for what will eventually become a full-fledged Philosophy program of its own at UC Merced in the future. This hire would be comparatively inexpensive, and would require little or no lab space. Possible research strengths: agency, moral psychology, mental causation, metaphysics of mind, bioethics, perception, personal identity, animal cognition, concepts, embodied cognition. Possible teaching contributions: Introduction to Philosophy (UG), Introduction to Logic (UG), Philosophy of Mind (UG), and perhaps develop new courses such moral psychology, bioethics, free will and agency, metaphysics of mind, or animal cognition (UG or Grad). Possible research synergies: Yoshimi's research on

consciousness and dynamical systems, Vanderschraaf's research on moral and political philosophy, Noelle's research on cognitive control, and Spivey's research on unconscious perception.

Political institutions; Political Science (Assistant): To hire a political scientist who focuses on either political behavior or political institutions within the context of U.S. politics. One of the primary strengths of the current Political Science group is in the area of American politics. This hire would build on that strength and help reinforce graduate training in this area. Possible research strengths: American mass public opinion; campaigns, voting, and elections; Congress; presidency; judiciary; state and local politics; interest groups; political parties; race, ethnicity, and politics. Possible teaching contributions: POLI 1 (Intro. to American Politics), POLI 2 (Controversies in American Politics), various upper division American politics classes (and future corresponding graduate classes). Possible research synergies: Hansford, Monroe, Nicholson, and Trounstine (Political Science – American politics); Van Dyke and Weffer (Sociology – American political protest and social movements); Economics faculty.

Health Psychologist; Psychology (Associate/Full) Health psychology deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health psychology includes research into how behavior affects physical health as well as how physical health affects behavior. The same strategy as depicted for searching to fill the previous position in health psychology in 2011-12 will be employed for this search. It will be important to consider what expertise was added to the health psychology faculty from senior hires in 2010 and 2011-12, which are unknown at present. Nonetheless, our priorities are to provide teaching and research expertise in salient areas of health psychology such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), (e) meta-analysis of effects in health psychology, (f) interactions between behavior and health over development in childhood (ages 0-20), and (g) etiology and prevention of behaviors associated with increased health risks (e.g., tobacco use, sexual risk behaviors, unhealthy diet). Interest in health issues prevalent in the Central Valley is of high priority within the aforementioned research areas.

A search at the senior level, based on our experience, usually generates a relatively small pool of outstanding candidates. This makes it unwise to highly focus the search on only one or a couple of these areas. Rather the best candidates overall matching our opportunities and needs need to be identified in this search. If otherwise equal candidates are available, the preference is to add strength in areas not yet covered by current faculty,; yet this should be balanced with the benefits from adding faculty in already covered areas to build high

recognition in a few focal areas. Opportunities for synergies with the COE Health Disparities and the Health Sciences Research Institute will of course be valued

The hire at the senior level is likely to be moderately expensive in terms of salary and start-up funds. Most all health psychologists need lab space, varying from damp lab space for use in collecting biological specimens from humans to desk space for data management and analysis by a cadre of assistants. Space needs would start at the size of a large lab (e.g., 650 sf) in the new Social Sciences and Management Building, and would expand proportional to any grant funding obtained; startup costs might be in the $150,000 range. Possible research strength: It is impossible to predict the research strengths this hire will bring, because, as explained above, searches at the senior level will necessarily be open across the broad range of aforementioned listed topics. Examples of strengths possibly represented with this hire can range from controlled experimental research with biological measurements to longitudinal survey research on national representative samples to randomized controlled trials of intervention strategies with patient populations to meta-analysis of existing research findings. Analytic strategies may also be as varied, including for example analysis of complex sampling design, longitudinal growth curve modeling, hierarchical linear modeling, structural equation modeling, neural network analysis, and traditional general linear model analysis Possible teaching contribution: Because actual expertise cannot be predicted the possible teaching contributions may be varied and include, for example, some set of the following *undergraduate courses*: Psy 1 Introduction to Psychology, Psy 10 Analysis of Psychological Data, Psy 15 Research Methods in Psychology, Psy 105 Research Methods in Psychology, Psy 120 Physiological Psychology, Psy 131 Social Psychology, Psy 132 Personality, Psy 133 Abnormal Psychology, Psy 140 Clinical Psychology, Psy 145 Human Sexuality, Psy 146 Alcohol, Drugs and Behavior, Psy 147 Health Psychology, Psy 150 Psychological Perspectives on Cultural, Racial and Ethnic Diversity, Psy 190 Topics in Psychology, and new course(s) in some focused area of health psychology. It is also possible this hire can contribute to the newly approved Minor in Interdisciplinary Public Health. At the *graduate level*, we plan to expand the basic curriculum in health psychology to provide a solid foundation for those graduate students with this focus. We are especially interested if this hire can cover additional foundational courses such as Psy XXX Biological Basis for Health Psychology and Psy XXX Health Psychology Methods and Measures, in addition to seminars in the an area of expertise. Possible research synergies**:** Possibilities include: Hoyt's research into biobehavioral mechanisms related to chronic disease, Song's research into decision making regarding health risk behaviors, Wallander's research into quality of life and development during childhood, and Shadish's meta-analysis research in health psychology, plus whatever an expected new hire at the senior level for the fall 2010 will add. Moreover, we expect synergies with the activities in the COE on Health Disparities and Health Sciences Research Instititute.

Quantitative Psychologist; Psychology (Assistant) We intend to hire a quantitative psychologist with a solid background in statistical modeling, but who does not overlap unduly with the previous hire. This hire will require both laboratory space equivalent to one of the smaller labs in the new Social Sciences and Management Building, and startup funds of about $80,000 (in 2010 dollars). This position will *expand our existing strengths* in Quantitative Psychology, and strengthen our ability to contribute to research in both Developmental and Quantitative Psychology. This hire will also teach one of our two required graduate statistics courses. Possible research strengths: longitudinal data analysis, multilevel modeling, categorical data analysis, structural equation modeling, item response theory, meta-analytic model Possible teaching contributions: PSY 10, *Analysis of Psychological Data*; PSY 15, *Research Methods in Psychology*; PSY 105, *Advanced Research Methods in Psychology*; PSY 171, *Psychological Tests and Measurement*; PSY 190, *Topics in Psychology*; PSY 202A *Advanced Psychological Statistics I*; PSY 202B, *Advanced Psychological Statistics II*; PSY 202C, *Multivariate Methods*; PSY 205, *Measurement Theory and Psychometrics*; PSY 206, *Quantitative Methods for Reviewing Research*; PSY 207, *Linear Structural Modeling*; PSY 211, *Computer Programming for Social Sciences*; and PSY 212, *Special Problems in Psychological Statistics.* This hire may also develop new undergraduate and graduate courses, for example, *Multilevel Modeling* or *Longitudinal Data Analysis* Possible research synergies: Direct synergies are with Shadish's research on meta-analysis and Vevea's research on meta-analysis and item response theory. However, this hire will benefit most of our faculty in Developmental and Health psychology where nested design requiring multilevel models, and longitudinal designs following children or patients over time, are common.

Health Sociology; Sociology (Open): We intend to hire a sociologist who studies the sociology of health and medicine. This hire is likely to be relatively inexpensive, and require little or no lab space. They would expand our breadth by focusing either on health institutions, or inequality and health. Possible research strengths: social aspects of individual health and well being; inequality in health outcomes; inequality in medical institutions; the social organization of health care. Possible teaching contributions: Soc 30 (Social Inequality), may develop an upper division health sociology course, graduate courses on sociology of health, and could potentially teach courses on inequality or organizations, depending on their interests. Possible research synergies: Would fit well with the University's Center for the Study of Health Disparities and the undergraduate Public Health minor; Beattie, Weffer and Hamilton's focus on social inequality; and, Song, Wallender and Hoyt's research on health psychology, as well as health research in the natural sciences.

Management positions recommended but not ranked or prioritized

Finance (2010-11);* Associate or Full*: To hire a researcher who studies the ways in which individuals, business entities and other organizations allocate financial resources over time, with particular attention given to decision-making under conditions of uncertainty. Finance courses are core to any Management program, but Merced currently has no ladder rank faculty in this area, limiting our course offerings. Potential hires could have a PhD in Finance or Management, Economics, Mathematics, Decision Sciences, or other fields. There are also significant potential synergies with Economics, Applied Mathematics, Cognitive Science, and Engineering, depending on the expertise of the specific scholar recruited.

Possible research strengths:)1)-the generation and analysis of financial information; 2) methods to raise and allocate investment funds, including asset pricing, capital budgeting, investment strategy, and international asset management; 3) the structure and regulation of financial institutions; and 4) behavioral finance. Possible teaching contributions: MGMT 25 (Introduction to Finance), MGMT 121 (The Economics of Money, Banking, and Financial Institutions), MGMT 165 (Intermediate Finance), and new courses developed by the successful recruit. Possible research synergies: Economics faculty, Yihsu Chen (Engineering/SSHA; energy/asset modeling); Harish Bhat (Applied Mathematics); Evan Heit (decision sciences); Cognitive Science faculty

Marketing (2010-11);* Associate or Full*: To hire a researcher who studies the process whereby demands for products, services and ideas are anticipated, managed and satisfied. Marketing courses are core to any Management program, but Merced currently has no ladder rank faculty in this area, limiting our course offerings. Potentially hires could have a PhD in Management, Economics, Psychology, Decision Sciences, Cognitive Science. There are significant potential synergies with faculty in a number of areas, such as Economics, Sociology, Political Science, Psychology, and Cognitive Science. A specific area of potential specialization for UC Merced is a specialization in the retail sector, so attracting a marketing scholar to the campus could bolster this burgeoning strength. Possible research strengths: Understanding, explaining and predicting consumer behavior and the effectiveness of various marketing strategies, and developing theoretical frameworks with which consumer choice can be better understood and more efficient and effective strategies can be designed. Potential applications include media communications in such areas as health, environment, or politics, which would complement other faculty's interests. Possible teaching contributions: MGMT 120 (Marketing), other marketing courses not currently offered, such as Consumer Choice, Media and Advertising, Market Segmentation, Behavioral Economics; cross-listed courses with Political Science, Sociology, Psychology, etc. Possible research synergies: Economics faculty (especially Todd Neumann, who studies history of retail, and Rob Innes who studies market structures); Sociology faculty (social movements

and effects of mass media); Psychology faculty (any faculty with interests in social psychology or public health communications); Anthropology faculty (sociocultural); Cognitive Science faculty (judgment and decision making). HSRI.

Management Strategy (2010-11) **Any:** To hire a researcher who studies how firms strategize with respect to the various uncertainties and constraints that they face. Possible areas include the interactions of economic incentives, firm strategy, public policy and political economy, institutional design, and technology management, with applications to antitrust, telecommunications, energy and the environment, airlines, health, banking, human resources, game theory, international trade, and strategy, both private and public. Such a faculty could add applied "content" courses to the Management program. Merced currently has no ladder rank faculty, limiting our course offerings. Potential hires could have a PhD in Management, Economics, Decision Sciences, Political Science, Sociology, Public Health, Engineering, or other fields. There are also significant potential synergies with Economics, Political Science, Sociology, Engineering, and Psychology.

Possible research strengths (examples, not exclusive list): 1) International Economics: The effects of international trade and trade restrictions on prices and welfare; the determination of exchange rates and relative prices across countries; the economics of pollution havens, eco-dumping, international labor and environmental agreements, and international economic development; 2) Industrial Organization: Strategy, pricing, and performance in imperfectly competitive markets, including the nature and effects of contracts, vertical and horizontal organization of production and retailing, and antitrust; 3) Risk and Insurance: The intersection of Finance and Economics, including decision making under uncertainty, market failures in insurance, pricing risk, public decision making under risk, diversifiable vs. undiversifiable risk, and ethical issues in cross-generational choices under risk.; 4) Health Economics and Management: Economics of health care management and delivery from consumer decision making to doctor incentives, hospital management, innovation and marketing of pharmaceuticals and vaccines, and alternative health delivery systems. Possible teaching contributions: MGMT 116 (Organizational Strategy), MGMT 141 (Industrial Relations and Human Resource Economics), Organizational Behavior, applied courses in public policy, energy management, health management, insurance, international trade, plus many other potential courses not currently offered in applied areas of Management, depending on expertise. Possible research synergies: Economics faculty, Yihsu Chen (Engineering/SSHA; energy/asset modeling), Tony Westerling (Engineering/SSHA; resource management), Psychology faculty (with public health interests), Public Health faculty, Peter Vanderschraaf (Philosophy; game theory), Political Science and Sociology faculty, SNRI and HSRI more generally.

Projected space requirements of SSHA

In July 2011 SSM is scheduled to open. This will be of enormous importance to SSHA and the campus in general. As a part of the plan (and which was a serious reason for the delay in finishing the plan) I undertook a careful analysis of existing and projected SSHA space requirements under the most optimistic of our FTE requests.

At the start of AY 2010-11 (or 7/1/10), SSHA ladder faculty will require 50 offices assuming all hires (including a projected Public Health position) are successful. Three of our cross-hires (Chen, Noelle, and Westerling) have offices in Engineering. One office is currently occupied by Greg Herken, who will be retiring on 6/30/10; this space will be open at the start of the new academic year.

Office needs are thus:

7/1/2011	50
7/1/2012	61 (11 new)
7/1/2013	69 (9 new)
7/1/2014	78 (9 new)

SSM currently has 72 spaces designated as faculty offices. Taken together, SSHA has allocated to it a total of 123 offices (this includes the 72 SSM offices and the existing 51 COB offices; this includes Herken's to-be-vacated office). If SSHA is allotted the number of faculty requested in this proposal (27), by the start of AY 2013-14 we will have a total of 78 faculty. In principle, this creates a surplus of 45 offices that can be devoted to continued growth, assignment to adjuncts, or other academic purposes. This number may be smaller if FTE are released to the Management major from the Provost's pool.

At the start of AY 2010-11 (7/1/10), assuming a full slate of successful hires, we will require 19 lab spaces. Thus, assuming that the FTE proposal is fully funded, lab needs are:

7/1/2010	19
7/1/2011	26 (seven new)
7/1/2012	29 (3 new)
7/1/2014	31 (2 new)

There are a total of 16 "spaces" designated as labs in COB, AOB or Castle. Note that the definition of lab is broad: some are sets of offices, others are true lab spaces, and still others are conference rooms that have been re-tasked to research purposes. SSM has a total of 41 spaces designated as research labs or studios devoted to the arts (in MAP). This is a fairly conservative estimate of the number of lab spaces in SSM. In principle, this leaves a surplus of 10 lab spaces for continued growth. In general, planned lab space meets or exceeds the amount of square footage currently devoted to lab use in COB/AOB.

In summary, space is not a significant concern for the development of the SSHA FTE plan.

Strategic plans as submitted by the four programs of SSHA

The following plans are offered as part of the overall SSHA strategic plan. It is here that each program makes its best case for the allocation of FTE, and these plans are the basis upon which I as dean created the draft FTE allocation plan. I have not modified these documents in any way aside from placing them all into the same font. They are listed in alphabetical order. Plans submitted by the graduate groups follow them.

Cognitive and Information Sciences Strategic Plan

0. Executive Summary
Within three years, Cognitive and Information Sciences at UC Merced can become one of the top ten cognitive science programs in the world.

The Cognitive and Information Sciences (CIS) bylaw 55 unit proposal, and the CIS graduate group proposal, are currently in their respective review processes. This strategic plan document supplements those proposals with a description of our vision for the future growth of Cognitive and Information Sciences at UC Merced. The CIS faculty unit brings together faculty in the School of Social Sciences Humanities and Arts who utilize computational models and/or technological innovations in their research. CIS faculty members are dedicated to synergizing research and teaching in interdisciplinary endeavors that form a natural class around the emergence of organized system behavior at all scales, including for example biological intelligence, artificial intelligence, perception-action systems, game theory, systems science, communications, and both human-computer and human-environment interaction. These research areas, and their ties to computational modeling and technological innovation, complement UC Merced's closely-related strengths in robotics, computer graphics, machine learning, and visual/spatial analysis (in the School of Engineering, SoE), computational biology (in the School of Natural Sciences, SoNS), and environmental sciences (spread across all three schools at UC Merced).

At the academic core of the CIS faculty unit is the field of Cognitive Science, made unique in our case with an emphasis on computation and simulation techniques. At UC Merced, Cognitive Science combines theories and methods from computer science, complex systems, neurobiology, linguistics, philosophy, service science, psychology, and neurobiology. Our overarching research program aims to understand how cognition and other self-organized behavior emerge within and between biological organisms and natural and

artificial systems. The cognitive scientists produced by our graduate and undergraduate curricula go on to conduct research in universities, and pursue careers in areas as diverse as cognitive engineering (which includes areas such as human factors engineering, computer supported collaborative work, and user interface design), information sciences, management, law, service science, graphic design, communications, and medicine.

Cognitive and Information Sciences has become a signature academic program at UC Merced. Our cognitive science major is popular among undergraduates (fourth largest major in SSHA). Our faculty and graduate students are receiving prestigious awards and publishing high-profile articles. We are actively pursuing and obtaining substantial extramural funding. We have captured the attention of cognitive scientists worldwide. This success is the result of careful planning, outstanding hires, forward-looking vision, and expansive interdisciplinary research. It is also the result of resourcefulness. We make the most of our limited FTE, space, and graduate support resources.

To continue our success, the CIS faculty unit must grow and maintain balanced ties to all its related disciplines. Only then can it benefit from the cross-fostering of ideas in various research and teaching agendas while contributing value in return to each of the other disciplines. CIS will, therefore, contribute in a balanced way to different strategic areas at UC Merced, for example, through links to Engineering, Biological Sciences, and Management. CIS will continue to serve as a hub of scientific and academic integration amidst the exceptional intellectual synthesis that promises to make UC Merced unique within the University of California system, and among universities around the world.

1. The Challenges

The Cognitive and Information Sciences faculty unit has gotten off to a strong start, yet challenges lie ahead. We need to:

- obtain faculty positions to fill gaps and expand areas of strength
- obtain faculty positions devoted to teaching in the Cognitive Science major
- hire faculty who will actively seek and obtain extramural funding
- acquire adequate research space for faculty and graduate students
- fortify our stand-alone PhD program (proposal currently under review)
- strengthen ties to the School of Engineering
- build bridges to the School of Natural Science
- ensure that our program has strengths in multiple sub-areas of Cognitive Science
- improve recruiting efforts for undergraduate and graduate students
- expand research opportunities for students from underrepresented groups

2. The Strategy

By raising the Cognitive and Information Sciences faculty unit as a beacon of excellence within UC Merced, a large and diverse array of related disciplines

will be similarly raised with it. Due to its integration of varied researchers across the campus in their joint endeavor to study the function of natural systems, brains, and artificial minds, programs such as computer science, psychology, economics, management, and the biological sciences will all benefit from an institutional commitment to CIS.

2.1 Cognitive and Information Sciences Faculty

The CIS faculty unit consists of 10 core faculty members, as well as 24 affiliate faculty members (listed elsewhere). The 10 core members come from a variety of disciplines that intersect computation and cognition:

Yihsu Chen (Assistant Professor of Environmental Economics and Engineering, and Geography, SSHA and SoE)
Chris Kello (Associate Professor of Cognitive Science, SSHA)
Paul Maglio (Associate Adjunct Professor of Cognitive Science, SSHA)

Teenie Matlock (Associate Professor of Cognitive Science, SSHA)
David Noelle (Assistant Professor of Cognitive Science and of Computer Science and Engineering, SSHA and SoE)
Michael Spivey (Professor of Cognitive Science, SSHA)
Peter Vanderschraaf (Associate Professor of Philosophy, SSHA)
Anthony Westerling (Assistant Professor of Environmental Policy and Engineering, and Geography, SSHA and SoE)
Art Woodward (Professor Emeritus of Psychology, SSHA)
Jeff Yoshimi (Assistant Professor of Philosophy, SSHA)

2.2 National Recognition of the CIS Faculty Unit

In the following section, we present metrics to begin documenting the overall national (and international) recognition among our 9 core active (non-emeritus) CIS faculty, comprising 1 full professor, 3 associate professors, 1 adjunct associate professor, and 4 assistant professors. To make these performance metrics quantifiable (and eventually generalizeable), some details are unavoidably lost. Note: The choice of some metrics may be revised in the future, perhaps as a shared template of performance metrics is adopted across multiple faculty units.

These metrics clearly demonstrate that the CIS faculty have research programs that exert great influence in their various fields. These metrics also indicate that CIS faculty are successful at bringing in extramural funding, and that they receive awards for recognition in research and teaching. The first metric we report for our CIS faculty unit is the h index.[2] For calculating h index among our CIS faculty, citation counts were obtained from scholar.google.com on 1/14/2010.

[2] In 2005, J. E. Hirsch introduced an elegant (though imperfect for some disciplines) quantitative metric of a scientist's impact on his/her field, the h index. (In the scientometric literature, there are critiques, extensions and modifications of this metric, but debate over alternate versions has not been settled.) The h index is calculated as the highest number N of published papers that have each been cited at least N times. For example, if a scientist has 14 papers that have each been cited 14 or more times, and his/her 15th most cited paper has not been cited 15 or more times, then that scientist's h index is 14.

<u>h index:</u>
• Overall mean h index for the 9 non-emeritus CIS faculty: 11.8
• Full, mean h index: 26
• Associate, mean h index: 14
• Assistant, mean h index: 6

Number of articles (co-)authored by non-emeritus CIS Faculty w/ >100 citations: 22

Number of CIS Faculty who have served as a member on a research grant review panel: 5

Number of funded extramural research grants on which CIS Faculty are PI: 7

Number of funded extramural research grants on which CIS Faculty are co-PI: 9

Sum total costs of current extramural research grants to CIS Faculty: ~$3.28M

Number of Journal Editor or Associate Editor positions among CIS Faculty: 4

Number of Journal Editorial Board positions among CIS Faculty: 7

Number of official positions held by CIS Faculty in Scientific Societies: 6

Total number of invited presentations by CIS Faculty in 2009: 49

Number of academic awards/honors for CIS Faculty in 2009: 7

Number of academic awards/honors for grad students of CIS Faculty in 2009: 8

2.3 Vision for the Future

When college seniors the world over ask where they should do graduate work in cognitive science, their faculty advisors will rattle off the top PhD programs in Cognitive Science, and it will sound like this: UCSD, Johns Hopkins, Edinburgh, Indiana, MIT, Brown, Rochester, Washington University, Carnegie Mellon, and UC Merced. Our goal of being a top ten program is coming to fruition as a result of rapidly increasing visibility, award-winning faculty, robust research strengths, and success in extramural funding. Our quick rise to this status is aided by the fact that the number of Cognitive Science PhD programs is still considerably smaller than the number of PhD programs in more traditional fields (e.g., Computer Science, Psychology, etc.),

and by the fact that our PhD program is one of only two such doctoral programs on the west coast (along with UCSD).

Being a top ten program in Cognitive Science will yield many positive outcomes, especially for our students. Our undergraduates will be admitted to well-known Cognitive Science PhD programs, such as MIT or UCSD, or obtain profitable industry jobs, especially in companies in nearby Silicon Valley. The latter is a likely outcome for many of our students given current hiring trends. Many high tech companies are beginning to employ large numbers of service scientists (applied cognitive scientists with expertise in programming and management) in the coming decade. For instance, IBM is hiring thousands of individuals in this area to secure its position as a world leader in service science, management and engineering. To ensure they will have service scientists to hire, IBM has been providing seed money and establishing partnerships with universities worldwide, such as UC Berkeley, UCSC, and throughout Europe and China. (See past issues of *Business Week* and *Computer World*.) (For other benefits, see section 3.)

UC Merced's Cognitive and Information Sciences group is becoming one of the signature badges of honor for the campus and the UC system, with considerably less investment than would be needed for building such prestige in other disciplines already represented at most universities. Essentially, institutional investment in CIS is a "low-hanging fruit" with enormous pay-off that will spread beyond its core faculty members to its affiliate members and to connected disciplines, including Computer Science, Biology, Philosophy, Psychology, Economics, and Management. As CIS is an interdisciplinary hub that connects SSHA with the Schools of Engineering and Biological Sciences, it both benefits from and adds to the synergistic activities across fields, thus feeding back to the various supporting disciplines, improving their own visibility and prestige in return. Thus, institutional support that goes to CIS is naturally multiplied and amplified into support for several neighboring disciplines, maximizing the scientific reputation of UC Merced in multiple fields. As an example of UC Merced's growing scientific reputation, while Professor of Cognitive Science, Teenie Matlock, was President of the UC Merced chapter of Sigma Xi (The Scientific Research Society) in 2009, UC Merced was one of only six universities nationwide awarded a *Sigma Xi Certificate of Excellence* for exceptional chapter activity, innovative programming, and community leadership. In addition, Michael Spivey was awarded Sigma Xi's highly prestigious William Procter award for distinction in research (previous recipients include Stephen Jay Gould, Herbert Simon, and Margaret Mead). From efforts like this, there will soon come a day when any UC professors who suggests that UC Merced ought to be "a small undergraduate liberal arts college" won't simply be seen as rude or insensitive, but patently and obviously wrong.

2.3 Mission

Through its scientifically rigorous integration of a variety of theoretical frameworks and methodological approaches in the study of intelligent behavior,

the Cognitive and Information Sciences Faculty Unit is an interdisciplinary hub that both draws from and gives back to the research and education strengths that are growing at UC Merced throughout the Social Sciences, Humanities and Arts, Engineering, and Biological Sciences. This symbiotic relationship will quickly and inexpensively place Cognitive and Information Sciences among the top ten Cognitive Science programs in the world.

3. Goals and Strategies

Strengths. There are four emerging areas of research strength in the Cognitive and Information Sciences faculty unit at UC Merced. Each provides multiple routes for multidisciplinary interaction, and together they form the foundation on which expansion will be based. Our productivity in these research areas has already generated considerable national and international interest in our Cognitive and Information Sciences group. Over the next few years, we aim specifically to *build on these strengths* with three of our six requested hires (Cognitive Science & Technology, Computational Linguistics, and Visual Perception).

1. *Computation*, e.g., neural networks and dynamical systems (Kello, Noelle, Spivey, Yoshimi), simulation and forecast techniques (Chen, Vanderschraaf, Westerling), distributed cognition (Maglio), statistical methods (Woodward, Westerling)
   CIS Affiliates: machine learning (M. Carreira-Perpiñán, S. Newsam), Bayesian reasoning (E. Heit)

2. *Cognitive Technology*, e.g., artificial intelligence (Kello, Maglio, Noelle), service science (Maglio), human-computer interaction (Matlock, Maglio)
   CIS Affiliates: robotics (S. Carpin, M. Kallman)

3. *Perception and Action*, e.g., spatial cognition (Matlock), visuomotor processing (Spivey), dynamical analysis of cognitive performance (Kello), cognitive neuroscience (Noelle), phenomenology (Yoshimi)
   CIS Affliates: computer vision (S. Newsam, M-H.Yang)

4. *Language*, e.g., linguistics (Matlock), speech production (Kello), sentence comprehension (Spivey), philosophy of mind (Yoshimi)
   CIS Affiliates: child language use (Y. Dunham)

Weaknesses. The weaknesses that our faculty unit experiences result from slowed growth and financial support during the present budget crisis. Our primary weakness is that there are gaps in our coverage of important fields under the umbrella of CIS. A related weakness is that, due to enormously heavy service loads and highly active participation and leadership in School, UCM, and Senate committees, CIS faculty have precious little time to service the undergraduate and graduate programs. Despite these drains on faculty

time, and due to heroic efforts on the part of CIS faculty, our current coverage of CIS fields is sufficient for our faculty unit and our graduate group to display the necessary cohesion to garner praise from colleagues all over the globe. While we have also been successful at recruiting highly competitive graduate students, the need still looms large for making hires that can fill the gaps in our coverage. In previous strategic plans for the Cognitive Science group, great emphasis was placed on hiring in Cognitive Neuroscience, Philosophy of Mind, and Spatial Analysis. Accordingly, over the next few years, we aim specifically to *fill in our gaps* with the other three of our six requested hires in these areas. These three areas are critical to our research and teaching, yet CIS currently has only 1 or 2 faculty experts in each.

Opportunities. Many unique opportunities result from sustaining a 21st Century Cognitive and Information Sciences Program at UC Merced. Unique interdisciplinary research collaborations, which would be difficult or impossible at many other universities are naturally emerging among our core and affiliate faculty, who come from diverse backgrounds. Similarly, our program produces rare interdisciplinary educational opportunities for undergraduates, such as project-based training that combines computer programming, statistical methods, data visualization techniques, systems design, experimental protocols, and experience with technologically advanced laboratory equipment. Undergraduate cognitive science courses and lab opportunities also allow other majors in SSHA to combine science with the arts or humanities in any number of interesting projects (e.g., interactive media and virtual reality; music perception; visual processing of art; discourse analysis of literary works; comparative linguistics). They also provide students from Natural Sciences (NS) and the School of Engineering (SoE), such as those majoring in biology and computer science, the opportunity to take social science classes related to their interests (e.g., *Introduction to Cognitive Science, Artificial Intelligence, Neural Networks, Cognitive Neuroscience*).

Graduate training in Cognitive and Information Sciences can prepare PhD's for academic posts not only in cognitive science departments but also in computer science departments, information science departments, psychology departments, philosophy departments, linguistics departments, and, as well as for industry positions in areas related to cognitive engineering, data mining, and machine learning. Cognitive Science training on our campus can also benefit students from underrepresented groups. Many of our Cognitive Science undergraduate majors are from ethnically diverse backgrounds or are women. The low representation of women and other minorities (below 10 percent) is viewed as a problem in cognitive science departments and programs across the country, and among members of the Cognitive Science Society.

Threats. The key threat that we see lurking in the future is one that would severely affect many faculty groups on campus, not just CIS. The threat of UC Merced being demoted to the status of an undergraduate liberal arts college, if its research reputation were to dwindle and/or it had not graduated enough

PhDs by 2013, would be simply devastating. The campus would experience a mass exodus of its most world-renowned faculty. The primary (and most affordable) solution to this threat is a substantial increase in graduate student support campus-wide. Without high-quality graduate students in our faculty laboratories, the scientific research that maintains our national and international reputation will inevitably fade. Our best graduate applicants understandably express concern when they learn that UC Merced offers little in the way of university fellowships, imposes exorbitant non-resident graduate tuition fees, and provides no office space for graduate students (often forcing them work at a desk in a public space, rather than risk interfering with laboratory data collection by sharing a desk in the lab during a human cognition experiment.) In order to avoid being relegated to an undergraduate liberal arts college in the future (and thereby losing all of its highest-quality faculty), it is critical that UC Merced invest heavily in its graduate student community.

3.1 Research Opportunities and Funding

Although most academic programs generally seek research funding from one or two basic sources, research projects in the Cognitive and Information Sciences faculty unit routinely draw from a wide variety of external research funding sources, including grants from:

- government institutions
  NSF, NIH, NOAA, NASA, DARPA, USDA, California Energy Comission
- private institutions
  McDonnell, Sloan, Glushko-Samuelson Foundation
- University of California partnerships
  UCOP Digital Media Discovery Grants, CITRIS
- local industry groups and high-tech companies
  HP, IBM Research, Google

Our Cognitive and Information Sciences graduate group (proposal under review) is a natural candidate for a training grant (such as an NIH T32, an NSF IGERT, or an NSF GK12) that would include fellowships for graduate students and postdocs, conference travel funds, and funds for a colloquium budget. We are in an excellent position to pursue such funding because our faculty have an impressive track record of external support.

In 2008, the Glushko-Samuelson Foundation provided a generous gift of 50,000 dollars to cognitive science faculty to boost the visibility and support activities centered around cognitive science at UC Merced. The gift, which was intended to last for three years, has supported the following activities for the past two years:

1) Distinguished Cognitive Scientist award and visit. This high-profile event attracts faculty, students, as well as members of the Merced community,

to a lecture and reception to showcase important advances in cognitive science that have an impact on everyday life. The 2008 recipient of the Distinguished Cognitive Scientist award was Professor George Lakoff of UC Berkeley Linguistics Department. The 2009 recipient was Linda B. Smith of University of Indiana Cognitive Science Program. The 2010 recipient is Michael Mozer of University of Colorado, Boulder Cognitive Science Institute and Computer Science Department. With each visit, faculty and graduate students have the opportunity to meet and discuss their research with a well-established leading cognitive scientist.

2) *Mind, Technology, and Society* (MTS). This weekly talk series brings in experts from cognitive science and related areas, including neuroscience, linguistics, philosophy, computer science, and information sciences, to present their work to a combined graduate seminar (COGS 250) and faculty audience. These well-attended lectures also bring in undergraduates and researchers from the School of Natural Sciences and the School of Engineering. MTS keeps UCM cognitive scientists and colleagues apprised of recent developments in the cognitive science and related fields and provides graduate students the opportunity to network.

3) Conference travel funds for students. These funds enable UC Merced graduate students to attend and present their research at the annual Cognitive Science Society meeting. This enables our students to acquire peer-review of their work in a richly interactive conference atmosphere. It also provides the opportunity to network with leading figures in the field, and to interact with other cognitive science students.

4) Best Cognitive Science Project. Funds are also available (but have not yet been used) to award an undergraduate and a graduate student an award for an outstanding research project in UCM Research Week. Such awards ensure that the campus maintains a strong emphasis on research at all levels of education, and to increase visibility of the campus in the community.

This honor bestowed upon the cognitive science group by the Glushko-Samuelson Foundation demonstrates confidence in our efforts to rapidly build a world-class program in cognitive science. The donor provided comparable gifts only to cognitive science programs at UC Merced, UCSD, Johns Hopkins, and UC Berkeley. We look forward to future interactions with this foundation and other private philanthropic organizations.

3.2 Teaching Opportunities and Enrollment

UC Merced Cognitive Science has gained the attention of cognitive scientists worldwide since its inception in 2004-5. When the campus opened a

year later, cognitive science courses instantly attracted students who were intrigued by interdisciplinary training in human behavior, biology, and technology. In early 2005, a make-shift cognitive science emphasis track under SCS was created. In 2007, the bonafide Cognitive Science majors, BA and BS, were created to meet student demand. A minor in Cognitive Science was also crafted and approved.

Though the number of cognitive science majors may never be as large as the more traditional majors, such as psychology or political science, the number of cognitive science majors at UC Merced is already impressive. There are already 77 COGS majors and 22 COGS minors (January, 2010), making Cognitive Science the fourth largest major in SSHA and one of the top 10 majors on the campus). Moreover, as is the case at UCSD and UC Berkeley, which offer cognitive science undergraduate programs, our courses function as service courses for students in other areas, including biology, computer science, and psychology. Our courses contribute to a variety of programs. In fact, some COGS classes are cross-listed with other areas, in particular, COGS 123/CSE 173, COGS 125/CSE 175, COGS 153/MGMT 153, COGS 152/MGMT 150, and COGS 141/PSY 162.

Student interest in cognitive science is evident in robust course enrollments in COGS courses. Note that our courses are often capped because we do not have a sufficient number of TAs or because of limited room size (e.g., COGS 1, Fall 2009, COGS 5, Spring 2010). We routinely find ourselves forced by the administration to turn students away who want to add our courses. This actually produces a form of catch-22, whereby we have insufficient TAs to expand the undergraduate enrollment in a course, and then with those courses not expanded in size, there is no clear evidence for the need to increase the number of TAships next time (thus hindering growth of the graduate program as well).

Undergraduate Training. Over the next three years, we would like to continue to offer our more popular undergraduate COGS courses for majors and non-majors, for instance, COGS 1 (*Introduction to Cognitive Science*), COGS 5 (*Introduction to Linguistics*), COGS 105 (*Cognitive Science Research Methods*), COGS 152 (*Service Science),* COGS 159 *(Metaphor and Thought),* COGS 153 *(Judgment and Decision Making*), COGS 123 (*Computational Cognitive Neuroscience*). Several of these courses are requirements for the major or minor.

However, despite the growing interest in cognitive science, we are understaffed and cannot possibly meet student demand. Not being allowed to make a new hire for two years has kept us from offering several courses we need to offer. **Note that only three Cognitive Science related faculty teach exclusively Cognitive Science courses and manage the day-to-day business of its major** (Kello, Matlock, and Spivey). All other faculty who teach Cognitive Science courses have substantial teaching and program-development commitments in other disciplines as well. For example, Yoshimi also teaches in Philosophy and manages its minor, and Noelle also teaches in

Computer Science & Engineering and contributes to its strategic planning. These circumstances place restrictive limitations on COGS offerings. A larger teaching staff is critically needed so we can cover courses that we have been unable offer, for instance, COGS 128 (*Cognitive Engineering*), COGS 154 *(Cognitive Science Applications for Management)*, COGS 175 (*Spatial Cognition*), COGS 130 (*Cognitive Neuroscience*), in addition to courses that need to be developed, for instance, *Introduction to Computational Linguistics*, *Perception and Action*, and *Seminar in Visual Processing*. Note that these courses would serve other majors beside CIS, i.e. Computer Science, Management, and Biology.

To meet our students' diverse needs and ensure their success in graduate school and the job market, we will propose new emphasis areas for the Cognitive Science BA and BS in 2011. For the BS, plans include emphases in *Cognitive Engineering* and in *Neurobiology*. For the BA, current plans include emphases in *Philosophy of Mind* and in *Linguistics*. The Linguistics emphasis will meet the needs of UC Merced students with an interest in language. As linguistics is a pillar of cognitive science, our faculty plan to develop additional courses in this area. We currently offer *Introduction to Language and Linguistics* (COGS 5) and *Metaphor and Thought* (COGS 159). Other emphases to be discussed include *Service Science.*

Graduate Training. Last year we generated a proposal for a new standalone PhD in Cognitive and Information Sciences. The proposal is now under review, and once CCGA and WASC approval is achieved, cognitive science faculty will no longer be members of the Cognitive Science emphasis track within the Social and Cognitive Sciences (SCS) graduate group (current status).

Faculty are currently teaching a minimal slate of CIS graduate courses, in particular, COGS 201-202 (*Cognitive Science Foundations I & II*), COGS 203 (*Introduction to Neural Networks in Cognitive Science*), COGS 223 (*Computational Cognitive Neuroscience*), COGS 250 (*Mind, Technology, and Society* colloquium series), and COGS 285 (*Topics in Philosophy of Cognitive Science*). There are currently 12 students in the Cognitive Science portion of the special emphasis graduate group in Social and Cognitive Sciences. It is expected that these students will choose to transition into the stand-alone CIS graduate program.

As CIS becomes a standalone graduate program and enrollment increases, CIS faculty will need to spend more time teaching CIS graduate courses and training CIS graduate students. The potential for continued growth in a CIS graduate program is evidenced by our success in actively recruiting students (e.g. through our website and by creating and distributing pamphlets and other materials at the annual Cognitive Science Society meeting and to undergraduates in departments of cognitive science, psychology, linguistics, philosophy, and computer science nationwide[3]). An example of a looming need is for CIS faculty to develop and teach a Computational Modeling Foundations graduate course (COGS 206). New faculty hires in CIS will fulfill this need and others related to serving the CIS graduate program.

3.3 Interdisciplinary Opportunities

Cognitive and Information Sciences at UC Merced has demonstrated a firm commitment to excellence in interdisciplinary research. Several of our faculty conduct research or collaborate with scientists in other disciplines, especially with faculty in the School of Engineering. For example, a psycholinguist is collaborating with a computer scientist to develop virtual agents that gesture and communicate "naturally." An engineer studying pattern recognition is connecting with a vision researcher who conducts eye-movement recordings. A cognitive linguist with expertise in conceptual semantics is collaborating with a psychologist studying visually-guided reaching movements. An expert in judgment and decision-making is collaborating with a political scientist on ballot propositions. And a computational neuroscientist exploring neural network modeling is interacting with a neurophilosopher experimenting with dynamical systems theory. And there is clear potential for novel inter-group collaborations in the future, including topics such as bioethics, political philosophy, and geographic information systems. With additional hires in the areas listed in the next section, there will be dozens of robust interdisciplinary research

[3] See our website and the recruiting pamphlet at http://cogsci.ucmerced.edu

collaborations, extramural funding opportunities, and educational initiatives that span SSHA, Engineering, and Biological Sciences.

We will continue to initiate and foster interdisciplinary opportunities in teaching, research, and extramural funding. Within SSHA, we highlight our support for growth in the number of Philosophy faculty. Just as there are many synergies between Philosophy faculty and Cognitive Science faculty in CIS, additional Philosophy faculty would provide many course opportunities for Cognitive Science majors and indeed all other majors around the university. We also would like to establish connections with other colleagues in the humanities. Hiring a computational linguist would allow us to make this bridge. Hiring in the area of cognitive engineering and spatial analysis would make for interesting and unique connections for research with Maurizio Forte in virtual heritage. In Natural Sciences, we support growth in neuroscience. Hiring a cognitive neuroscientist in the next three years will round out undergraduate Cognitive Science offerings and encourage interaction between Biology and Cognitive and Information Sciences. In the School of Engineering, we continue to offer support for hires that open up new lines of interdisciplinary research, including intelligent systems, information sciences, design, and data analysis. Achieving a critical mass of such cognitive and computational scientists would help UC Merced achieve one of the five core goals it outlined in its 2009 Strategic Vision, to "build internationally renowned, multidisciplinary expertise in cognitive science and intelligent systems that leverages UC Merced's expertise in the natural and applied sciences, engineering, humanities and arts." One of the objectives of that core goal is to "establish the Cognitive Science and Intelligent Systems Research Institute (CSISRI)."

3.4 Faculty Development for 2010-2013

Our strategy for hiring new faculty is justified by our undergraduate enrollment numbers (Cognitive Science is the 4th most popular major in SSHA), but those teaching needs are not the primary motivation for our planned hires. Our strategy for hiring new faculty is primarily motivated by an identification of our strengths and boosting them to secure our top ten status in cognitive science programs worldwide. Table 1 outlines our optimal strategy for growth of the CIS faculty unit in ways that will capitalize on these existing strengths, most importantly, and will also fill in gaps in our coverage of research and teaching areas. Over the next three years, we wish to increase our core faculty by six FTEs.

<u>Table 1. Strategic Faculty Searches for the Next Three Years:</u>
2010-2011: i) Cognitive Science & Technology, ii) Cognitive Neuroscience
2011-2012: iii) Computational Linguistics, iv) Philosophy of Mind
2012-2013: v) Visual Perception, vi) Spatial Analysis

These six positions are sought over the course of the next three years into 2013, with the first two searches to take place during the 2010-2011 academic year. We note at the outset that each of these positions has some potential to be a cross-school or cross-area appointment, although ideally each search should have some flexibility in this regard. We intend to include broad interests on search committees, including representatives from both SSHA and the School of Natural Sciences for the Cognitive Neuroscience search and including representatives from both SSHA and the School of Engineering for the Cognitive Science & Technology search, for example. During all of these searches, extra measures will be taken to solicit applications from women and minorities.

Cognitive Science and Technology (2010-2011)
Level: Assistant or Associate

Goal: We intend to hire an applied cognitive scientist to *expand our existing strength* in technological and computational aspects of CIS, facilitate industry cooperation, strengthen ties with Virtual Heritage/SSHA and CSE/SoE. Our last faculty recruitment effort (search began 2007-8) focused on a Cognitive Engineering hire. The search was nearly successful. A hiring case for a candidate with expertise in both human-computer interaction (HCI) and visual perception achieved majority faculty support when the position was "deferred" by administration in response to the economic crisis. Freezing this position has crippled our plans to steadily advance our curricula into cognitive science applications to technology, and adversely affected our undergraduates. Many students pursue the cognitive science major because they are interested in the development and use of technological applications, and more generally, applied cognitive science. For some, expertise in this area is key to employment opportunities. (Comparison point: UC Berkeley Cognitive Science majors often obtain jobs in industry, for instance, Google and Yahoo!) Our students continue to ask when COGS 128 (*Cognitive Engineering*) will finally be offered, and we hope to be able to meet their needs soon.

Possible research strengths: Human-computer interaction, cognitive robotics, visualization, motor control, attentive user interfaces, virtual environments.

Possible teaching contributions: *Cognitive Engineering* (UG), *Perception and Action* (UG), *Computational Modeling Foundations* (Grad), *Cognitive Robotics* (Grad).

Possible research synergies: Matlocks' human-computer interaction, Maglio's work on service science and virtual environments, Kallmann's (CIS Affiliate) work on artificial intelligence, Newsam's (CIS Affiliate) work on pattern recognition, Noelle's work on computational neuroscience, Carpin's (CIS

Affiliate) work on robotics and motion path planning, and Kello's work on computational neuroscience and virtual environments.

Estimated start-up: ~$125K

Expected lab space requirements: one 20'X20' room and one 10'X10' room

Cognitive Neuroscience (2010-2011)
Level: Assistant

Goal: We intend to hire a cognitive neuroscientist to *fill a gap in our coverage*, most likely using electrophysiological methods (EEG) to study the neural bases of cognition, broadly speaking. EEG methods are inexpensive and feasible relative to brain imaging, and hiring a cognitive neuroscientist trained in a cognitive science or psychology department would be far cheaper (particularly regarding start-up package) than hiring a similar individual trained in biology or related departments. Last year, a neuroscience candidate was recruited as a target of opportunity (UC Presidential Postdoc) through SoNS. The candidate was transferred to SSHA to be hired as part of the CIS faculty, but our offer was declined because the start-up package was much smaller than the candidate expected. A candidate with a cognitive science background would of course need sufficient lab space, but would have start-up expectations more in line with SSHA budget constraints.

Possible research strengths: Learning, memory, motor system, attention.

Possible teaching contributions: Potentially easing the teaching burden in the campus's most impacted major, Biology, this FTE could teach *Neuroscience* (UG), *Cognitive Neuroscience* (UG), and *Proseminar in Cognitive Neuroscience* (Grad).

Possible research synergies: For this position, there is great potential for fruitful collaboration with the computational cognitive neuroscience work of Noelle (SoE/SSHA), as well as with the neural network and dynamic systems modeling work of Kello, Yoshimi, and Spivey (all SSHA).

Estimated start-up: ~$200K

Expected lab space requirements: one 20'X20' room and one 10'X10' room

Computational Linguistics (2011-2012)
Level: Assistant

Goal: We intend to hire a cognitive and information scientist with a solid background in linguistic theory in addition to training in computational and/or

experimental methods. This hire is likely to be relatively inexpensive, and require little or no lab space. This position will *expand our existing strengths* in Computation and in Language, and strengthen ties with SoE, perhaps in research areas such as automated speech recognition, data mining, and cryptography.

Possible research strengths: statistical natural language processing, corpus analysis, latent semantic analysis, speech recognition, speech perception, natural language understanding.

Possible teaching contributions: COGS 5, *Introduction to Language and Linguistics*; COGS 180, *Topics in Cognitive Science*; *Computational Modeling Foundations* (Grad), and will develop new undergraduate and graduate courses, including *Introduction to Computational Linguistics*.

Possible research synergies: Matlock's research in cognitive linguistics, Kello's work on speech and reading models, Spivey's research on sentence processing, Newsam's (CIS Affiliate) research on data mining, Carreira-Perpiñán's (CIS Affiliate) work on speech processing, and Yoshimi's research on philosophy of mind.

Estimated start-up: ~$80K

Expected lab space requirements: one 10'X10' room

Philosophy of Mind (2011-2012)
Level: Assistant.

Goal: We intend to hire a philosopher who will *fill a gap in our coverage* of the cognitive and information sciences, where we currently have only two faculty with relevant expertise. Recently, a great many philosophers of mind have begun synthesizing experimental findings from cognitive science and neuroscience, and applied results from robotics and artificial intelligence, to formulate and support their logical arguments for various theories of how the mind works. By hiring in the area of Philosophy of Mind, we simultaneously smooth out potholes in CIS's ability to teach enough courses in this important area and lay the groundwork for what will eventually become a full-fledged Philosophy program of its own at UC Merced in the future. This hire would be comparatively inexpensive, and would require little or no lab space.

Possible research strengths: agency, moral psychology, mental causation, metaphysics of mind, bioethics, perception, personal identity, animal cognition, concepts, embodied cognition.

Possible teaching contributions: Introduction to Philosophy (UG), Introduction to Logic (UG), Philosophy of Mind (UG), and perhaps develop new courses such moral psychology, bioethics, free will and agency, metaphysics of mind, or animal cognition (UG or Grad).

Possible research synergies: Yoshimi's research on consciousness and dynamical systems, Vanderschraaf's research on moral and political philosophy, Noelle's research on cognitive control, and Spivey's research on unconscious perception.

Estimated start-up: ~$50K

Expected lab space requirements: none

Visual Perception (2012-2013)
Level: Assistant or Associate

Goal: We intend to hire a vision scientist who will *expand our existing strength* in Perception & Action, and may strengthen ties to both the School of Natural Sciences (potentially assisting with the teaching burden of the impacted Biology major), and the School of Engineering, with potential connections to computer vision research.

Possible research strengths: visual perception, visuomotor coordination, visual neuroscience, computer vision

Possible teaching contributions: COGS 140/PSY 161 *Perception* (UG), COGS 141/PSYCH 162 *Visual Perception* (UG), and perhaps develop new graduate courses such as *Visual Neuroscience* (Grad), and/or *Computational Approaches to Human Visual Perception* (Grad).

Possible research synergies: Noelle's research in computational cognitive neuroscience, Spivey's research in eye movements and visual cognition, Matlock's work in spatial language, Newsam's and Yang's (CIS Affiliates) work in computer vision, and Kallman's (CIS Affiliate) work in motion path planning.

Estimated start-up: ~$100K

Expected lab space requirements: two 10'X10' rooms (possibly shared with pre-existing)

Spatial Analysis (2012-2013)
Level: Assistant

Goal: We intend to hire a spatial analysis scientist who will *fill a gap in our coverage* of cognitive and information sciences, providing connective bonds between our own faculty with expertise in areas such complex systems, ecology, neural networks, and statistics, and may strengthen ties to other areas in SSHA and SoE, such as virtual heritage, geographic information systems, cluster analysis, and geocomputation.

Possible research strengths: computational geography, complex systems, spatial statistics, ecology, archaeology

Possible teaching contributions: This hire could develop new courses such as *Geographic Information Systems* (UG), *Introduction to Complex Systems* (UG), *Complex Systems Analysis* (Grad), and *Computational Modeling Foundations* (Grad).

Possible research synergies: Westerling's research on ecological systems analysis, Chen's research on economic systems analysis, Vanderschraaf's work on evolution of conventions, Guo's (CIS Affiliate) work on geocomputation, as well as Forte's (CIS Affiliate) and Aldenderfer's (SSHA Dean) work related to geographic information systems.

Estimated start-up: ~$80K

Expected lab space requirements: one 10'X 10' room (possibly shared with pre-existing)

3.5 Finances

The Cognitive and Information Sciences faculty have an outstanding record of extramural funding, as summarized in section 2.2. Continuing to aggressively seek grants from NSF, NIH, DARPA, NASA, NOAA and other agencies will help us to provide excellent training to students in our labs and sustain our ability to conduct world-class research in the years to come. The following trends also ensure that our Cognitive and Information Sciences faculty unit will thrive:

- Enrollments in COGS courses are high at UC Merced (Section 3.2).
- Nearly 200 new Cognitive Science related undergraduate programs or departments have been established at universities in the past 20 years, including 106 departments and programs in the U.S. alone (e.g., UCSD, MIT, Johns Hopkins, Indiana University, University of Rochester). Thus, this interdisciplinary topic has significantly more visibility and recognition than it used to.

- At the same time, the small number of actual PhD programs related to Cognitive Science make it quite achievable for us to secure a *top ten* position among them.
- Cognitive Science majors are rapidly increasing at other UC campuses (e.g., there are currently over 400 majors at UCSD).
- More and more cognitive scientists are needed in the work force in the 21st Century, especially those with additional strengths in computer science and engineering, management, or neurobiology.

Based on the growing popularity of cognitive science as well as hiring trends, we anticipate as many as 240 Cognitive Science majors at UC Merced by 2013. This could mean as many as 100 students in the Cognitive Engineering track (BS), 70 students in the Neuroscience track (BS), and 70 students in the Cognitive Science BA in general. (See Section 3.2 for planned emphases.) And it will also mean new courses and larger enrollments in the courses we already have.

To cover the courses needed by undergraduate Cognitive Science students and graduate CIS students, and to continue to provide service courses to other groups on the campus, including the impacted Biology major, we will need by 2013 a total of 14 Cognitive and Information Sciences faculty, counting our current 8 non-emeritus non-adjunct faculty plus the 6 requested hires.

In addition to administrative funding for faculty lines, we will continue to vigorously pursue extramural funding. Extramural funding will enable the Cognitive and Information Sciences faculty unit to develop innovative, interdisciplinary projects with colleagues in SSHA, such as Virtual Heritage and Geographic Information Systems, as well as with colleagues in Engineering and Natural Sciences. Several cross-school funded collaborations have already been established. For instance, Marcelo Kallmann has set up a motion capture laboratory with Teenie Matlock, Shawn Newsam, Stefano Carpin, and other faculty. The lab is useful to several other cognitive scientists and engineers at UC Merced, including Michael Spivey and David Noelle, as well as researchers who study virtual heritage and second life, including Maurizio Forte. As another example, Stefano Carpin, Marcelo Kallmann, Teenie Matlock, Shawn Newsam, and David Noelle were recently granted an NSF MRI award to purchase two humanoid robots, and related equipment, in order to study embodied models of human cognition and techniques for human-robot interaction (HRI). Extramural funding will also help support graduate students so they are not permanent teaching assistants. And it will help provide undergraduate students with research opportunities they need to succeed after graduation. The enhancement of undergraduate training resulting from this research support will in turn increase enrollment of Cognitive Science majors. Finally, the formation of a Cognitive Science and Intelligent Systems Research Institute (CSISRI), as recommended in the campus's 2009 Vision Statement, can be the synergizing conduit for an even greater number of extramural funding proposals, graduate training grants, and center grants -- especially if some very small portion of the indirect costs from those grants is allowed to come back and support the Institute itself, so that it can quickly become self-sufficient.

Strategic Plan
Humanities and World Cultures, 2010-13

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I. Overview of group

Humanities and World Cultures consists of three majors (Anthropology, History, Literatures and Cultures), three stand-alone minors (Arts, Writing, Spanish), one cross-disciplinary minor (American Studies) and four programs (Foreign Languages, Global Arts Studies, Media Arts Program, World Heritage, Writing). It encompasses a variety of academic programs with a focus on the nature of human cultures and societies, the varieties of human cultural expression, as well as practice in the arts. The distinctive experience of students in these fields is that they learn to read and critically analyze societies and cultures in relation to both general norms and patterns and particular sets of values and circumstances -- cultural specificity which mitigates against reductive approaches to social phenomena. Furthermore, this critical engagement fosters empathy and understanding of other cultures vital in a global society.

We share common intellectual concerns which are addressed through a range of questions and methods. These common questions involve the creation, preservation and understanding of our cultural heritage; studies of societies and cultures past and present; questions of justice, aesthetics, and ethics; religious or spiritual practices and beliefs. We share common concerns with the construction and production of human culture – whether in the arts, political and social institutions – and processes of social and cultural change. The study of humanities and world cultures provides both tools for students to express their understanding of the world and critical and analytical perspectives within which those practices can be located.

Most of our faculty are members of the Graduate Group in World Cultures; we also have faculty members participating in the Social and Cognitive Sciences Graduate Group, the Sierra Nevada Research Institute; WCH faculty are involved with planning for cross-school programs in Environmental Science and in Spatial Analysis, and for a planned Spatial Analysis and Research Center. Within the UC system, faculty have been involved with UC Humanities Research Institute, the UC Institute for Research in the Arts, the Pacific Rim Research Group and UC-MEXUS.

Humanities & World Cultures courses enrolled a total of 6138 students in 2009-10; through the Writing Program in particular, we provide vital support for General Education, although all the fields in the program teach many students from other fields. At the same time, we offer advanced training in key fields of human endeavor, that provide skills in imaginative and empathetic inquiry and critical analysis to prepare students for the world of the 21st century.

II. Snapshot

	Senate Faculty	Majors Spring 10	Minors Spring 10	Total Enroll 2009-10
Anthropology	4	18	11	433
American Studies			1	
Arts (MAP)	1		47	789
GASP	2			228
History	5	72	31	546
Literature	5	70	10	391
Spanish	1		80	273*
World Heritage	1			64
Writing	1		67	272**
TOTAL (incl. all language and writing	20	160	247	6138

* Spanish courses included are only SPAN3, 4, 10, 11, 103, 105, 106, 141, 142, 180

** Writing courses included are only WRI 25, 30, 100, 125,130, 131, 150

Senate Faculty
Virginia Adan-Lifante
Susan D Amussen
Gregg Camfield
Robin DeLugan
Kevin Fellezs
Maurizio Forte
Jan Goggans
Gregg Herken
Kathleen Hull
Ignacio Lopez-Calvo
Sean Malloy
Manuel Martin-Rodriguez
Ruth Mostern
Holley Moyes
Robert Ochsner
Sholeh Quinn
Dunya Ramicova
Linda-Anne Rebhun
Cristian Ricci
ShiPu Wang

III. Introduction

Mission and Vision

The University of California has a three-fold mission of teaching, research, and service. The mission of Humanities and World Cultures is to develop innovative undergraduate programs which provide training in the intellectual skills of particular fields, while emphasizing the connections among them. Humanities and World Cultures locates the study of human societies and cultures in time and space, using methods ranging from textual, visual and musical analysis, archival and archaeological research, and participant observation; it teaches the practice of the arts – music, film, visual arts, and writing – in relation to their history; language instruction provides students with important skills for interacting in a global context.

Goals

Our goal is to provide a model of intellectual excellence that values particular disciplinary traditions and artistic practices while exploring the ways those traditions interact and can fruitfully engage each other. Specifically we hope to:

- Nurture junior scholars as they become intellectual leaders in their fields
- Continue to recruit excellent scholars at the junior and senior level
- Contribute to a model of interdisciplinary inquiry among undergraduates, graduate students and faculty.

Opportunities & Challenges

A combination of established senior scholars and outstanding junior faculty with broad collaborative interests provides us with the opportunity to develop an innovative, intellectually rigorous set of undergraduate and graduate programs, while stimulating new areas of research for all faculty.

At the same time, both the graduate program in World Cultures (currently developing a full program tentatively called “Cultures and Society”) and all the undergraduate programs in HWC have created imaginative curricula with marginal resources. If the University has been under-resourced, and SSHA relatively under-resourced in comparison with the rest of the University, HWC has been under-resourced within SSHA. Four of our programs have only one ladder faculty; one has only two. Of our approved majors, Literatures and Cultures is hindered in any attempts to expand to its original vision, as is History, and Anthropology is unable to meet its basic needs. None are adequately able to provide enough course offerings that students may graduate within their major. **This is neither intellectually nor practically sustainable.** Most faculty teach a range of courses more common in regional universities than in our peer institutions, and many teach overloads or, via independent study groups, the equivalent of an overload class, to ensure students will have enough units to graduate in their major. As the number of students on our campus approaches 5000, it will no longer be tenable to have key disciplines of the research

university operating with such marginal resources. Our undergraduate majors do not have an adequate range of electives, and in many areas, there are no ladder rank faculty available to teach required introductory courses when a faculty member goes on leave; in History and Anthropology, we have no one with expertise in the area of a required course. In the absence of stable funding for lecturers, we need a critical mass of ladder faculty in each of our programs in order to support recognizable, sustainable, as well as intellectually defensible and compelling programs of study and research. In addition, too many faculty are without colleagues in adjacent fields (conceptual, temporal or geographical, not just disciplinary), which hampers the development of our graduate program.

IV Three year growth plan – overview

Over the next three years, we see the programs within HWC growing by slightly more than the overall growth in campus enrollment. This estimate takes into account the expected shift in majors to SSHA from the sciences and engineering. If SSHA enrolls 55% of student majors in three years as is currently anticipated, we expect to enroll c. 25% of SSHA majors, or about 600 majors.

Three-year Projections Based on Major Enrollment for SSHA during AY2007-08 and AY2008-09

	Major Enrollment Frequency		Major Enrollment as % of UG Enrollment		SSHA % UG Enrollment Remains Constant		SSHA % UG Enrollment Increases to 55%	
					Mean % of UG Enrollment	Projected Major Enrollment	Mean % of UG Enrollment	Projected Major Enrollment
Major	Fall 2008	Fall 2009	Fall 2008	Fall 2009	Fall 2012	Fall 2012	Fall 2012	Fall 2012
ANTH	4	18	0.1591723	0.5625	1.8†	92	2.85	145
ENGLISH/CW		46			2.3‡	117	3.87	197
HIST	64	75	2.5467569	2.34375	2.45	125	3.87	197
LITC	51	73	2.0294469	2.28125	2.16			
MAP					0.65*	32	1.03	52
SPANISH		21			1.5#	77	2.75	140
SSHA Enrollment		1051				1675		2805
TOTAL UCM UG Enrollment	2513	3200				5100		5100

† Based on projections included in Table A2
‡ Assumes that English has a slightly higher proportion of SSHA majors than LITC does at present – 7% rather than 6.5 – on it's way to being c. 10% of SSHA majors, or 5% of UG majors
* Projection based on assumption that half of current ARTS minors (i.e., 20 of 41 students; 0.65% of current UG population) would declare major if available
# Projection on Spanish majors is a combination of the Spanish track in LITC, and half the current Spanish minors become Spanish majors – i.e. .7%

The next three years will also see the following developments:

- the establishment of a new major in English and Creative Writing, and one in Spanish Language and Literature; each of these new majors draws on the resources of an existing major (Literatures and Cultures) and existing minors (Writing and Spanish);
- the development of the ARTS minor into a major in Multi-disciplinary Arts
- the establishment of a minor in Global Arts Studies
- the establishment of a minor in World Heritage

- the establishment of a minor in Japanese
- Implementation of the SSHA foreign language requirement

To support our growth plan, we are asking for the following:

- Release of two positions authorized in 2008-9 for which searches were frozen
- Fourteen new FTEs
- replacement for a retiring faculty member Gregg Herken; this position is included as a search, but is not a new FTE.
- 4 new lecturers for the writing program will be required, and the conversion of 15 Unit 18 lecturers to LPSOE. (This assumes that responsibility for CORE 1 and CORE 100 are shifted to College One.)
- 5 full time lecturers in Foreign Languages
- Continuing funding for lecturers and Visiting Artist positions within MAP
- conversion of the FTEs for our existing President's post-doctoral fellows (DeLugan, Fellezs), per the Provost's written commitment

While we recognize that these requests are higher than stated allocations allow, this a conservative, if optimistic, list: as individual program plans make clear, our needs are greater than what we have listed here, particularly if the University wishes to shift enrollments toward SSHA. Furthermore, since the last two years have seen no appointments in our area, we have front-loaded our request into the first year of the plan period.

The list that follows is ranked for the first year, but not the years following. (The first position is listed to indicate an area of development, but not considered part of the ranking as it replaces an existing FTE.) The ranking was established as an unhappy consensus of the group: all positions represent critical needs in a desperately understaffed set of programs. We gave first priority to ensuring that no program had only one faculty; then to the position in Biological Anthropology, a required area for the Anthropology major, that was approved in 2008-9 and then frozen. The rest of the positions are in a rough rotation, recognizing when positions were last filled. The ladder rank positions are as follows, with our preferred year of hiring:

Year	Program	Description of Position	Rank	Status
2010-11	History	US Ethnic: Chicano	Junior	Replace existing FTE
	MAP	Music	Senior	New
	World Heritage	Architecture/Conservation	Senior	New
	Anthropology	Biological Anthropology	Junior	Approved 2008
	Literature	English Renaissance	Junior	New

	(English)			
	Literature (Spanish)	Spanish Linguistics	Junior	New
	History	Colonial America	Senior	New
	GASP	Music: Asia/Transnational	Open	Instead of AH appt approved 2008
	MAP	Architecture/Sustainability	Senior	New
2011-12	History	Modern Latin America	Junior	New
	Literature (Eng/Creative Writing)	Romantic/Victorian Literature	Senior	New
	GASP	Art History: pre 20th C transnational	Open	New
	World Heritage	Museums and Cultural Resource Management	Open	
2012-13	History	US West/Environmental	Rank open	New
	Literature (Eng/CW)	Post-colonial literature/English	Open	New
	Literature (Spanish)	Spanish Golden Age	Open	New
	Anthropology	Socio-cultural Anthropology	Senior	

In addition to these ladder faculty, we propose to convert 15 unit 18 lecturers over the three-year period to LPSOEs in English/Writing (6 in 2011, 4 in 2012, 5 in 2013), and to add 5 full time lecturers in Foreign Languages (1 in Chinese, 1 in Japanese, 1 in French, and 2 in Spanish); we need to retain existing lecturers in MAP as well as the Visiting Artist position.

In 2013-15, we envision ourselves growing by another 20-25 ladder faculty members. GASP would reach a sustainable size to become a major. In addition to the organic growth of existing programs, we propose to expand our programs to include additional areas of study that will be important in our maturing university:

- hire at least two ladder rank faculty members in Literature and Cultures, with a specialization in comparative literature, one in Japanese/Chinese and one in French or Arabic
- hire a scholar of religious studies, preferably Islamic World. Depending on the research focus of that person, they would initially be part of either Literature & World Cultures, Anthropology, or History.

We also envision creating an interdisciplinary honors major in Humanities & World Cultures, which will draw on existing majors, but provide opportunities for interdisciplinary senior seminars.

Our long term expectation is that from 2015-20, existing programs will continue to grow, and we will add to our existing majors a major in Religious Studies.

V. Resource Requirements over three years

A. Faculty

The positions we are requesting over the next three years are listed here; a full description of the positions in the context of particular programs and their strategic plans is available below, in section VIII.

2010-11:

Information only – replacement FTE: History: Comparative Race and Ethnicity in the US(19th-20th century): History of Comparative Race and Ethnicity has been one of the fastest growing and most intellectually stimulating fields in the history profession over the last three decades, employing innovative and interdisciplinary methodologies to interrogate issues of identity, migration, language, and power in the United States and its contested borderlands. Hiring in this field would enrich the intellectual diversity of the history faculty and allow us to meet the considerable student demand for classes in this area. In particular we seek a scholar of comparative race and ethnicity whose specialties include Chicano/Latino History. The History faculty have received formal and numerous informal communications from current and prospective students expressing grave concern over the lack of curriculum in Chicano/Latino History. In light of our student body demographics and UCM's status as a Hispanic Serving Institution, it is vital that we address this crucial need immediately. We anticipate that this hire will also build further connections among the disciplines and support the Hispanic Studies cluster in the graduate group as well as the World Cultures graduate group in general.

1. **MAP** Music

We need a music specialist with a broad spectrum of experience, and an interdisciplinary vision for the music curriculum to enhance the musicology curriculum offered by GASP. Music can potentially connect to many other areas of endeavor at UC Merced. As a twenty first century research university, UC Merced needs to develop a non-traditional approach to teaching music. Instead of focusing on traditional instruments, the projected music curriculum will concentrate on digital music technology and on exploring interdisciplinary connections while still offering strong foundation in traditional instruments and voice courses for those students who wish to continue their music education while at UCM.

2. **World Heritage**: Conservation architect

The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage. The International principles guiding the preservation and restoration of ancient buildings need specific interdisciplinary expertise in conservation and architecture. In this profile it is required a relevant international experience in preservation, documentation and conservation projects of built heritage with a particular focus on cultural landscapes, archaeological sites, rural and urban contexts. The candidate

should have also an interdisciplinary knowledge of specific technologies applied to this field (photogrammetry, architectural relief, CAD, 3D modeling) in relation with preservation and conservation aspects.

3. **Anthropology:** Biological Anthropologist (Assistant Professor): The frozen search is for a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology program in Section VII.A below. Given the many needs of UCM to which a position in biological anthropology might contribute, the search was broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race. Office and laboratory space in SSM is already allocated for this position, and necessary start-up funds will vary depending upon the expertise of the preferred candidate. We anticipate, however, that start-up funds to cover initial laboratory and/or field costs will be less than $100,000.

4. **Literature and Cultures/English and Creative Writing:** Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Moreover, such a scholar would support both the graduate group and would provide synergies with Professor Amussen in History, thus increasing the attractiveness of the graduate program; it could also lead to collaboration with the performing arts. In 2005, UCM agreed on search for British literature hire, which ultimately failed. Thus, it is clear that even the earliest vision of UCM's literature program would include British literature, and anecdotal feedback from students supports that need.

5. **Literature and Cultures/Spanish:** Spanish-language Linguist. Linguistics is key to the development of any top tier department of Hispanic Studies. In Dartmouth, 2 faculty members out of 16 teach linguistics.

6. **History**: Colonial America and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world; a senior hire will provide visibility for our program. This position would also be key in recruiting graduate students and building the graduate program.

7. **GASP**: Music studies (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality.
We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[4] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

8. **MAP**: <u>Sustainable Architecture</u>
Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

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[4] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

2011-12

GASP Art history (open rank): due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

History: Mexican/Latin American History (18th-20th century). This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the Hispanic Studies cluster as well as the World Cultures graduate group as a whole.

English/Creative Writing: Romantic/Victorian British Literature (senior). In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.

World Heritage: Museums and Cultural Resource Management, Assistant Professor Cultural Resources Management (CRM) regards theory and practice of managing cultural resources (natural and cultural heritage, tangible and intangible heritage). National and international experience in museum studies, cultural resource management, research and teaching on heritage management with an emphasis on musealization aspects, communication, knowledge and expertise in new media and digital technologies, web museums, virtual museums. This profile should be able to train new generations of managers in charge of natural and historical parks, galleries, museums, international organization and/or other NGOs involved in heritage assessment, interpretation, and management.

2012-13

Anthropology: Socio-cultural Anthropologist (Associate or Full Professor): a third socio-cultural anthropologist will contribute to each of our four focal research areas, with research and teaching interests that complement those of our existing faculty in socio-cultural anthropology. Similar to our position in biological anthropology, the search for this position may be broadly defined (or subsequently tailored, in consultation with colleagues across campus based on converging needs), since such a colleague might articulate with various graduate groups or ORUs established on campus by that time. For example, this position might bring expertise in the following general research areas: global environmental justice and policy with obvious cross-campus links to the School of Natural Sciences and SNRI; subjectivity and subject formation, which could build links across SSHA in particular with psychology, the humanities, and the arts; or globalization studies, which has the potential to forge cross-school and cross-campus research collaborations. A ladder-rank faculty member is required, as only a tenure-track faculty member can contribute to the development of interdisciplinary graduate groups and ORUs on campus. The addition of this socio-cultural anthropologist will also facilitate flexibility in teaching rotations for anthropology faculty, as a whole, thus permitting more regular instruction of anthropology courses incorporated in the World Cultures graduate program, the American Studies minor, and new World Heritage program, while also facilitating faculty sabbaticals for the anthropology faculty, as a whole. This position will require office space in SSM and modest start-up funds; no laboratory space is required.

History: US West/Environmental (19th-20th century). Environmental history is a vibrant and rapidly growing sub-field. Hiring in this area will deepen ties between the History program and the rest of the campus and offer the possibility of collaboration and significant grant funding. A Western Environmental historian may work on questions such as historical water rights, resource extraction, erosion, or climate change: all topics of immense contemporary urgency that benefit from a historical perspective. This position offers synergies with current faculty in Literature, Archaeology, Engineering, and Earth Systems Science, and would support the World Cultures graduate group as well as the History major.

English/Creative Writing: Colonial and Post-Colonial Literature in English. This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.

Spanish: Golden Age (or trans-Atlantic Golden Age/Colonial). It is quintessential in any Hispanic Studies department because it represents the foundation of modern Hispanic literature in its three main genres: narrative,

theater and poetry. It represents the flourishing in arts and literature in Spain, coinciding with the political rise and decline of the Habsburgs dynasty. In Dartmouth, 3 out of the 9 faculty members in Iberian Studies teach Golden Age (including Portuguese, Race and Gender Studies), and one out of 7 faculty members in Latin American literature teaches Colonial literature.

B. Space and Facilities

In Literature and Cultures, History, Writing, and GASP, the only space needs are offices for new faculty. Anthropology, Foreign Languages, Media Arts, and World Heritage all have specific space needs for teaching and/or research. In three years we will need research lab space for 2 biological anthropologists, 2 archaeological anthropologists, and 2 world heritage scholars; we will need teaching lab space for the arts (3 rooms), anthropology (2 classrooms), Foreign Languages and world heritage. Some of this space has been allocated in the new SSM building.

Anthropology:
The Anthropology program needs sufficient “damp” and “wet” laboratory space for both research and teaching for some faculty. The lack of sufficient research laboratory space may hamper attracting and retaining top faculty, while the lack of sufficient teaching laboratory space will undermine maintenance of the Anthropology major and minor. Pending completion of SSM, our short-term strategy in AY 2007-08 turned to securing research laboratory space at Castle for both current and anticipated faculty in biological and archaeological anthropology. Anthropology research laboratory space planned for SSM—perhaps augmented by the current biological anthropology laboratory at Castle or core facilities elsewhere on campus—is sufficient for current and anticipated faculty in these two sub-fields. This may not be true for future colleagues, however, particularly if we hire faculty whose research includes analysis of phytoliths, pollen, or genetic material. The inability to reconfigure SSM anthropology laboratories to permit the addition of fume hoods (due to building specifications, including the lack of back-up power) necessary for such research means that additional research laboratory space must be identified in SEI and/or SEII. Thus, anthropology faculty must be included in planning for SEII or these needs must be anticipated as space in SEI is reallocated with the completion of SEII.

Anthropology also needs a commitment from the Provost's office regarding dedicated teaching laboratory space for undergraduate education in both archaeological and biological anthropology. Dedicated space is needed because substantial instructional collections must be stored on-site; institutions or agencies lending these archaeological and osteological collections impose strict security requirements for such storage, and off-hour access and layout space is required for students working with collections over the course of a semester for laboratory classes and/or individual

undergraduate research projects. We have identified one room (COB 110) that can suffice in the short term, and use of the adjoining room (COB 114) would be desirable if that space is relinquished by the Arts program upon completion of SSM or at some later date. In the long-term, anthropology faculty will require two dedicated, approximately 1,200 ASF teaching labs—one for archaeological laboratory classes and discussion sections, and the other for biological laboratory classes and lower division discussion sections. No Anthropology teaching laboratory space has been designated on campus. If COB 114 should become available (i.e., if Arts should request and be allocated substitute space that better suits their needs), the Anthropology program might use COB 110 (once dedicated to Anthropology Instruction) for both archaeological and biological anthropology teaching labs. If Anthropology teaching lab space cannot be dedicated within COB, then it must be found in SEI or SEII. Given the delayed construction schedule for the latter building, however, this could severely impact necessary laboratory instruction for undergraduate students. These instructional spaces need to be identified before the end of AY 2009-2010 to clearly demonstrate that necessary resources are available for the program as part of the WASC accreditation process and for instructional improvement grant opportunities through NSF to outfit the teaching laboratory space (see below).

Anthropology expects to secure internal or external funding to develop these instructional infrastructure to support undergraduate education. This is particularly critical given the substantial financial investment required to support biological anthropology, in particular. Resources already acquired to support lower division instruction include two locking metal storage cabinets, a glass display cabinet and casts of fossil hominids skulls, selected primate skulls and skeletons, and a modern human skeleton. This teaching collection was made possible, in part, through a grant received from the CRTE in AY 2008-2009. Additional materials required to satisfy needs for upper division biological anthropology courses include casts or type collections used to assess age, sex, ancestry, pathologies, and other physical characteristics from human skeletal remains; basic osteometric equipment and/or hardware and software to support digital geometric morphometrics; and possible sample preparation equipment such as machinery to make bone thin sections or take x-rays. Costs will depend upon the next faculty hire within this sub-field, but expenses for the skeletons and models needed for anticipated methods courses are estimated at $50,000. Similarly, upper division archaeological laboratory courses require modest laboratory equipment for either student workstations (e.g., digital scales, microscopes, calipers, hand lenses) or the lab as a whole (e.g., flotation machine, ultrasonic cleaner, flatbed scanner, oversize scale), and field equipment is required for an archaeological field course or field school (e.g., GPS units, digital cameras, compasses, screens, shovels, trowels, tape measures, total station, etc.). It is anticipated that the total cost for both the archaeological laboratory and field equipment will not exceed $75,000. Such courses would also benefit

from geological, faunal, and floral type collections, which might be purchased or established in conjunction with faculty in Natural Sciences, while development of some computer hardware and software (e.g., quantitative and qualitative analysis) capabilities for the teaching laboratory would also be undertaken. Such collections might require approximately $25,000 in funding. Finally, additional cabinetry and basic laboratory furniture for 16 lab stations supporting computational or analytical work is necessary, including lab benches, adjustable chairs, electrical connections, and task lighting. It is anticipated that costs for such infrastructure will not exceed $100,000 Anthropology faculty are pursuing internal and external sources of funding to acquire necessary instructional laboratory materials.

Foreign Languages
The teaching of Foreign languages requires special equipment to allow the practicing of speaking and listening. A dedicated language lab has been designated in SSM building, and we expect that to meet our needs for the next five years.

Media Arts Program
Teaching art technique and art practice requires specialized and dedicated classrooms due to unique pedagogical needs. Though a variety of courses in art technique and practice have been offered at UC Merced since opening its doors to students in 2005, specialized classrooms and labs are required in order to fully develop art technique and practice courses. For instance, while lecturing is part of teaching technique and practice, students primarily learn "hands on." Students draw, sculpt, use digital equipment, and sing in these classrooms. A section of the new SSM building (scheduled to open in 2011) has been designed to serve the needs of the art technique and practice curriculum. There are classrooms, labs and offices specifically designated for teaching of art technique and practice. Two classrooms have been allocated for the digital media course needs. Additionally, there are extra large faculty offices to accommodate faculty artists working with students in one on one independent or directed study format. This specially designed space is more than adequate to serve the needs of MAP in its present form as well as for the projected B.A. and graduate Program.

World Heritage
In addition to existing teaching and research lab space, each new faculty member will require research lab space. It may be possible to combine World Heritage teaching labs, but that depends to a great extent on the research of the people hired.

C. Library
New and current faculty in all fields of HWC will need additional library resources, which are in some areas sorely inadequate at the present. These include basic teaching resources as well as material necessary for faculty to

pursue their research. In fields such as anthropology and history, many vital resources are not yet available electronically; in other cases, UC Merced has not subscribed to resources faculty need to do their work. In particular, fields of the humanities tend to use older scholarly resources: unlike fields in which only the latest data are relevant and electronic journal articles are the disciplinary standard, older monograph literature is often revisited to gain additional insights and assess new hypotheses. Furthermore, important reference material which is not available through interlibrary loan must also be acquired. We are aware of potential opportunities to acquire all or part of personal libraries of retiring faculty at other California institutions, and we hope that the Library will support or initiate these or other efforts to acquire classic monograph series, in addition to any other material necessary for faculty to do their jobs.

D. Assessment

Programs in HWC have all chosen to develop qualitative assessment procedures. As the number of students increases, and with it the number of papers to be read, we need to provide some support for FAOs. We propose the following scale to acknowledge the work of FAOs:
Minors, Majors up to 100 students: a summer 1/18
Majors over 100 students: a summer 1/9
Program Review: When a program in HWC is undergoing program review, the FAO should receive a teaching release.

E. Staff Support

-- one staff member to provide support for teaching/administration of group (could initially be shared with CRHA)
-- By 2012, 50% instructional technology staff support to support World Heritage, Digital humanities, digital arts as well as potential hybrid course delivery ventures.
-- a 50% instructional technology position in the Writing program (soft money)
-- by 2013, we will need a 50% coordinator for languages other than Spanish.

VI. Grants and Outside Funding

The fields in Humanities and World Cultures typically do not provide extensive external funding opportunities. However, faculty in the group have received funding to participate in programs at UCHRI, for travel and research; California Partnership for the San Joaquin Valley (through the Great Valley Center), and UCM's Graduate and Research Council to monitor changes in the quality of life and social efficacy of two targeted Merced County communities; and the Bureau of Land Management to develop source-specific obsidian hydration rates for cultural resource management and archaeological research in Lincoln County, Nevada. In addition, anthropology faculty are part of a grant application to the NIH in partnership with other faculty on campus.

VII. Public Service

HWC faculty have been involved in a wide range of public service activities in the Merced area and in the state more generally. These activities include:
- participation in CURAJ—Community-University Research and Action for Justice, a Central Valley-wide initiative—that networks the members of the UC academic community with community-based organizations to address pressing Central Valley issues.
--Professors Camfield and DeLugan are on the Chancellor's Task Force to Promote Community Engaged Scholarship.
- Professors DeLugan and Hull are also working to strengthen the support structure and communication network at UCM for faculty interested in developing and collaborating across campus on regional research as well as service-learning and student internship opportunities.
- Professors Cristian Ricci and Robin DeLugan have organized the Human Rights film festival
- History 190 has placed students in internships that serve local arts/historical organizations
- the Chicano/a Literature series has featured artists and writers in community settings;
- Professor Martín-Rodríguez writes a periodical column on literature for *La Voz: Hispanic Cultures and News from the Central Valley*
- Hull is a regular presenter at the MUHSD Robert Fore Excellence in Science retreat for high school science teachers in Wawona; both DeLugan and Hull have given presentations at the Challenger Learning Center
-*Wilma McDaniel: the Okie Poet Laureate* opened to the public in September of 2009, a celebration of the life and work of the poet Wilma McDaniel, curated by Goggans and her research assistant.
- The Center for Research in Humanities and Arts offers programs that are open to the community, from the Human Rights Film Festival to lectures and talks by our own faculty and visiting faculty.
- CRHA funded speakers for the California Exhibition Resources Alliance photographic exhibit, ***Hobos to Street People: Artists' Responses to Homelessness from the New Deal to the Present.***

VIII. Program Strategic Plans

A. Anthropology

The Anthropology program at the University of California-Merced (UCM) distinguishes itself by focusing research and teaching on a select group of common research themes relevant to our local, state, and global communities. The undergraduate major emphasizes methodological skill and intellectual rigor in addressing specific issues within these themes, and promotes undergraduate research opportunities—including working on faculty research, service-learning, and individual research—that deepen learning experiences and attract students to our program. Anthropology faculty currently contribute to two interdisciplinary graduate groups, and we are also building our program in anticipation of initiating a disciplinary graduate program at some time in the future.

This document presents a plan for growth of the Anthropology program over the next five years, including plans for strategic hires in biological anthropology in AY 2010-11, socio-cultural anthropology in AY 2012-2013, and another in biological anthropology in AY 2013-2014 to support undergraduate, interdisciplinary graduate, and anticipated disciplinary graduate programs; development of dedicated damp teaching laboratory space in COB; continued development of appropriate damp and wet research laboratory space on campus in SSM, SE I, and/or SE II; and enhancement of library resources for undergraduate instruction. In addition, this plan looks ahead to avenues for intra- and inter-disciplinary research and partnerships involving Anthropology both within and beyond SSHA.

CHALLENGES

The Anthropology program must address challenges that range from those similar to any start-up program at UCM to those unique to this diverse discipline. Within the next five years, the Anthropology program must:

- Recruit additional ladder-rank faculty in the three core sub-fields sufficient to support the undergraduate Anthropology major and minor requirements, interdisciplinary graduate instruction in conjunction with faculty in both SSHA and Natural Sciences, and the longer-range goal of a stand-alone anthropology graduate program;
    - Currently, the Anthropology program lacks ladder-rank faculty in one required area of undergraduate instruction (biological anthropology), exposing our undergraduate students to risk that required courses may be unavailable.
    - Projected rotations require a total of five ladder-rank faculty for minimal coverage of undergraduate and graduate instruction (within one interdisciplinary graduate group) yet do not account for periodic faculty leave. A total of seven anthropology FTE are necessary to handle both instruction and contingencies for leave, as well as manage anticipated administrative responsibilities related to WASC

programmatic assessment.
    - Current and requested additional Anthropology faculty FTE and projected rotations for the initial five ladder-rank faculty do not take into account potential future faculty commitments to dedicated GE in courses such as CORE
- Develop sufficient “damp” and “wet” research laboratory space for faculty and affiliated graduate students whose specializations necessitate such space;
    - Current "damp" lab allocations in the SSM building will accommodate three ladder-rank faculty (one already hired beginning AY 2006-2007, one to start AY 2010-2011, and a third to be hired in the future) although FTE necessary to sustain the Anthropology program in the next five years will require two additional labs
- Acquire dedicated teaching laboratory space for undergraduate education in both archaeological and biological anthropology;
    - Current "damp" teaching laboratory space is shared with other disciplines for courses that do not require such damp space, prohibiting the development of the teaching space to fully meet program needs and the application for grant funds to support such lab development
- Invest in instructional infrastructure in socio-cultural, archaeological, and especially biological anthropology to support undergraduate education;
- Improve library resources in ethnographic, archaeological, and biological anthropology primary literature and multimedia; and
- Identify and develop intersections for interdisciplinary partnerships in faculty, graduate and undergraduate teaching, and research within and beyond SSHA, including cross-campus collaborations as well as collaborations with faculty throughout the UC system and/or regional institutions of higher education.
    - The breadth of research encompassed within anthropology may support a variety of interdisciplinary graduate groups to which ladder-rank faculty might contribute, although specific proposals for many such programs are still under development.

Building on our current strengths, while also considering long-term needs that fulfill our stated mission and initiatives within the UCM community at large, the anthropology faculty have identified four initial cross-field teaching and research areas for the program:

- indigeneity, race, ethnicity, and the nation-state;
- transnationalism, migration, and demography;
- health, nutrition, and the environment; and
- heritage, tourism, and public culture.

These themes and their potential cross-campus connections are considered

more fully below.

Data from the American Anthropological Association, other UC anthropology programs, three years of anthropology instruction at UCM, and student response to the major and minor allow us to anticipate how the program will grow over the next five years and, therefore, justify FTE for additional faculty beyond those necessary to minimally serve undergraduate majors and minors, interdisciplinary graduate students, undergraduate general education, and the long-term goal of a disciplinary graduate program. We also recognize that as the Anthropology program grows, its potential interdisciplinary contribution to UCM will likely increase as well, supporting continued growth in four focal research areas or beyond. Therefore, the 5-year period covered by this Strategic Plan will be used to continue to fill basic needs for undergraduate instruction; track progress, enrollment, and emerging faculty partnerships within and beyond SSHA to facilitate future strategic planning; and envision future mid- to long-term goals with respect to faculty research contributions, graduate education, and the national and international profile of the program within the discipline.

Teaching Opportunities and Enrollment

Student response to the major and minor has been positive, since interest in the program was initially cultivated by faculty and demonstrated by student inquiries during the 2006-07 academic year. As of September 2009, 18 students are enrolled in the Anthropology major and 11 students are enrolled in the Anthropology minor. The major enrollment is approximately 0.5% of the current undergraduate student population at UCM. Moreover, the enrollment in the major is exactly on target with program projections for enrollment the 2008-2013 Anthropology Strategic Plan, which noted "that as many as 18 students will declare the Anthropology major within one year of program initiation." Based on comparisons with other UC campuses for which Anthropology majors account for approximately 0.5 to nearly 3% of the total undergraduate population, we estimate that Anthropology majors at UCM will eventually represent at least 1% of the total undergraduate population. . As indicated in Table A3, enrollment in anthropology courses has also grown steadily since 2006—not simply due to the increasing number of undergraduate students or the addition of faculty and lecturers, but as an increasing percentage of the total undergraduate population. We anticipate continued growth in the coming years in both lower and upper division courses. Professors DeLugan, Hull, and Rebhun have all sat on graduate students exam, thesis, and/or dissertation committees for World Cultures graduate students, some of whom have either been advanced to candidacy or completed their degrees.

Table A.1. Three-year Projections Based on Major Enrollment for SSHA during AY2007-08 and AY2008-09

Major	Major Enrollment Frequency		Major Enrollment as % of UG Enrollment		Mean % of UG Enrollment	Projected Major Enrollment Based on Mean %		
	Fall 2008	Fall 2009	Fall 2008	Fall 2009		Fall 2010	Fall 2011	Fall 2012
ANTH	4	18	0.1591723	0.5625	1.5†	34	53	77
COGS	56	87	2.2284123	2.71875	2.4735811	95	109	126
ECON	50	50	1.9896538	1.5625	1.7760769	68	78	91
HIST	64	75	2.5467569	2.34375	2.4452534	94	108	125
LTCU	51	73	2.0294469	2.28125	2.1553484	83	95	110
MGMT	177	190	7.0433745	5.9375	6.4904372	250	286	331
POLI	117	158	4.6557899	4.9375	4.7966449	185	211	245
PSY	329	372	13.091922	11.625	12.358461	476	544	630
SOC	0	28	0	0.875				
TOTAL UCM UG Enrollment	2513	3200				3850	4400	5100

† ANTH percentage is minimum projection based on comparison with other UC campuses; see figures in Tables A.2 for more realistic projections based on UCM enrollment data

Note: This table demonstrates that most majors that have been in existence for four or more years have apparently peaked and/or stabilized in terms of their percentage share of undergraduates

Table A.2. ANTH Major Projected Enrollment Based on Enrollment for AY 2009-10, Augmented by Additional “Home–grown” Majors†

	FR	SO	JR	SR	Total Majors
Fall 2009	7	1	8	2	18
Fall 2010	10	14	18	8	50
Fall 2011	10	17	31	18	76
Fall 2012	10	17	34	31	92

†This projection assumes seven FR (rather than four) will subsequently declare ANTH major during their SO year

Table A.3. Anthropology Course Enrollment Growth AY 2006-07 to AY 2009-2010.

	AY 2006-07	AY 2007-08	AY 2008-09	AY 2009-10
Total course enrollment	99.00	166.00	271.00	438.00
Enrollment as percentage of the total undergraduate population	8.18%	9.49%	10.69%	13.57%
Average # students/course	24.75	23.71	27.10	39.82
Average # students/instructor	49.50	55.33	67.75	108.25

Hiring/FTE priorities are as follows:

→**Biological Anthropologist (Assistant Professor**): The frozen search is for a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology program above. Given the many needs of UCM to which a position in biological anthropology might contribute, the search was broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race. Office and laboratory space in SSM is already allocated for this position, and necessary start-up funds will vary depending upon the expertise of the preferred candidate. We anticipate, however, that start-up funds to cover initial laboratory and/or field costs will be less than $100,000.

→**Socio-cultural Anthropologist (Associate or Full Professor):** Our next

priority is to hire a third socio-cultural anthropologist no later than Fall 2012. This position is critical to the further development of each of our four focal research areas (see above), with research and teaching interests that complement those of our existing faculty in socio-cultural anthropology. Similar to our required hire in biological anthropology, the search for this position may be broadly defined (or subsequently tailored, in consultation with colleagues across campus based on converging needs), since such a colleague might articulate with various graduate groups or ORUs established on campus by that time. For example, this position might bring expertise in the following general research areas: global environmental justice and policy with obvious cross-campus links to the School of Natural Sciences and SNRI; subjectivity and subject formation, which could build links across SSHA in particular with psychology, the humanities, and the arts; or globalization studies, which has the potential to forge cross-school and cross-campus research collaborations. A ladder-rank faculty member is required, as only a tenure-track faculty member can contribute to the development of interdisciplinary graduate groups and ORUs on campus. The addition of this socio-cultural anthropologist will also facilitate flexibility in teaching rotations for anthropology faculty, as a whole, thus permitting more regular instruction of anthropology courses incorporated in the World Cultures graduate program, the American Studies minor, and new World Heritage program, while also facilitating faculty sabbaticals for the anthropology faculty, as a whole. This position will require office space in SSM and modest start-up funds; no laboratory space is required.

→ **Biological Anthropologist (Open Rank**): As noted above, the final hiring priority within the span of this Strategic Plan is a second biological anthropologist during AY 2013-14. While a lecturer in biological anthropology might help service the major through periodic instruction of ANTH 5 in the short term (see Appendix B), a lecturer is unable to contribute to upper division laboratory instruction, since such instruction is generally based in faculty research collections. In addition, anticipated continued growing demand for ANTH 5—as a course simultaneously fulfilling a science requirement for SSHA students and a social science requirement for NS and Engineering students—may necessitate more frequent rotation and, thus, faculty support for, biological anthropology. Therefore, a ladder-rank faculty will eventually be required, with a preferred methodological specialization that will complement that of the biological anthropologist hired in AY 2010-11. We envision that this faculty member might take advantage of existing core campus equipment for research or, perhaps share laboratory space in SE II (e.g., if the individual has expertise in human genetics or isotopic studies of human remains). Given the wide variety of laboratory and start-up needs for biological anthropologists, Anthropology faculty will consult with the SSHA Dean on definition of this position to work within anticipated resources.

B. Foreign Languages

Overview: A considerable number of students enter UC Merced expecting to learn a second language as part of their college education. Others already have experience with the foreign language they want to learn, but desire to become fluent or, in the case of heritage learners, gain a better understanding of the culture and language they partly learned at home. Since we live in a multicultural society, the Foreign Languages Program strives to provide students with the opportunity to learn a second language, a skill appreciated by most employers, a requirement for some graduate programs, and an essential tool to conduct research overseas. Learning a foreign language and gaining knowledge of the diverse cultures around the globe, as well as in the United States, is fundamental for a better understanding of our world and the peoples that inhabit it. Therefore, the Foreign Languages Programs at UC Merced will keep promoting the study of foreign languages and cultures from an interdisciplinary perspective while encouraging the research on foreign language acquisition and teaching. For this reason, one of our goals is the implementation of the one year Foreign Language requirement approved by the SSHA faculty on the academic year of 2006-2007.

***Teaching*:** The Foreign Languages Program faculty teaches lower division courses in four language programs: Chinese, French, Japanese and Spanish. In addition, it contributes to undergraduate programs such as the minor in Spanish. All courses in the Foreign Language Program are considered general education courses.

Chinese: Chinese has been offered at UC Merced since Spring 2007, mostly at the elementary level. Chinese courses have been taught by a part-time Lecturer. However, during the 2009-2010 academic year, the three sections of CHN 1 and the one section of CHN 2 offered had a full or almost full enrollment. Consequently, in the next five years there will be a need for opening at least one more section of CHN 1 and CHN 2 every academic year and for offering Intermediate Chinese courses starting Fall 2010.

French: French has been offered at UC Merced since Fall 2006, mostly at the elementary level. French courses have been taught by a part-time Lecturer. However, during the 2009-2010 academic year, the three sections of FRE 1 and the one section of FRE 2 offered had a full or almost full enrollment. Consequently, in the next five years there will be a need for opening at least one more section of FRE 1 and FRE 2 every academic year and for offering Intermediate French courses starting Fall 2010.

Japanese: Japanese was first offered at UC Merced in Fall 2006. Since then, the Japanese elementary and intermediate courses have been taught by one full-time Lecturer. In Fall 2009, a part-time lecturer was also hired in response of the growth of the Japanese program. One of the goals of the Japanese program is to start offering upper division courses on the academic

year of 2011-2012, and a minor in Japanese for the academic year of 2012-2013.

Spanish: Spanish has been offered at UC Merced since Fall 2005. The Spanish Program is the largest of all foreign language programs. It offers lower division and upper division courses. At the lower-division level, the Spanish Language Program offers two tracks: one for non Spanish Heritage Speakers (SPAN 1-SPAN 4) and another for Spanish Heritage Speakers (SPAN 10-SPAN 11). As of Spring 2010, the Spanish Language Program faculty includes one full-time Lecturer SOE, two full-time Lecturers, one part-time Lecturer and two Teacher Assistants (ABD). Some of the Spanish Language program faculty contribute to the minor in Spanish. The number of sections that the Spanish Language area offers at the lower-division level grows every academic year. For the next five years, we anticipate the addition of at least one section of SPAN 1 and SPAN 2 every academic year. Similarly, and due to the popularity of the minor in Spanish, increasing the number of courses and sections is a priority for this program.

The following table summarizes enrollements in Foreign Languages from 2005 to 2010:

FLAN ENROLLMENTS 2005-2010

	2005-06	2006-07	2007-08	2008-09	2009-10	Anticipated enroll. 2011-12
Chinese	n/a	30	31	75	92	130
French	n/a	56	43	65	93	130
Japanese	n/a	72	76	94	124	140
Spanish	LD 78 UD 26 Total 104	LD 115 UD 68 Total 183	LD 97 UD 113 Total 210	LD 172 UD 156 Total 328	LD 239 UD 221 Total 460	LD 300 UD 300 Total 600
Total all	**104**	**341**	**360**	**562**	**769**	**1000**

C. Global Arts Studies Program (GASP)

GASP defines the arts broadly in order to promote an interdisciplinary study of the arts. Unique among UCs and other research universities in the U.S., the GASP curriculum integrates subjects conventionally housed in disparate departments and offers students a broad multicultural and transnational understanding of the arts through courses that investigate the effects of formal conventions and innovations, industrialization, colonialism, commercialism and globalization on art practices from a balanced, inclusive range of critical perspectives.

Within three years, we expect to not only be contributing to the History program, but to also offer a minor. In five years, with an additional 3 faculty, we would be able to propose a major. Given our current enrollments (see Chart A), we estimate that a minor in GASP would draw more than 50 students. To make a minor sustainable, we need 2 new hires (including the previously allocated art history hire) in the next two years in order to be able to launch a Minor in GASP, with a total of 4 faculty members, by Fall 2013. Many current GASP courses are cross-listed in history, thus contributing to the History Major by Fall 2010. As such, it is vital to increase the size of GASP faculty to better serve students who wish to acquire knowledge in the history of the arts, as well as those with a more general interest in expanding their understanding of global cultural history.

Chart A. The enrollments in courses taught by the existing GASP faculty since 2006

	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010
Semester Total (Art History)	10	27	39	47	50	62	56	14
Semester Total (Music)	40	n/a	38	62	36	41	111 *	49
Annual Total		**77**		**186**		**189**		**230**

*These include enrollments in the ethnomusicology course offered by a lecturer.

In order to offer a truly global and cutting-edge curriculum, and to complement the strengths of the two existing Americanists in GASP as well as those in the current History Program, GASP needs 2 FTEs for 2010-12—one in art history (previously approved), and one in music—to be able to provide the minimal number of courses for a GASP Minor to launch in 2013. By 2015, with the addition of 3 additional ladder faculty, we expect to launch a major.

<u>Position Descriptions</u>

1. Music studies (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality.

   We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[5] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

2. Art history (open rank): due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

3. GASP seeks a music scholar who specializes in a musical tradition of Latin America (including the Caribbean) who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. Rationale: there are a number of faculty whose research encompasses Latin America and a Latin American specialist could provide synergy to a Latin American studies program or minor. Additionally, there is a large student population who identify as Hispanic, indicating strong student interest in courses that deal with Latin American culture.

4. Art history (open rank): GASP seeks an art historian who specializes in artistic traditions of Asia within a transnational context. Priority will be given to scholars whose work focuses on pre-20th century periods, as well as those whose scholarship investigates issues of race, nationalism, gender and/or sexuality in relation to artistic production. This will be an important position for GASP and UCM students for two significant reasons. First, given the student population at UCM, where the largest

[5] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear. Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way. Finally, a pre-20th century specialist will complement the work of Professor Mostern in History.

5. GASP seeks a music scholar who specializes in a musical tradition of Europe who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. Rationale: European musical traditions play a significant role in the music we listen to today. In order to provide a well-rounded major (which this hire could conceivably allow GASP to become, provided the art history component of GASP is growing at the same rate), GASP will need a Europeanist.

In AY 2010-11, GASP will require a FTE for Kevin Fellezs. As a UC President's Postdoctoral Fellow, Fellezs's first five years of salary are paid by UCOP. Fellezs was hired in AY 2006-07. In AY 2010-11 it will be time to convert him into a UCM tenure-track FTE effective AY 2011-12. As per the memo of 12/2/09 from Provost/EVC Keith Alley to the UCM Deans, *this is one of four such positions that is already accounted for in the FTE allocations* and, thus, need not be considered in the further allocation of ladder-rank faculty lines to GASP.

The two existing faculty members of GASP offer a unique curriculum consisting of courses in the faculty's respective areas of expertise—art history and music studies in the U.S.—as well as those that provide a global perspective on the studies of the arts. These include:

GASP 2 Introduction to Music Studies (Music/Global)
GASP 3 Introduction to Visual Culture (Art History/Global)
GASP 31 Critical Popular Music Studies (Music/Global)
GASP 32 Jazz History (Music/U.S.)
GASP 34 American Musical (Music/U.S.)[6]
GASP 101 Visual Arts of the Twentieth Century (Art History/Global)
GASP 121 Asian American Music (Music/U.S.)[7]
GASP 135 African American Music (Music/U.S.)
GASP 141 History and Practice of Photography (Art History/Global)
GASP 151 Topics in Visual Culture: Museums and Art Controversies (Art History/U.S.)
GASP 175 Race and Nationalism in American Art (Art History/U.S.)

[6] This course touches on Asian American issues in discussions and readings when viewing *Flower Drum Song*, for example.
[7] This course is still under consideration by the Curriculum Committee.

D. History

Overview

History is one of the oldest and most stable of academic disciplines. Its insights, methods, and pedagogy are centered upon the creation of narratives that explain human activities as they change over time. History's distinctiveness as a discipline is its examination of phenomena that occur in many places (such as land ownership, religious conversion, migration, and state formation) through an empirical focus on particular places and times. It unites the social scientific search for general principles and the humanities focus on cultural specificity and authored text. Successful history programs offer courses that span geographical and temporal locations.

History was a part of the founding vision of the School of Social Sciences, Humanities, and Arts at UC Merced. In 2003, a historian (Gregg Herken) was one of the first two faculty hires in SSHA. Another historian was added the following year (Ruth Mostern), and another the year after that (Sean Malloy). Two more historians (Susan Amussen and Sholeh Quinn) joined the faculty in 2008. In 2005, History was a track of the World Cultures and History major, one of nine opening-day majors planned by a systemwide task force. History became a free-standing major in 2006. In 2008, History became the first major at the university to offer an approved Honors program.

History enrolls more majors than any other major in HWC and the fifth highest in SSHA. We collaborate closely with the Global Arts Study Program (GASP), World Heritage (WH), Literature, and Anthropology, cross-listing courses and sharing electives, and we contribute fully to the World Cultures graduate group. A student whose dissertation focused on history was among the first UC Merced students to receive a Ph.D.

The anticipated retirement of Gregg Herken at the end of the Spring 2010 semester necessitates a full-time US history lecturer hire for 2010-11 and an immediate US History search simply to retain our current staffing. We need to expand our faculty to a minimum of eight members by 2012.

Challenges and Opportunities

- Strengths: The history faculty is successful and productive, and has attracted a number of graduate students. Our enrollments and enrollment growth are robust, and student evaluations for all history faculty are strong. The integration of history with GASP and WH supports UC Merced's interdisciplinary orientation. The history research, teaching, and curriculum bridges cutting-edge approaches such as transnational and digital history with strengths in traditional sub-fields such as political and social history. Our Honors program makes History an appealing major for Merced's most academically ambitious undergraduates.

- Weaknesses: The history program is woefully understaffed, especially in US history and in modern world history, particularly in light of the anticipated retirement of Gregg Herken. A successful history curriculum requires students to take courses that concern many historical periods and global locations. The UC Merced history program lacks coverage of many eras and world regions, compromising our ability to deliver a methodologically appropriate major. The only way for History faculty to participate in graduate education is for the program to hire lecturers to teach some upper-division courses as well as lower-division courses. This is educationally problematic, and risky in light of fluctuations in funding for these positions.
- Opportunities: The next three years offer a chance for the history program to make focused and targeted hires that enhance the strengths of the program, group, school, and campus. The history strategic plan and curriculum are well-organized and have consensus support of the faculty, allowing us to make good use of resources. The four Priority I hires laid out in this plan are the minimum we need to have a small but intellectually coherent program with adequate faculty rotations and a sufficient number of upper-division and lower-division offerings; we will be able to deliver an effective major and contribute to graduate education and synergistic activities on campus.
- Threats: If the History program cannot grow at a desirable rate, our most ambitious undergraduate students will transfer to other campuses. We may lose younger faculty to other universities. We will have inadequate staffing to contribute to graduate education. Our students will have to take classes from lecturers, even at the upper-division level, which will diminish their opportunities for intellectual mentorship and continuity. Finally, we will continue to offer a major that is not aligned with that of peer institutions.

Current Areas of Research Concentration

The History program has two tracks: US History and World History. The US History track has two faculty specializing in mid-twentieth century diplomatic history, including Gregg Herken, who will retire at the end of the Spring 2010 semester. The World History track has three faculty, each of whom specializes in an era in the history of a particular country and its civilization (China-Mostern, England-Amussen, Iran-Quinn) and all of whom also have an interest in transnational questions. All members of the program teach thematic courses as well as courses in their era and location of expertise. All members of the History faculty have a record of publication and grant funding consistent with UC expectations.

Current Undergraduate Teaching

The History major currently enrolls 75 students, 2.4% of the total UC Merced undergraduate population. The history minor currently enrolls 35 students, an additional 1.1% of the undergraduate body. Many History courses meet general education requirements and elective requirements for other majors, and History courses have an interdisciplinary enrollment.

History has the distinction of offering the only Honors major on campus, an opportunity for our finest students to work one-on-one with a faculty advisor and a second reader to complete a year-long piece of original research in their senior years.

In Fall 2009 History enrollments totaled:

Course Number	Course Name	Instructor	Enrollment
H10	World History to 1450	Quinn	49
H16	US History	Johnston (graduate fellow)	59
H80	Chinese History to 1350	Mostern	48
H100	Historian's Craft	Quinn	23
H117	History of South Asia	Meeks (instructor)	17
H130	The Cold War	Chi (instructor)	38
H139	US Race and Ethnicity	Malloy	27
H190	Applied Research	Malloy	4
H193	Honors Thesis Research	Malloy	2
TOTAL FALL 2009 HISTORY ENROLLMENT			**267**

Contribution to Graduate Education

All of the members of the History faculty are also members of the World Cultures graduate group and actively contribute to graduate education. The History contribution to graduate education is summarized in the following table (not including numerous independent study courses):

Name	Courses Offered	Committees Chaired	Committee Memberships
Amussen (since 2008)	WCH 201	From Union Institute & University: Vicky Gabriner, Ben Justesen, Elizabeth Hohl (completed or almost	N/A

		completed); Kathleen Halecki and Martha Sullivan (in progress)	
Herken (since 2003)	H 203, "The Historian's Craft"; H 250, "The Cold War, 1941-91"; H 200, "The Uses & Abuses of the Past"; H 299, Directed Reading: modern U.S. political history	Trevor Albertson Richard Ravalli	
Malloy (since 2005)	• U.S. Social/Cultural History • Race, Empire, and U.S. Foreign Policy	• Johnston (Ph.D.) • Deflin (MA)	• Williams (Ph.D.) • Ravalli (Ph.D.) • Winter (Ph.D.) • Acevedo (Ph.D.)
Mostern (since 2004)	• Humanities and New Media (twice) • China and World History (once)	• Goger (MA) • Hua (Ph.D.) • Meeks (Ph.D.) • Williams (Ph.D.)	• Albertson (Ph.D.) • Bond (CSUS MA) • Gainor (Ph.D.) • Grossner (UCSB Ph.D.)
Quinn (since 2008)	n/a	n/a	• Hill (Ohio University Ph.D.) • Venosa (Ohio University Ph.D.)

Proposed Faculty Hiring

Assuming that History retains its current share of the student body, and assuming an increase of 650 students per year in the UC Merced undergraduate population, there will be 120 history majors, 56 history minors, and 427 students enrolled in history courses by 2012. With the planned shift of majors to SSHA, and an expansion of the faculty, these numbers are conservative estimates.

	2009-10	2012 (assuming 60% increase)
#majors	72	120
#minors	31	56
Majors as % of total UCM student body	2.4	2.4
Minors as % of total UCM student body	1.1	1.1
Total enrolled students Fall 2009	536	857
Majors:faculty	13:1	n/a

In order to meet the requirements of the history curriculum and offer the necessary number and breadth of elective courses for that student body, we will need to offer 20 courses per year.

	2009-10	2012-13
# required lower division courses	4 (H10,11, 16, 17)	4
Minimum # lower division electives	2 (one per semester	2
# required upper division courses[8]	2 (H100, H191)	4 (2 sections each of H100 and H191)
Minimum # upper division electives[9]	6	10
TOTAL	14	20

For the purposes of calculation, we assume that each faculty member should teach a notional two undergraduate courses per year per faculty member. (This is a rough estimate that allows for graduate teaching, sabbaticals, leaves, and course remissions. Based on these calculations, UC Merced could support a History program with 9-10 faculty members.

We recognize that we cannot expect to make eight new hires in the next three years. However, it is important to contemplate these calculations to demonstrate what a sustainable growth plan would require in a resource-adequate environment. The **smallest** number of hires that will allow us to maintain a minimally functional History program in the next three years is **four**: one immediate hire to replace Gregg Herken, and three new hires. With an eight person program, we will be able to rotate each required lower division course between two expert members of the ladder-rank faculty, to more closely cover the globe and the major historical eras, to fill our most pressing lacunae, and to

[8] Assuming that honors thesis instruction remains an overload assignment.

[9] Each major must take six upper division electives over two years. Calculations assume a 35 student enrollment cap, given that we lack the TAs to grade the papers that must be assigned in upper division courses; when we have a significant number of graduate students, we may begin to enroll more students in upper division courses.

offer a marginally adequate number of classes for our students. The resulting 15:1 student-faculty ratio would be similar to that in other UC History departments.[10]

However, we want to emphasize that the minimum is not ideal. We have looked for comparison not just at other UC campuses, but also at small research universities. Among public universities, small research universities are rare, with the College of William and Mary most closely approximating our expected size of about 8,000 students. (It is important to note that 8,000 is less than half the size of the smallest of our sister campuses. It does not seem that any of the UC campuses can serve as good comparison schools for us). On the other hand, small, prestigious research universities are a bit less rare among private schools, with Brandeis, Brown, and Rochester being the three AAU members that enroll between 5 and 9 thousand students, and Dartmouth and Brown the two Ivy League schools. The departments at these universities range in size from 14 to 38, with an average of 28.6 faculty.

Rank I Priority Hires

Our most urgent and immediate need is authorization to hire a full-time US History lecturer for 2010-11 as a temporary replacement for Gregg Herken.

Our four highest priority permanent hires include three US History positions (the first of which is a replacement for Gregg Herken), and one World History position. At the end of this hiring phase, we will have four World History faculty and four US History faculty, with each track evenly split between specialists in early history and in modern history. The hires can be summarized on as follows:

Year	Positions
2010-11	• US: Colonial History (Rank: Senior) • US: History of Comparative Race and Ethnicity (Rank: Junior)
2011-12	• World: Mexican History (Rank: Junior)
2012-13	• US: Western/Environmental History (Rank: Junior)

- American History: Colonial and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world, and Hull on the early contact period; a senior hire will provide visibility for our program.

[10] At UC Davis, over the past 5 years there have been between 490 and 412 majors, with a major/FTE ratio from over 17 to 13.2; at UC Riverside, there are approximately 460 majors in history or double majors with a large history component, with a major to FTE ratio of 16.4.

- American History: History of Comparative Race and Ethnicity (19th-20th century): History of Comparative Race and Ethnicity has been one of the fastest growing and most intellectually stimulating fields in the history profession over the last three decades, employing innovative and interdisciplinary methodologies to interrogate issues of identity, migration, language, and power in the United States and its contested borderlands. Hiring in this field would enrich the intellectual diversity of the history faculty and allow us to meet the considerable student demand for classes in this area. In particular we seek a scholar of comparative race and ethnicity whose specialties include Chicano/Latino History. The History faculty have received formal and numerous informal communications from current and prospective students expressing grave concern over the lack of curriculum in Chicano/Latino History. In light of our student body demographics and the UCM status as a Hispanic Serving Institution, it is vital that we address this crucial need immediately. We anticipate that this hire will also build further connections among the disciplines and support the planned Hispanic Studies graduate group as well as the World Cultures graduate group.
- World History: Mexican/Latin American History (18th-20th century). This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the planned Hispanic Studies graduate group as well as the World Cultures graduate group.
- American History: US West/Environmental (19th-20th century). Environmental history is a vibrant and rapidly growing sub-field. Hiring in this area will deepen ties between the History program and the rest of the campus and offer the possibility of collaboration and significant grant funding. A Western Environmental historian may work on questions such as historical water rights, resource extraction, erosion, or climate change: all topics of immense contemporary urgency that benefit from a historical perspective. This position offers synergies with current faculty in Literature, Anthropology, Engineering, and Earth Systems Science, and would support the World Cultures graduate group as well as the History major.

Rank II Priority Hires

The goal of the next growth phase will be to expand the History program from a faculty of 8 to a faculty of 12. While we need to make more hires and see the direction of future campus growth before we can create detailed descriptions for these future positions, our general needs are clear. We need to make three more hires in World History in order to have a bare-minimum coverage of each world region, and we need to make one more hire in modern US history to meet projected student demand. We have identified several thematic areas that will inform our future positions: health, medicine, and environment; race, gender, ethnicity, and migration; and spatial and digital analysis. We anticipate the following future positions:

- Modern World: Africa/South Asia/Southeast Asia
- Modern World: Continental Europe/Imperialism
- US: Twentieth Century Social/Cultural History
- Premodern World: Africa/South Asia/Southeast Asia

Metrics for Evaluating Success

- Enrollment: We aim to maintain or increase our major share at 2.4% of the total student body and our minor share at 1.1% of the student body. We aim to maintain or increase our total student enrollment as a percentage of the student body. We aim to admit and graduate Ph.D. and MA students with a History focus through the World Cultures graduate group.
- Program Maturity: We aim for some representation of all world regions and historical eras. We need adequate hiring to support research synergies among History faculty and between History and other faculty.
- Grants and Publications: We expect to see productivity at a rate and quality that is standard for research university faculty in the profession and in the UC system.

E. Literature and Cultures

Overview:
Having divided from the initial World Cultures and History egg, the Literatures and Cultures major is part of the second phase in the gestation of undergraduate programs in the Humanities. Literatures and Cultures in conception is a combination of Comparative Literature and Cultural Studies, but it began with just two tracks, one in Literature of the English-speaking world and one in Literature of the Spanish-speaking world. It is now time to move into a third phase, dividing the major into three: English, Spanish, and a residual Literatures and Cultures major that can continue to generate new programs in literary studies, in both individual languages and a program in Comparative Literature and Cultures. Furthermore, we propose that the new English major combine with the writing minor, and that the Spanish major combine with the Spanish minor

Strengths/Opportunities/Challenges:
Literatures and Cultures is the 6th largest major in SSHA (out of ten majors), with a slightly more than a 2:1 ratio between those in the English-language track and those in the Spanish-language track. Judging by NCES (National Center for Education Statistics) data, these numbers are low comparatively, as English is, in the comparison group of majors offered by SSHA, the third largest major in B.A. granting colleges and universities nationally, and Spanish, while toward the bottom, should be about equal to Economics. If Literatures and Cultures were pulling the expected majors from traditional English and Spanish majors, it would trail Psychology by about a 2:3 ratio, would exceed History, Political Science, or Sociology by about 2:1, and would exceed Economics by nearly 3:1. The gap between expectations and performance probably has four causes, all of which our strategic plan seeks to address:

(1) The name of the major is not readily recognized.
(2) The number of majors in the Spanish-language literature track is always going to be influenced by the students studying the Spanish language, so it is now (for the most part) a subset of Spanish minors.
(3) The separation of English-language literature from the writing program eliminates the important and traditional synergies between reading and writing in English.
(4) The obvious career tracks for Literature majors in any of the modern languages are not clearly supported. For example, the lack of name recognition could make it for a UC Merced graduate to compete in the job market as a translator, as a journalist, or as a high school teacher with a B.A. in Literatures and Cultures.

We thus believe that new Spanish and English majors would significantly bolster enrollments in both of the new majors compared to the old. Indeed, with more properly defined majors UC Merced might come closer to the enrollment ratios seen at other U.S. universities. Given our location and the consequent

attractiveness of study in Spanish, we expect the new configuration to attract about 10-15% of SSHA majors, somewhere on the order of twice our current 6.5%. The advantages would be to:

- help balance the majors in SSHA, an objective worth pursuing as faculty in the Humanities are much less expensive than those in Psychology, Cognitive Sciences, or Business, requiring no laboratory spaces, lower start-ups, and lower salaries.
- Support general education (see the Writing Program's strategic plan)
- Introduce students to cutting-edge research in English- and Spanish-language literatures and cultures
- Bolster our ability to improve educational outcomes at all levels in the Central Valley by providing UC caliber graduates who can enter post-secondary education in both English and Spanish.
- Provide clearer and broader career trajectories for our students, including easier paths into graduate and professional programs.

None of this would come at any cost to the graduate program and would probably improve ladder-rank faculty research output by broadening the faculty base for university service (again, see the Writing program's proposal to convert a number of Unit 18 lecturers to Lecturers P/SOE; P/SOE faculty can serve on any Senate Committee that does not deal with personnel issues for ladder-rank faculty, and their explicit dedication to pedagogy means that they would be in an ideal position to work on assessment, general education, and similar tasks. A similar approach to Unit 18 lecturers in Spanish would provide even more Senate faculty to serve on committees).

More importantly, by blending current faculty in the LITC major with faculty in the two minors, the two new majors would enable us to come much closer to the numbers of faculty expected from a small, prestigious research university in the fields of English, Spanish, and Comparative Literature. Among public universities, small research universities are rare, with the College of William and Mary most closely approximating our expected size of about 8,000 students. (It is important to note that 8,000 is less than half the size of the smallest of our sister campuses. It does not seem that any of the UC campuses can serve as good comparison schools for us). On the other hand, small, prestigious research universities are a bit less rare among private schools, with Brandeis, Brown, and Rochester being the three AAU members that enroll between 5 and 9 thousand students, and Dartmouth and Brown the two Ivy League schools. Judging against the benchmarks that these schools provide, and assuming our target enrollment at the end of three years will be five thousand and our maximum will be eight thousand, we will need to expand our regular faculty in both English and Spanish.

English: Including those in both literature and writing, we have Gregg Camfield and Jan Goggans full time; Manuel Martín-Rodríguez in both English and Spanish; and Robert Ochsner, a member of the LIT group as well as the one Senate faculty member in the Writing Program (currently a full-time administrator, Ochsner is, we hope, open to being lured back to

50% time in teaching). The average of the five comparison schools is 27 "regular" faculty members.[11] We will need to increase our faculty size substantially in order to be even remotely comparable. Conversion of Unit 18 lecturers now in the Writing Program will provide much of this necessary expansion (15-16 faculty), but steady hiring of tenure-line faculty in English-language literature will also be required

Spanish: Including those in both Literature of the Spanish-speaking world and Spanish language, we have Ignacio López-Calvo and Cristián H. Ricci full time; Manuel Martín-Rodríguez in both Spanish and English; and Virginia Adán-Lifante, who is a member of the Literatures and Cultures group (the one Senate faculty member in the Spanish program) as well as the Language Coordinator. The average of the five comparison schools is 10 "regular" faculty members.[12] We will need to increase our faculty size substantially in order to be even remotely comparable.

Implementing these two new majors will not be inordinately difficult inasmuch as each will use courses already listed in the catalogue. It will not be inordinately expensive, inasmuch as the resources already allocated to the minor programs with which they will be merging will augment resources currently allocated to the two Literature tracks. Maintaining Literatures and Cultures on top of these two majors will not be difficult either, as the overlap in courses will mean that all of the courses Literature majors will need to graduate will be readily available.

We should be able to begin the process of spinning off the two majors this academic year, as a Spanish proposal is nearly complete and an English proposal is not far behind. We would expect that with WASC review, the new majors would be available for 2011-12.

Research, Grants and Awards:
The five faculty members who form the original core of the Literatures and Cultures major have each received a variety of grants and awards, from an Endowed Chair (Camfield), National Endowment for the Humanities (López-Calvo, Ricci), Chiang Ching-Kuo Foundation for International Scholarly Exchange (López-Calvo), American Institute for Maghrib Studies (Ricci), Newberry Library (Martín-Rodríguez), Recovering the U.S. Hispanic Literary Heritage (Martín-Rodríguez), and funding via the Graduate Resource Council, since the campus's

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[11] We are using Brown University's definition, which is roughly equivalent to our Senate membership. Brown University has 33 "regular" and 12 "non-regular" (i.e. part-time or visiting adjuncts) faculty in English; William & Mary has 39 "regular" and 11 "non-regular;" Dartmouth 30 and 29; Brandeis 18 and 6; Rochester lists only their regular faculty, at 23. All of these include some writing faculty in the "regular" group.

[12] We are using Brown University's definition, which is roughly equivalent to our Senate membership. Brown University has 10 "regular" and 1 "non-regular" (i.e. part-time or visiting adjuncts) faculty in Hispanic Studies; William & Mary's Hispanic Studies has 10 "regular" and 3 "non-regular;" Dartmouth's Spanish and Portuguese Department has 16 and 10; Brandeis University's Hispanic Studies has 10 "regular" faculty (they only list their regular faculty); Rochester lists only their regular faculty, 4.

first year. Additionally, despite heavy teaching and service loads, the faculty's scholarship has remained robust, with recent books (Ricci, López-Calvo, Goggans, Martín-Rodríguez) and peer-reviewed articles in top-tier professional journals from all faculty members, as well as new projects in online publications and public humanities, all of which have expanded the boundaries of research in the area of literary and cultural studies.

Teaching (current and projected):
Along with teaching our normal course load, faculty in both English and Spanish concentrations have pursued teaching areas which hold out innovative promise:

1. Environmental literature and writing: UC Merced's ongoing relationship with Yosemite, its new designation as a system-wide Natural Reserve, and the availability of the Wawona Research station, which houses at least 30 students, offer an exciting opportunity to build on creative writing and literary studies in the area of nature writing, national parks, and environmental literature. Faculty in both the English and Writing tracks have experience in putting on workshops, working in natural reserve systems, and teaching environmental literature. Courses in these areas will serve as a major draw to incoming students, highlighting the campus's proximity to Yosemite and its many avenues of research taking place within the park.
2. The Central Valley and California Studies: Faculty members in the writing program have already established an ongoing series of lectures by writers in the Central Valley and Greater California. The literary archive of Central Valley and Dust Bowl writer Wilma McDaniel arrived at Kolligian Library through faculty efforts, and an ongoing project introduces students to the public humanities by putting them to work curating an exhibit of Mark Twain in the Sierra foothills. California Studies, in general, offers students new ways to understand cultural production of various generations while also helping them to understand the current conditions of their own lives.

3. The faculty members in the Spanish-speaking world have developed a series of activities to improve the visibility of the program and to fulfill the goals of UC Merced's as a "Hispanic-serving institution:" organization of international conference, inviting scholars, writers and activists such as Luis Leal, Víctor Fuentes, Dolores Huerta, Najat El Hachmi, Cristina García, David W. Foster Mary Alice Waters, and Landry-Wilfrid Miampika, among others. They have also organized, along with different student associations (Amnesty International, MEChA, Latin American Student Association, Ballet Folklórico, Persian Student Association, Muslim Student Association) and faculty members from other disciplines, cultural activities such as an annual Human Rights Film Series, theater performances. Since 2004, they have been participating in parents' orientation meetings and outreach activities. Finally, they have engaged

graduate students in conferences as well as in national and international academic publications. They have taught courses and seminars dealing with different academic issues such as race and gender, migratory phenomena, exile, and transculturation.

4. The area of Chicano/a literature has boasted very healthy enrollments since UCM's opening days, and it encompasses teaching, research projects and academic/community events. The Chicano/a Literature series has brought more than twenty authors, artists, and scholars to campus and community venues. Three different research projects in this area have offered graduate and undergraduate students hands-on research opportunities. As the one area that brings together the two proposed majors, Chicano/a literature may serve as a model for the development of future areas of intersection between the proposed majors. The proposed creation of an interdisciplinary Chicano/a Studies major (currently under development) will also have a positive impact in this area.

Graduate Programs

Literature faculty members work hand in hand with the entire graduate group. Faculty offer graduate courses and have assumed the role as major advisor, committee chair, or committee member for Camfield (all doctoral, director of one dissertation, committee member of two); Goggans (director of one dissertation, committee member of two MA theses, and three doctoral); Ricci (director of one MA thesis, member of two doctoral committees and co-director of three dissertation committees in Italy and Spain); López-Calvo (director of 4 dissertations and member of three other doctoral committees, and member of a doctoral committee in Spain); Martín-Rodríguez has served as director of four Ph.D. and one M.A. committees.

In order to best expand the range of courses offered in each track and to provide –albeit on a small scale – the kind of academic program expected within the UC System and to serve the unique needs of the vastly underserved Central Valley, we anticipate the following hires over the next three years:

English

In addition to writing faculty conversions (see MWP plan), the English program will need to hire the following:

1. Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western

history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Among the comparison schools, Dartmouth has the most innovative faculty configuration, yet even they have 3 faculty members dedicated to early modern English literature. Moreover, such a scholar would support both the graduate group and would bolster offerings in History, and, perhaps, the performing arts.

In addition, the newly reconceived English and Creative Writing major hopes to ultimately expand widely enough to utilize faculty strengths to offer students a secondary subject matter state accreditation in English. Many students in the Central Valley who major in literature hope to become teachers, and offering them the accredited means to achieve that goal will serve both them and the university itself. Rubrics from the California Commission on Teacher Credentialing clearly mandate that any program qualified by the state must include a course on Shakespeare. Thus, the inclusion of a hire in this area is imperative, since as an already established program, with declared majors, student need and demand has already been established, and a credential program could span programs in English and Spanish literatures, helping to prepare students in both concentrations for the vocation of teaching.

2. Romantic/Victorian British Literature. In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.
3. Colonial and Post-Colonial Literature in English. This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.
4. Some combination of literature of identity (eg, ethnic literatures, lit by women, queer theory, etc) in English
5. A creative writer of significant stature to be brought in as a senior hire.

Spanish:

1. Spanish-language Linguist. Linguistics is key in the development of any top tier department of Hispanic Studies. In Dartmouth, 2 faculty members out of 16 teach linguistics.

2. Golden Age (or trans-Atlantic Golden Age/Colonial). It is quintessential in any Hispanic Studies department because it represents the foundation of modern Hispanic literature in its three main genres: narrative, theater and poetry. It represents the flourishing in arts and literature in Spain, coinciding with the political rise and decline of the Habsburgs dynasty. In Dartmouth, 3 out of the 9 faculty members in Iberian Studies teach Golden Age (including Portuguese, Race and Gender Studies), and one out of 7 faculty members in Latin American literature teaches Colonial literature,

3. Gender and/or race, area and period open, expertise in colonial literature or 19th century Latin American literature, preferred. In Dartmouth, 90 % of the faculty members in the Department of Spanish and Portuguese work on these fields. Two of them teach 19th C Latin American literature and four teach 19th C Iberian Studies.

Metrics of Success:

The first measure of success will be the establishment of the two new majors. Other measures will in part depend on this first success.

Faculty: We'll use the normal criteria articulated by the APM.

Graduate students:

- conference papers delivered
- publications
- grants and awards received
- time to degree
- job placements.

Undergraduate students:

- Increase in the number of majors, with a quick burst as when the two new majors are approved, as we expect many minors in Spanish and Writing convert to majors in Spanish and English respectively. We expect steady growth over the following years as the applicant pool becomes familiar with the change. By the time we reach a steady state in about six-to-eight years after both new majors are in place, we will expect to enroll around seven-to-ten percent of SSHA majors in English and three-to-five percent in Spanish.
- Publications in undergraduate journals.
- Involvement in research projects

- Placements in graduate programs.
- Employment.
- Community service.

F. Media Arts Program

Overview

In 2007 5% of all degrees Bachelor degrees in the UC System were conferred in Fine &Applied Arts. Since fall of 2005 **1, 868** students have enrolled in Media Arts Program courses.

Semester	MAP Total for Semester	MAP Total	Semester	MAP Total for Semester	MAP Total
Fall 2005	46	46	Spring 2008	129	486
Spring 2006	88	134	Summer 2008	22	508
Fall 2006	82	216	Fall 2008	219	727
Spring 2007	79	295	Spring 2009	268	995
Summer 2007	1	296	Summer 2009	95	1,090
Fall 2007	61	357	Fall 2009	351	1,441
			Spring 2010	427	1, 868

As shown above as of January 24, 2010 427 students have enrolled in the fourteen courses offered for spring Semester 2010 by the Media Arts Program (MAP). This number represents over 10 % of the 3,414 students enrolled at UC Merced. (Also, of the fourteen courses offered, nine have reached maximum enrollment.) Of the eighteen SSHA Programs, only one (**Psychology** which is the largest major on campus) has **higher** enrollment of students than MAP.

It must be noted that MAP is administered by one ladder faculty member in comparison to the other SSHA Programs and Majors which (with exception of Languages) all have between 7 and 2 ladder faculty members. For the past two years MAP has received funding for one visiting faculty (teaching 4 courses a year) and allotment of funding representing between two and four full time lecturers. Spring 2010 enrollment represents average of **60 students** per instructor and **30 students** per course.

The percentage of UC Merced students enrolled in MAP courses has been between 8 and 23 % since the campus has opened in 2005. Forty students have declared minor in Art as of fall semester 2009.

The statistics listed above indicate substantial student interest in the MAP curriculum, as well as its relevance to their chosen fields of study and the high quality of instruction. Additionally, the strong interest in MAP courses is a sign that UC Merced students seek a well-rounded education which must include the

arts. To deny our students the opportunity to study art is to deny them the education they deserve.

MAP courses are designed to give students tools to express themselves creatively and to offer them insight into how art is created. MAP aims to provide students with an environment in which they are free to explore, to experiment and to develop new techniques, but only after they have acquired the basic building blocks of each medium.

Courses also provide students with historical perspective on the various media represented in the Program and require writing and research in addition to the acquisition of technique and creative projects. (Global Arts Studies Program provides critical analysis and theory courses.)

The multidisciplinary focus of Media Arts Program is unique in the UC system. The strict division between art disciplines common to all UC campuses represents art education whose goals do not always adequately reflect the fluid state of the arts today. Contemporary artists employ multiple art media techniques to create works aimed at culturally diverse global audience.

MAP differs from many other university based art technique and practice programs by not emphasizing a particular art movement but by seeking to be inclusive. Throughout history the arts have been claimed as the exclusive domain by various constituencies from the Christian Church to cognoscenti of the avant-garde. The mass media and digital media have contributed to integration and cross pollination of art forms and their dissemination throughout the world. Thus MAP has been created in response to the trends and challenges of the twenty-first century. Its aim is to reflect and creatively confront the capacities of twenty-first century media arts which make it possible for artists to cross the traditional boundaries of art disciplines and to create new hybrid forms of art expression by integrating traditional artistic forms with digital technology. At the same time, MAP in its long term planning, wishes to bring attention to marginalized traditional art forms.

Every contemporary art form today utilizes digital technology. A research university campus provides a unique opportunity for exploration of the breaking down of established divisions between artistic and technological disciplines. A cross school position between SSHA and School of Engineering (which is necessary for fulfilling the mission implied in the name “Media Arts”) was proposed in 2006 but was denied. Current Strategic Plan requests this position again because it has the potential to attract students to both schools and is integral to of Media Arts Program’s long term goals. It also resonates with research interests represented in other SSHA Programs.

Whereas in the UC system technique and practice courses are generally open only to majors, MAP is designed to offer all UC Merced students access to both lower and upper division technique and practice courses. The long term vision of MAP offering courses to non-majors is crucial to the success of the Program, the Minor and the future B.A. This vision, if fulfilled, has the potential to attract students to UC Merced who would otherwise decide to study elsewhere by offering them a more focused art minor than the other UC campuses offer. The participation of non-majors is designed to integrate the Media Arts Program into

the academic goals of UC Merced students and thus to further amplify the interdisciplinary nature of the arts.

The National Endowment for the Arts*: Artist in the Workforce 1990 – 2005 Executive Summary Report* states that the artist population is growing more diverse; however Hispanic, Asian, Native American and African-Americans still represent only 20 percent of all artists. This statistic indicates a need to attract Hispanics, Asians, Native Americans and African Americans to study art on the university level. Students listed in the categories above are more likely to have been denied arts education before their arrival on a university campus. Many public schools have eliminated or curtailed art education curriculum. Throughout history the arts have represented one of the most inclusive populist forms of expression and have been integral in the human struggle to overcome exploitation, racism and other political and social inequities. Underrepresented students should not be denied the power that art has to transform and transcend. It is no more appropriate to provide students with courses that only talk about art than it is to provide them with courses than only talk about science. The technique and practice courses offered at UCM represent a laboratory-like setting where students are given the opportunity to form their own understanding of what art is and the potential it has to enrich their lives, as well as the basis to develop new forms of artistic expression.

II. Program Goals

The five year MAP Strategic Plan is designed to implement the following goals:

- Strengthen the Minor in Arts by finalizing the development of a comprehensive curriculum in the visual arts, music, architecture and new media
- Finalize the Proposal for an Individualized B.A. in Multidisciplinary Arts (Architecture, Visual Arts and Music) with a 5th Year Master of Arts Credential (originally planned for submission in Spring 2009 but now planned for submission in Fall 2011 **contingent on the allocation of 2 FTE in 2010-2011)**
- Develop plan for Master of Fine Arts Graduate Program in New Media

III. Resource Allocation

A. Faculty

The Media Arts Program consists of a sole faculty member, Dunya Ramicova who has been in charge of the Program since 2004 (the two faculty members hired with funding allocated to the arts are no longer affiliated with the arts, though the courses they offer are part of MAP planning for the B.A. The minor in Art consists of courses taught by both MAP and GASP faculty.)

Currently, Professor Ramicova is charged with administering an art technique and practice curriculum which at other University of California campuses is distributed over an array of schools, and departments with faculty members

numbering in the dozens. The task is daunting and frustrating since it is clear that the Program has strong potential to grow and to put UC Merced on the cutting edge of art education as well as making UCM more attractive to students. Without additional faculty much of MAP mission will remain not only unfulfilled but also endangered.

Proposal for **B.A. in Art** exists. It is designed to be implemented **with three ladder faculty members**, one visiting **Artist in Residence position** and **four full time lecturers.**

In the meantime, the existing Minor in Art needs to be revised, preparing ground for the eventual degree Program as well as graduate level courses.

It is important to note that the Minor in Art is interdisciplinary and that the B.A. Proposal utilizes for its requirements courses already offered by other SSHA Programs. Furthermore, the arts are naturally interdisciplinary in that their influence reaches into many areas of academic study at UCM such as digital technology, literature, history, psychology, management, anthropology and more.

The MAP strategic planning for FTE allocation is as follows:

1. Secure the continuity and development of the arts technique and practice (MAP) curriculum and the success of B.A. Proposal, 5th Year Master of Arts Credential and potential for development of Master of Fine Arts Graduate Program **by hiring two ladder faculty members in 2010-2011.**

Two positions have been identified which fit into the current and future plans of SSHA and the university: music specialist and sustainable architecture specialist.

1. <u>Music</u>

We need a music specialist with a broad spectrum of experience, and an interdisciplinary vision for the music curriculum to enhance the musicology curriculum offered by GASP. Music can potentially connect to many other areas of endeavor at UC Merced. As a twenty first century research university, UC Merced needs to develop a non-traditional approach to teaching music. Instead of focusing on traditional instruments, the projected music curriculum will concentrate on digital music technology and on exploring interdisciplinary connections while still offering strong foundation in traditional instruments and voice courses for those students who wish to continue their music education while at UCM.

<u>2.Sustainable Architecture</u>

Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers

or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

Here it is necessary to clarify that in the art technique and practice qualified candidates do not have PhD degrees (with some exceptions in music where there are professors with PhD degrees teaching Music Theory which is part of music technique and practice education. More common degrees for those who teach music technique and practice are Doctor of Musical Arts, DMA or Doctor of Music, DM. Faculty members teaching music technique and practice may also have Master of Music, MM degrees.) The most common terminal degree in the arts is Master of Fine Arts. However, highly acclaimed and accomplished practicing artists without terminal degrees teach at many music, performing arts and visual arts departments in the UC system and universities all over the world. To advance, practicing artists/academics have to meet criteria as stringent as those imposed on other academics, and to believe otherwise is to disrespect a large segment of the academe.

2. Seek **a cross school (SSHA and School of Engineering) position in 2011** to fulfill the mission of MAP to facilitate the exploration of the integration of technology and art and to provide students with a truly twenty first century art education.

This is a crucial part of MAP planning whose core is the exploration of digital technology in the arts and new media. Planning for this hire will be facilitated by the completion of the SSHA building where appropriate facilities for teaching courses in media arts and technology will be available (Please, see section B.) The basis for development of collaborative research and courses representing a bridge between technology and the arts already exists as at least two faculty in computer science and engineering (CSE) have research interests that are already aligned with this vision. Professor Kallmann's research interests include 3D modeling, computer graphics, and computer animation. Professor Newsam's research interests include image processing, digital libraries and multimedia.

3. **Secure the continuation of the funding for lecturers who are essential to the success of MAP.**

It is standard throughout the UC system to employ lecturers to teach art technique and practice. In the research conducted in the fall of 2008 which surveyed thirty seven UC art technique and practice departments, fourteen departments employed more lecturers than ladder faculty. Though long term planning for MAP does not envision a larger number of lecturers than ladder faculty, UC Merced has been in the fortunate position to attract excellent practicing artists who are willing to teach as lecturers. The five lecturers that have taught MAP courses in the past four years not only have significant professional credentials but have given many hours of dedicated service above and beyond of what is required of them. A Chair (half a million dollar endowment) in art technique and practice has been fully funded by Isabel Coates as of June 2008.

It is not clear when this endowment will become available to fund lecturers and/or visiting faculty as requested.

B. Space

Teaching art technique and art practice requires specialized and dedicated classrooms due to unique pedagogical needs. Though a variety of courses in art technique and practice have been offered at UC Merced since opening its doors to students in 2005, specialized classrooms and labs are required in order to fully develop art technique and practice courses. For instance, while lecturing is part of teaching technique and practice, students primarily learn “hands on.” Students draw, sculpt, use digital equipment, and sing in these classrooms. A section of the new School of Social Sciences, Humanities and Arts building (scheduled to open in 2010) has been designed to serve the needs of art technique and practice curriculum. There are classrooms, labs and offices specifically designated for teaching of art technique and practice. Two classrooms have been allocated for the digital media course needs. Additionally, there are extra large faculty offices to accommodate faculty artists working with students in one on one independent or directed study format. This specially designed space is more than adequate to serve the needs of MAP in its present form as well as for the projected B.A. and graduate Program.

MEDIA ARTS PROGRAM STATISTICS.

MAP courses consist of curriculum in **Visual Arts** (Drawing, Painting, Form in Space, and Photography), **Architecture, Music** (Instrumental and Voice), and Theater

The statistics provided for the other UC campuses include only Visual Arts, Architecture and Music, since the courses taught by MAP in Theater are primarily design oriented.
Statistics are provided for Academic Year 2009 -2010 for Media Arts Program. The statistics for the other UC campuses are from fall 2008. Anecdotally, lecturer FTE has been lowered at other UC campuses in the arts.

	Media Arts Program UCM -**2009-2010**	UC San Diego	UC Berkeley	UC Riverside	UC Davis
# Ladder Faculty	**1**	UCSD has no Architecture – **55** Faculty	**78** Faculty	Riverside has no Architecture – **16** Faculty	Davis has no architecture **32** Faculty
# FTE Lecturers	**3** & **1** Visiting Faculty	**43** Lecturers **1** Adjunct	**45** Lecturers **8** adjuncts	**3** Visiting Faculty 1 Adjunct	**25** Lecturers

	teaching 4 courses/year		**2** Visiting		
# Students in Major	N/A	B.A. offered	B.A. offered & A.B. (non-professional architecture degree)	B.A. offered	B.A. offered
% of all UCM Students enrolled in MAP in 2009 - 2010	Based on **3,414** students enrolled, **23 %**				
Total # of students enrolled in all classes 2009-2010	**789**				
#MA students	N/A				
# PhD students	N/A	Degrees offered: MFA & PhD, AM & DMA	Degrees offered: MA, MFA, PhD	Degrees offered: MFA	Dgrees offered: MA, MFA, PhD
# students in Minor	**40**				

	2008-9	2012-13 (assume 60% increase)
#majors	N/A	B.A. Proposal to be submitted Fall 2011 – Arts majors represent c.5% of all UC degrees granted – UCM **low estimate 2% of** 5,000 students = **100** students
#minors	**40**	**64**
Majors as % of total UCM student body	N/A	N/A

Minors as % of total UCM student body	**ca. 1 ½ %**	**ca. 1 ½ %**
Total enrolled students	**582** (including summer session 2009-95 students)	**872**
Majors: faculty	?	n/a

	2008 - 2010	2012-2013
#required lower division courses for Minor in Arts	One MAP One GASP	same
# required upper division courses for Minor in Arts	Four MAP or GASP	same
# required lower division courses for B.A. in Art	N/A	**Seven**
# required upper division courses for B.A. in Art	N/A	**Nine** & Senior Comprehensive Requirement

G. World Heritage

Introduction

World Heritage is an emerging interdisciplinary and cross-disciplinary area that includes architecture, history, archaeology, art history, geography, anthropology, management, law, and other disciplines. Thus, faculty in this field brings together the humanities, social sciences, policy, and management, consistent with the interdisciplinary intent of the World Cultures program within SSHA. It is a great challenge to start at UCM a World Heritage Program, because there a very few cases of such educational programs at the international level, therefore it means that there are strong potentialities to get students, funds, visibility and relevance in a very short time. UCM is the ideal place for creating an innovative program like WH, since it is a new campus and it is able to develop advanced forms of learning, research and communication, according to a multidisciplinary approach.

In the next three years, with the addition of two additional faculty members, we will be able to launch a World Heritage minor, as well as a track within the World Cultures Graduate program (or its successor).

The key features of the program, strongly technology-oriented, will permit to create a new discipline and innovative profiles for new jobs in the field of humanities, CRM (Cultural Resource Management), economy, computer science, educational purposes and many others. GISs, 3D Landscapes, 3D documentation, laser scanning, virtual reality, virtual communities' environments will constitute the interdisciplinary and technological background able to engage students and instructors in very innovative and promising directions of learning, teaching and research.

The University of California, Merced has the opportunity to develop a comprehensive program that will bring together faculty from different fields to work with students and technicians in the process of reconstructing the world cultural and natural heritage. The development of the World Heritage program will also have many immediate and long-term benefits for SSHA and UC Merced. These include providing a unique minor (see the last section of the document) and, eventually, a major, within SSHA to attract students to UC Merced, fostering and engendering interdisciplinary across Schools within UC Merced, and attracting international graduate students who are seeking—and will be willing to pay for—a graduate program in this field. A World Heritage program will offer a range of funding possibilities to faculty throughout the humanities, an area in which financial sustainability is often challenging.

For the foreseeable future, the creation of a specific Institute of World Heritage, the first in USA, would be the ideal house for this kind of studies, education and research.

Finally the key word "World Heritage" represent a natural link with the UNESCO's activities (and so with Yosemite Park which is also in the World Heritage List) and with international institutions and stakeholders working in this field.

TOPICS

--Interpretation and Evaluation (the traditional work of the humanities--why should we care about THIS monument)
--Variation and Transformation (history and geography--how heritage changes over time and across space)
--Management (heritage sites, parks, museums, archives, libraries, tourism, and heritage in the community--taking care of heritage)
--Communication and Media (how heritage can be interpreted and communicated through different digital technologies and media)
--Meaning and Memory (how heritage influences culture, how culture influences heritage)

Expertise Areas

Documentation (archaeological fieldwork, data recording, data capturing, surveys and reliefs)

Technology (state of the art of digital technologies in virtual heritage)

Conservation and Preservation (architectural analysis, monitoring, archaeometry)

Restoration (architecture, artifacts, techniques)

International Policy (CRM, laws, legal issues, international institutions)

Museums and Parks (management, analysis, policy, communication)

Interpretation and Communication (sites' interpretation and media)

Virtual Communities (social networks, cyber-heritage, embodiment, social heritage)

Staffing

Position 1 (2010-11): Architecture and Conservation, Associate Professor

Position 2 (2011-12): Museums and Cultural Resource Management, Assistant Professor

2013-15:

Position 3 Natural Heritage, Assistant Professor

Position 4 International Heritage, Full/Associate Professor

Infrastructure

The activity of the World Heritage (WH) Program at UCM is articulated in different multi-tasking spaces: training labs, research labs, and virtual rooms. The training labs are shared spaces (with the three schools across campus) where the students learn software, implement case studies and use technological

devices. The training labs are located in the Kolligian Library, and currently serve, in particular, the following courses: WH01 Introduction to World Heritage, WH02 Cyber-heritage, WH110, Reconstructing Ancient Worlds, WCH (World Cultures and History) 298 – 001 Mindscape and Cultural Landscapes. The labs are specific spaces dedicated to multidisciplinary research projects of virtual heritage (cultural and natural) and cyber-archaeology. These spaces host digital archives, data, metadata and specific software and hardware: in particular the Powerwall, just installed, can display in 3D and in stereo archaeological data and models (reconstructed, simulated and acquired in the fieldwork). We are planning to organize research workshops and advanced courses in this collaborative environment. In addition, planned networking connections with other Powerwalls (e.g, at UC Davis and at the California State Park headquarters in Sacramento) will allow us to share collaborative environments and participatory learning activities between students, professors, and researchers.

Virtual Heritage Lab

The Virtual Heritage Lab (directed by M.Forte), created under the umbrella of the WH program, SSHA, III floor, is a research multidisciplinary space for grad and MA students involved in research and educational projects in WH. Applications and software: GIS, remote sensing, photogrammetry, photomodelling, 3D modeling, virtual reality, computer graphics, laser scanning, geometrical post-processing, game engines.

Powerwall

Co-PI M. Kallmann is currently PI on the CNS-0723281 award “MRI: Acquisition of Equipment to Establish a Cognitive Sensorium and Visualization Facility at UC Merced”. The main component of this on-going project is the development of a facility for operation of the stereo multi-tile Powerwall visualization system. The visualization system is already fully operational, and a Vicon full-body optical tracking system is currently being integrated in the same room for initiating full-body collaborative visualization projects. The facility is reserved for visualization and motion capture uses and is available full-time for research development. The facility is interdisciplinary and a scheduling system is being prepared for accommodating the needs of multiple future projects. The facility has received maintenance support from UC Merced and also research support from the Center for IT Research in the Interest of Society (CITRIS). Due its high visibility, the facility is also becoming an important research showcase for UC Merced. All these activities are ensuring the continued development of the facility and its related research and educational projects.

Additional spaces/labs are necessary in the field of remote sensing and spatial technologies and in the area of conservation/archaeometry.

Active Research Projects

WH faculty and students are currently engaged in 5 different research projects: The Virtual Museum of the Western Han Dynasty (in collaboration with Xi'an Jiaotong University); Cyber-archaeology in virtual collaborative environments (in collaboration with UCB, UC Davis); 3D Copan (in collaboration with University of New Mexico, Fondazione Kessler, ETH); 3-Digging at Catal Huyuk (in collaboration with Stanford University); Virtual Teramo (in collaboration with Italian National Research Council); Virtual Worlds (Consortium of 7 international partners).

Grants

-World Heritage Faculty and students have received a significant number of large grants to carry out their research, from the Pacific Rim Research Program,, Microgeo, UCCP,: GRC, National Endowment for Humanities, CNR, Italian National Research Council, CITRIS.

H. Merritt Writing Program
Five Year Strategic Plan: 2010 - 2015

A. Overview

The academic mission of the Merritt Writing Program (MWP) divides into three main areas of curricular responsibility and two secondary functions of academic support. Each applies exclusively to undergraduate education:

Primary curricular mission:

- university-writing requirements for freshmen (2 courses)
- upper-division writing requirements (6-7 courses)
- minor in writing (12-15 courses)

Secondary functions:

- support for general education (e.g., Core 1 and Core 100)
- support for tutoring, mentoring, learning communities, supplemental instruction, and Summer Bridge.

Although some of these responsibilities and functions overlap, they are distinct enough to require separate administrative oversight distributed among three half-time appointments (a director, 50% appointment, and two assistant directors, each with 50% appointments), and several coordinators. The MWP also has two administrative-support staff, one for personnel and grant management and the other for assessment and scheduling.

MWP courses are taught entirely by Unit 18 Non-Senate lecturers, 35 of whom have full time appointments with a five course teaching load and another 10 with part-time appointments. Most of these 45 lecturers are routinely assigned to teach any of three courses that nearly all freshmen must complete (i.e., WRI 1, WRI 10 and Core 1).

Total enrollment in MWP courses each semester exceeds 30% of all undergraduates, or more than 1,000 students per semester in AY2009/10. For Humanities and World Cultures, the MWP generates about 51% of total credit hours, and for SSHA the MWP produces 28% of all the school's credit hours. Officially, 63 students have declared their intention to complete the minor in writing, making that program among the larger minors in SSHA.[13]

Since 2005 the entire MWP has convened to evaluate students' writing progress by reviewing results of pre- and posttest samples of in-class writing or by noting specific learning outcomes in cumulative examples of writing produced

[13] Enrollment information is from official data of the Office of Institutional Planning and Analysis.

throughout the semester. The outcomes that are assessed include organization and development of substantial ideas; quality, tone and logical consistency of an argument with a clear purpose for the intended audience; and command of the appropriate style and formal conventions of academic discourse. Students who earn passing grades demonstrate in their course portfolios that they have met or exceeded specific standards that have been established for each MWP course.

Except for the director's position, currently there are no dedicated FTE lines assigned to MWP lecturers; however, after six years of employment in the MWP, lecturers will qualify for post-six continuing appointments that are supported by dedicated FTE lines. In AY20010-11, as many as eight MWP lecturers will undergo review for post-six positions, and a significant number will be eligible for this review in subsequent years.

This pending change in the review and appointment of lecturers will have long-term implications for the MWP and the university. Accordingly, this five-year plan anticipates some of the challenges that this change poses and recommends a number of strategic responses.

B. Strengths/opportunities/challenges

General Education

About one-third of all MWP appointments are needed to staff Core 1, a writing-intensive course that fulfills a general education requirement for freshmen. There are several compelling reasons to transfer administrative and related funding responsibility for Core 1 from SSHA/HWC/MWP to the Office of Undergraduate Education. Unlike the dean of SSHA, the College One dean has primary responsibility as an advocate for resource allocations in support of Core courses. The recent appointment of the Vice Provost for Undergraduate Education as dean of College One ensures that funding for Core courses can be requested as part of long-term planning for the development of a university-wide curriculum for general education. Further, the MWP was never intended to be the sole academic unit for delivery of Core courses; instead, as originally planned by the founding faculty and as noted in the 2007 WASC response to our Application for Candidacy, that responsibility is best attended to by faculty from throughout the university.

Recommendation 1: Starting in AY 2010-11, <u>College One will have full responsibility for funding and staffing the Core 1 curriculum</u>. Since this change will be entirely administrative, it should not require any new resources.

Under the current model of Core 1 delivery, the MWP independently recruits and hires Unit 18 lecturers to staff Core 1 discussion sections. An Assistant Director (50% appointment) of the MWP serves on the Core 1 Advisory Committee, co-supervises Core Friday events, conducts orientations for new discussion leaders, and works closely with all the Core 1 discussion leaders to maintain consistency of instruction in about 30-

35 discussion sections per semester. The Assistant Director also conducts formative and summative assessment of learning outcomes for Core 1. In all other respects College One already has academic and support personnel assigned for the delivery of Core 1. The proposed recommendation would entail shifting current resources for the 50% Assistant Director position from the MWP to College One.

> **Recommendation 2**: By the end of AY 2010-11, phase out all Core 100 equivalencies staffed by the MWP.

In Spring 2006 and 2007, students completed the upper-division requirement for general education by taking Core 100, a course that replicates some features of Core 1 as it attends to all eight guiding principles of general education. For various reasons of cost, staffing and sustainability, Core 100 was suspended after its second year.

In Spring 2008, the Academic Senate approved a two-year plan that has allowed students to fulfill an upper-division general education requirement by taking one of the following MWP courses: WRI 100, 116, 117, 118 or 119. Like Core 1 and Core 100, each of these five writing courses already addressed or was modified to address all eight guiding principles of general education. Equivalency of MWP courses with Core 100 was based solely on this alignment with the eight guiding principles; in other words, the writing curriculum has served as a temporary alternative to Core 100 pending development of a general education curriculum that will satisfy the upper-division requirement.

Since these courses were not originally intended to serve this general education function, having them continue indefinitely as Core 100 equivalents potentially undermines development of the curriculum for the MWP minor in writing and a pending major program (to be discussed later). In effect, these courses were originally meant to be interrelated building blocks of the professional track in writing, but we are delaying development of that track in order to serve students who are fulfilling the upper-division requirement for general education.

For the last two years the MWP has waived prerequisites to our upper-division courses so that any student can enroll in Core 100-equivalents without having to complete WRI 25 or WRI 30 and WRI 100. We have also suspended plans to make WRI 100 a "gateway" course that introduces writing minors to areas of specialization in creative and professional writing. To further develop the minor program as the foundation for a major in writing, we need to resume enforcing prerequisites and begin implementing planned changes to our upper-division curriculum.

By the end of Spring 2010, the MWP will have fulfilled its two year commitment to provide an alternative to Core 100. We understand that this support for upper-division general education will likely need to continue for AY2010-11; we also recognize the possibility that one or more writing courses could be part of a long-term, multifaceted solution to the delivery of upper-division general education. Nevertheless, the MWP has reached the point of being overcommitted in support of general education, with

potential negative consequences for the MWP's mission and main responsibilities. In meeting those responsibilities, we must shift resources from a separate (non-MWP) general-education curriculum in order to develop our own curriculum. That shift will allow us to build out our e-portfolio system of assessment; refine online delivery of hybrid writing courses; and implement a proposed sequence of gateway and capstone courses for the writing minor as a foundation for a new major in literature and writing.

Major in English and Writing

> **Recommendation 3**: Merge the minor in writing with the major in English/American literature to establish a new English and Writing major.

In each previous Strategic Plan that the MWP has submitted since 2006, a main objective has been development of a major in writing. Realistically, this stand-alone major will not emerge without the appointment of Senate faculty to the MWP, a point discussed in Recommendation 4. As a related consideration, since the state's deficit problems remain unsolved, we will likely have several more years of inadequate state support for higher education. Under these circumstances of severely limited resources and competing resource needs of existing academic programs, a relatively cost-efficient means to establish a new major would be to merge two existing programs. Thus, rather than postpone indefinitely the creation of a stand-alone major in writing, the faculty in American/English literature and the MWP are proposing a new dual track major in English and Writing, with one track in literature and a separate but complementary track in writing.

This plan will combine instructional resources that can expand the range of courses offered in each track and achieve efficiencies in operations that cannot be matched by separate majors. Similar to the undergraduate English degree at UC Santa Cruz, the proposed tracks will allow students to focus on literature or writing as their primary area of interest, but they will also complete the same gateway (i.e., entry-level) and capstone courses that faculty from each track will jointly staff. This collaboration among faculty in each track will strengthen assessment of program learning outcomes and distribute instructional workload in ways that enhance curricular breadth and depth.

Except for UCSF, all UC campuses offer a B.A in English literature and most offer a B.A. in writing (UCR, UCSC) or a closely related degree in communication (UCD, UCSD), journalism (UCI), linguistics (UCLA) or rhetoric (UCB). These are well established majors[14] that draw students to other UC campuses; a comparable degree option at UC Merced, specifically as it combines literary study with writing theory and praxis, should attract students to our campus who do not currently identify us as a viable alternative. Similarly, students interested

[14] At UC Santa Cruz, their combined literature and writing B.A. degree is tied for fourth place for the largest number of undergraduate degrees awarded (UCSC Institutional Research & Policy Studies, 2009 data, http://planning.ucsc.edu/portrait/docs/ucsc_profile.pdf, p2)

in careers as English teachers will have opportunity to complete writing and literature courses that fulfill requirements for a Single Subject teaching credential in English. A full proposal for this new major is forthcoming.

Recommendation 4: Appoint qualified MWP lecturers as Lecturers with Potential Security of Employment (PSOE).

During their fifth year of employment at a UC campus, Unit 18 lecturers undergo review for "post-six" status for continuing appointments, a process that has already begun for eight MWP lecturers. If continuing status is affirmed, then each post-six lecturer's appointment is supported by an FTE line for three years, and is thereafter subject to renewal every three years unless an academic program is discontinued or the lecturer fails to perform at accepted levels of instructional and professional competence.

Although these post-six appointments do not confer the equivalent of tenured status, they nevertheless do allocate a line to the lecturer whose sole responsibility is for teaching (the instructional workload for MWP lecturers is five courses annually). In contrast, lecturers with Potential Security of Employment (PSOE) or SOE appointments teach the same number of courses as Unit 18 lecturers but are also members of the academic Senate who are expected to fulfill service responsibilities. In other words, unlike Unit 18 lecturers, P/SOE lecturers can contribute to essential administrative functions of the university in ways that broaden distribution of service tasks and therefore proportionally lessen the service workload of ladder faculty.

Salary scales for P/SOE lecturers are nearly identical to those for non-Senate Unit 18 appointments (http://www.ucop.edu/acadadv/acadpers/tab0809/tabcont.html). Upon closer inspection, in some respects Unit 18 lecturers are actually more expensive to employ since, by union regulation, they must be paid for any non-teaching work they do or alternatively receive an instructional workload credit, which is an indirect form of payment that requires hiring someone else to teach a course that the Unit 18 lecturer would have otherwise taught. P/SOE lecturers would not receive additional compensation for fulfilling their service responsibilities.

Although lecturers are expected to teach as their main responsibility, many of those affiliated with the MWP are also active writers who publish regularly in respected poetry and fiction journals or chapbook series. Others actively publish on composition and pedagogy, present at professional conferences, and serve on editorial boards. As Unit 18 lecturers, this scholarship has no official status and therefore is not included in reports of faculty productivity. P/SOE lecturers, in contrast, are required to submit annual bio-bibliography reports that include this information.

Unit 18 lecturers with Continuing Appointments will have an FTE line assigned to their position. We are proposing that over the next five years approximately half the lecturers in the MWP (15-16) be appointed instead with P/SOE status.

Recommendation 5: Appoint an Assistant Director for Instructional Technology

The MWP had already begun a full transition from paper portfolios of student-course work to e-portfolios. We are also requiring all Unit 18 lecturers who undergo post-six review for continuing appointments to submit an e-portfolio that documents their teaching effectiveness and their engagement with the scholarship of teaching and learning.

The proposed Assistant Director position will be grant-funded (50% of full-time). In addition to implementing a robust e-portfolio system, this appointment will help coordinate assessment functions for efficiently tracking academic performance of students. A digital system of data collection will further provide the MWP with relevant information about program learning outcomes. As a related responsibility, this position will conduct training sessions for students and faculty on the use of e-portfolios and their integration within the university's course management system, UCMCROPS/Sakai.

C. Research, Grants and Awards

Since 2005 the MWP has been awarded over two million dollars in grants from federal, state, and private sources. These include the U.S. Department of Education (Title V and FIPSE), the Spencer and Hewlett foundations, numerous state of California writing project grants, and several UC-system grants (one Humanities and two Institute for Research in the Arts).

Most often these grants have funded academic-support programs such as tutor training, peer mentoring, learning communities, supplemental instruction, TA training, and summer "bridge" experiences for entering freshmen. With these external resources we have also sponsored the university's *Undergraduate Research Journal;* helped pay for publication of the *Fairy Shrimp Chronicles*; co-sponsored our campus Common Read Project; paid to have Alan Weisman, author of *The World Without Us*, address the Core 1 class in Spring 2010; and funded undergraduate and graduate student researchers to attend professional conferences. These are important contributions to the university's mission as a student-centered research university, and key examples cited in our Capacity and Preparatory Review report that was recently submitted (July 2009) to WASC.

As previously noted, Unit 18 lecturers in the MWP have published in refereed journals, delivered invited papers at professional conferences, and routinely given public readings of their creative work. As one notable example of creative

scholarship, in 2009 Jared Stanley won the international Crashaw Prize for poetry with his collection titled *Book Made of Forest*.

D. Resource and Space Requests

In Fall 2009 the MWP administrative staff was moved from the 3rd floor of SSHA to the 2nd floor, away from all the (45) lecturers who rely on their support and from the director and both assistant directors. Lack of direct access to support staff impedes efficient operation of the MWP, and it significantly undermines the director's ability to assess the job performance of key personnel. Assuming the MWP will no longer be staffing Core 1 discussion sections, several offices in the inner area of COB's third floor should become available in Fall 2010. At that time returning the MWP support staff to the inner section of the 3rd floor will not affect allocation of "outer" offices reserved for faculty. We are requesting this change in office location as part of the MWP's five year plan.

Approximately 85% - 90% of all MWP staffing is for campus or system-wide requirements in writing such as WRI 1 and WRI 10 and the "core" curriculum for general education (Core 1 and temporarily for Core 100). Nearly all of the remaining 10% - 15% supports our minor in writing. If the university meets its projected goals for new enrollment in Fall 2010, then we will need to staff courses for about 1250 freshmen and 145 transfers.

To staff university writing requirements for freshmen (WRI 1, 10 and writing-intensive discussion sections of Core 1), we will need about 30 lecturers. This total allows for a 10% failure in freshman writing courses resulting in additional sections that are needed for students retaking a course.

For AY 2010-11, the MWP will also continue to offer an "equivalent" of Core 100 so that juniors and seniors can fulfill the upper-division requirement for general education. The relevant courses for this purpose are WRI 100, 101, 117, 118, and 119. After AY 2010-11, the Writing Program will no longer staff additional sections of these courses as a temporary alternative to Core 100. We project a need for 4 lecturers who will staff these courses for the upcoming academic year.

Additionally, the MWP staffs several School and major-program requirements. For Natural Science majors, we annually offer about 10 sections of WRI 116 (Science Writing in the Natural Sciences) as the main option available to NS students who must fulfill a School requirement in communication. To staff WRI 116 we anticipate hiring two full-time lecturers. Similarly, Psychology majors are now required to complete WRI 101 (Writing in the Disciplines: Psychology). To staff approximately 4 sections of that course, we anticipate hiring one full-time lecturer and one part-timer whose appointment might be upgraded to a full-time position if enrollment in WRI 101 and/or 116 warrants that change.

Enrollment each semester in writing minor courses has been strong; preliminary indications based on students taking more than two minor-program courses suggest that as many as 75 students plan to complete the minor in writing, or 10-15 more than have officially declared this intention. Another 50 are likely to take at least one writing course as an elective. Based on these projections, we will need 2-3 full-time lecturers.

Currently (AY2009-2010), the MWP employs the equivalent of 40 full-time Non Senate Faculty lecturers (equivalency is based on total number of sections taught by full-time and part-time hires). For the upcoming academic year, AY2010-2011, we are requesting funding that will enable us to offer enough sections of required writing courses for freshmen and juniors—about 40-41 positions.

University-writing requirements for freshmen:	30
Upper-division writing & GE requirements:	8
Minor in writing:	2-3
	40-41 lecturers

If the MWP succeeds in having Core 1 responsibilities transferred to College One, then we will be hiring 10-11 fewer lecturers; also, if we no longer staff sections of Core 100 equivalent courses, then 3 fewer lecturers will be needed. The net result is shown in the following table, with the last two columns indicating assignment of lecturers to teach Core 1/100 sections versus no assignment for those courses.

Five Year Projections for MWP Hiring

Academic Year	Projected Enrollment			Lecturers needed:	
	Total	New Freshmen	Transfers	+ Core 1/100	- Core 1/100
2010 - 2011	3593	1258	153	41	28
2011 - 2012	4018	1348	155	42	29
2012 - 2013	4335	1430	157	43	30
2013 - 2014	4605	1513	160	44	31
2014 - 2015	4981	1572	189	45	32

As this table shows, by transferring responsibility for Core 1/100 to College One, the MWP will achieve a much more manageable size of 32 lecturers by AY2014-15.

Further reductions can be achieved by gradually assigning TAs to teach courses that fulfill university, school or program writing requirements. Unfortunately, there is no obvious metric for estimating how many TAs might be available to teach writing courses since they would also be needed to staff discussion sections in growing undergraduate majors. Staffing of Core 1 discussion sections could also include TAs, but the scalability of that course beyond a threshold of 1500 freshmen poses significant problems for the existing Core 1 curriculum.[15]

D. Metrics of MWP Success and Public Service

The Merritt Writing Program generates the majority of FTE for Humanities and World Cultures. Despite generating more than half the FTE for HWC, we receive no allocations for Senate-faculty appointments. Overall, MWP course enrollment averages about 18-19 students per section in classes with a 20 student cap, or about 90 students total in the five classes that full-time lecturers teach. The total cost per full-time lecturer appointment averages about $51,240 with benefits. On average, the cost of hiring lecturers is about 40% lower than the cost of hiring ladder-faculty (estimated at $87,500 regardless of rank and not including benefits). Calculated in terms of instructional units, each lecturer teaches about 320 units (90 students annually X 4 units per section = 320 units). This total exceeds the break even point for a steady-state writing program; it also indirectly supports the hiring of additional ladder faculty through our accumulated FTE.

Through grant support for the MWP's Summer Bridge (SB) Program, we have had remarkable success in preparing "at-risk" freshmen for their first year at UC Merced. Compared to other freshmen at our campus with similar academic and demographic profiles, the first 40 freshmen to complete SB have performed at a much higher level academically than their peers. Confirmed by an independent evaluator, the academic success of SB also has a financial counterpart in that last year (Summer 2009) we generated over $105,000 in Summer Session funds that the EVC distributed to the Schools.

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[15] Current projections by Institutional Planning and Analysis have our campus enrolling about 1500 new freshmen in Fall 2013. Since Lakireddy auditorium cannot accommodate more than 375 students for lectures, each increment of 375 students requires another lecture presentation and a related commitment of faculty time to this course. Also, since the Core 1 discussion sections are writing-intensive, those classes are capped at 20 students, and classrooms with a 20 student maximum are already fully utilized. Moving additional discussion sections to larger classrooms would negatively affect space utilization audits and related campus requests for new instructional buildings. That shift would also create scheduling problems for other courses with 25 or 30 student discussion sections. Conversely, increasing class enrollment from 20 to 25 or 30 students per Core 1 discussion section would negatively affect writing instruction and significantly increase workload, with risk of union grievances. However these spatial, curricular and workload matters are resolved, the current form of Core 1 should not be expected to scale up in sync with annual increases in the number of freshmen.

As related pedagogical point that demonstrates MWP instructional effectiveness, 2005-2009 UCUES data show that UC Merced freshmen who began at our campus (first two sets of bar graphs) identify themselves as weak writers, typically below the average of all other UC campuses. Yet by their junior year, these students match or exceed their other UC peers in confidence levels for writing ability. [The last two sets of bar graphs represent transfer students who completed freshman-writing requirements elsewhere.]

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The MWP cannot take full credit for this increased confidence among our students, but we can demonstrate through extensive assessment of writing and general education courses that our students improve significantly as writers. In sum, as a relatively inexpensive unit of the university, the Merritt Writing Program makes a pedagogically vital and arguably essential contribution to students and faculty.

E. Summary of Staffing Requests for AY 2010-2011:

1. Appoint 40-41 full-time lecturers. Specific staffing needs are shown below:

WRI 1:	40 sections (1250 freshmen; about 60% failure rate for the AWPE and about 10% failure rate in Fall semester sections of WRI 1)
WRI 10:	55 – 60 sections (1250 students, including those from AY 2009-2010 who deferred taking this course until their sophomore year, as is the policy in the School of Engineering)
WRI 11	2 sections
WRI 25	3-4 sections
WRI 30	2 sections
WRI 100	6 sections (fulfills Core 100)
WRI 101	5 sections (fulfills Core 100)
WRI 105	2 sections
WRI 110	2 sections
WRI 116	10-12 sections (fulfills Core 100)
WRI 117	6 sections (fulfills Core 100)
WRI 118	1-2 sections (fulfills Core 100)
WRI 119	4 - 5 sections (fulfills Core 100)
WRI 120	1 section
WRI 125	2 – 3 sections
WRI 130	1 – 2 sections

WRI 131 2 sections
WRI 150 1 section
Core 1: 65-70 sections (1250 freshmen plus about 100 who did not take this course their freshman year)
USTU 10 2 sections
USTU 110 1-2 sections

2. Convert Unit 18 lecturers with Continuing Appointments to P/SOE positions

Fall 2010: 6 PSOE
Fall 2011: 4 PSOE
Fall 2012: 5 PSOE

3. Appoint an Assistant Director for Instructional Technology (50% position). This position will be entirely grant supported and will not require allocation of any additional stateside resources.

Psychological Sciences Strategic Plan[16]

0. Executive Summary

Psychological Sciences has become a key discipline to UC Merced, with high undergraduate and graduate student enrollment, substantial external grant funding, and internationally recognized scholarly productivity and excellence in developmental, health, and quantitative psychology. Its primary need is to hire new ladder rank faculty to reduce the extremely high student/faculty ratio and the over-reliance on Unit 18 lecturers. Psychological Sciences has 7 (15%) of SSHA's approximately 46 faculty. By any metric, Psychological Sciences is drastically understaffed. If faculty were allocated in proportion to the number of majors (39%), for example, Psychological Sciences would have 18 faculty. This strategic plan outlines a three year hiring plan that would add 10 new ladder rank faculty, recognizing that the current budget situation may preclude meeting that goal fully. Secondarily, there is need for additional laboratory research space. The Social Sciences and Management building will provide that space when it opens in 2011 or 2012, as it is equipped with labs ranging from 450-600sf. Psychological Sciences faculty anticipate being allocated at least one of those labs per faculty member, commensurate with other UC campuses. The Appendix to this document provides information concerning the strategic planning criteria outlined by CAPRA and by the Provost.

[16] The administration has not requested that strategic plans be in any particular format. Consequently this strategic plan continues to use the format from past years requested by former Interim Dean Hans Bjornsson.

1. The Mission and Challenges

The Psychological Sciences Section of SSHA offers a broad undergraduate curriculum spanning all its subspecialties, and it offers graduate training with focused excellence in Developmental Psychology, Health Psychology and Quantitative Psychology. The main challenges are a shortage of ladder rank faculty given enrollment, and a shortage of space.

2. The Vision

Psychology has been identified as one of seven "hub disciplines"[17] in science—a key discipline with high scholarly activity that involves frequent and strong links to other disciplines (the other six hub disciplines are Mathematics, Physics, Chemistry, Earth Sciences, Medicine, and Social Sciences). Hub disciplines are both disciplinary and inter-disciplinary at the same time. The Psychological Sciences faculty believe that the scholarly reputation of UC Merced depends crucially on fostering the growth and excellence of all these hub disciplines. The role of Psychological Sciences at UC Merced is to be such a hub by creating disciplinary excellence with strong inter-disciplinary links.

3. The Overall Goals and Strategies

Psychological Sciences aims to

- Develop a writing-intensive undergraduate Psychology curriculum with opportunities for undergraduates to work on faculty research.
- Develop scholarly excellence in Developmental, Health, and Quantitative Psychology, reflected in successful publication and grant production.
- Develop a graduate training program in Psychological Sciences that produces research-oriented doctoral graduates who work in research settings in education, in government, and in the private sector.

4. The Organization and Administration

The Psychological Sciences Section of SSHA was created in Fall 2007, and has functioned as an independent organizational unit since then. It is currently staffed by seven ladder rank faculty: Assistant Professor Michelle Chouinard, Assistant Professor Yarrow Dunham, Assistant Professor Michael Hoyt, Professor William Shadish (Academic Personnel Chair), Assistant Professor Anna Song, Associate Professor Jack Vevea, and Professor Jan Wallander. In addition, a number of Unit 18 lecturers teach undergraduate Psychology courses. A proposal to recognize Psychological Sciences as a Bylaw 55 Unit accompanies this strategic plan.

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[17] Boyack, K.W., Klavans, R., & Borner, K. (2005). Mapping the backbone of science. *Scientometrics, 64*, 351-374.

5. Education

Psychological Sciences is the second largest major at UC Merced. In Spring 2010, it served 340 Psychology undergraduate majors (39% of the 871 SSHA declared majors). The ratio of Psychological Sciences majors to Psychological Sciences ladder rank faculty is 48:1—far higher than for any other SSHA major (except MGMT, which has no faculty). The Psychology minor serves 66 students, third highest in SSHA. Psychological Sciences undergraduate courses have about 20% of all SSHA credit hour production. The undergraduate major is writing intensive and provides many opportunities for undergraduates to participate in faculty research.

At the graduate level, Psychological Sciences currently has eleven graduate students, and its training program functions as part of the Social and Cognitive Sciences (SCS) graduate group. This is 41% of the total number of graduate students in the SCS graduate group and 26% of the total number in SSHA. The faculty are near completion of a CCGA and WASC application for an independent graduate group in Psychological Sciences. Two years ago, the faculty took several steps to increase the publicity of our graduate training. The payoff is occurring now—applicants for Fall 2010 have increased dramatically compared to previous years. Preliminary data provided about the number of applications for graduate training in the SCS graduate group on January 22, 2010, showed that 34 of 55 applicants were to Psychological Sciences; three more applicants listed both Cognitive Science and Psychological Sciences. Applications to Psychological Sciences this year are more than triple the average number of applicants to Psychological Sciences in past years, and more than triple the application pool of the nearest competitor: Cognitive Science with 9 applicants. Consistent with the high demand for graduate training in Psychology at other UC campuses, we anticipate continued growth in the applicant pool in future years.

6. Research

Psychological Sciences emphasizes three areas of research: Developmental Psychology, Health Psychology, and Quantitative Psychology.

Developmental Psychology at UC Merced currently focuses on childhood, with interests in cognitive development, language, and social development. Faculty in this area have strong overlapping interdisciplinary interests with the UC Merced Cognitive Science area. Future developmental hires will build on these strengths, but also expand the breadth of developmental interests at UC Merced into developmental neuroscience, and will broaden the age of our focus to include research with infants. In accord with this, our next priorities are hiring faculty members with research interests in these areas. Such hires would build on the program's current strengths, and would add to the interdisciplinary potential of the psychology area, due to further potential cross-collaborations with cognitive

science. Developmental neuroscience is a particular future hiring priority; as a cutting-edge research area, it potentially spans developmental, cognitive, and health psychology, as well as offering cross-disciplinary collaborations with cognitive science and human development/biology.

Health psychology deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health psychology includes research into how behavior affects physical health as well as how physical health affects behavior. To do so, health psychology draws upon multiple knowledge bases of psychology. For example within health psychology, there are social psychologists who study cultural influences on health; cognitive psychologists who study health decision making; developmental psychologists who study family influences on children's health; and physiological psychologists who study behavioral effects on the neural, cardiovascular, and immunological systems that are often the proximal causes of diseases. Health psychology also includes activities to promote physical health and prevent disease, which draws broadly from clinical psychology all the way to public health. Such interventions can be applied at different levels, from individuals all the way to the public in general. Examples include psychological interventions that prevent health problems or ameliorate existing health problems, such as the delivery of culturally-appropriate health promotion information, and prevention programs to aid elementary and high school students to avoid unhealthy lifestyle habits (e.g., related to obesity, substance use). Health psychology faculty will bring research and teaching interests that will be highly useful in UC Merced's quest to develop biomedical and population health research and education programs. Health psychology also usually fares extremely well in generating, often large amounts, of extramural research funding, often in large amounts.

Our priorities are to add faculty in health psychology who can bring teaching and research expertise in areas such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), and (e) meta-analysis of effects in health psychology. Interests in health issues prevalent in the Central Valley will continue to be of high priority within the aforementioned research areas. Furthermore, we are keen on building strengths within these areas in health issues during childhood and adolescence, to continue forging links with the developmental psychology area. However, we will also consider expanding coverage in the faculty group into health psychology applied to adult and aging periods as we grow.

Quantitative Psychology is the study and development of the research designs and statistical methods that are used by psychologists (and other social, behavioral, and biomedical scientists) in their work. Compared to Developmental

and Health Psychology, which are envisioned eventually to have large numbers of faculty, Quantitative Psychology will have a proportionally smaller number of full-time faculty, but will also have enough faculty to offer doctoral training in Quantitative Psychology. The rapid addition of such faculty early in program development is essential to the development of a strong psychology program, for several reasons. First, it provides a good means of ensuring competent teaching of crucial graduate level quantitative courses in psychology that are required in every high-quality doctoral Psychology program. Second, it serves as a catalyst for improving the statistical analysis of research data for the two substantive areas of health and developmental psychology, improving the likelihood of successful publication. Third, given that UC Merced does not have a statistics department, unlike most mature universities, quantitative psychology can be a source of faculty who can provide critical statistical consultation on extramural grants. Such consultation is essential for large grant-supported research programs that we hope to encourage in developmental and health psychology. Importantly, this expertise will benefit grant applications outside psychology as well. Fourth, the American Psychological Association (APA) has identified quantitative psychology as an area that needs an increased supply of trained faculty members. The web site of the Task Force for Increasing the Number of Quantitative Psychologists http://www.apa.org/science/bsaweb-tfinqp.html states:

> "Acknowledging the fact that the number of quantitative psychologists is dwindling at the same time that there is a pressing need for training and education in all aspects of quantitative methods, the APA Council of Representatives authorized a special task force in 2006…. The Task Force…was charged with addressing both the pipeline of qualified students and opportunities for training in quantitative psychology (with an emphasis on early undergraduate education through postdoctoral training)."

The quantitative psychology program at UC Merced will help respond to that need. Mostly, we will choose hires in quantitative psychology that complement the needs typical of developmental and health psychology. Thus we place high priority on hiring faculty with skills in (a) longitudinal data analysis, (b) multilevel modeling, (c) categorical data analysis, and (d) structural equation modeling. A second level priority would be a hire in psychometrics such as in item response theory; psychometrics forms the backbone of many quantitative psychology programs, so exposing quantitative psychology students to that area is important. Finally, the two current quantitative psychology faculty members (Shadish, Vevea) are experts in meta-analysis. Currently in the United States, there is no training program specializing in meta-analysis. So we will give special priority to recruitment of faculty who can contribute to the development of such a training program in meta-analysis.

In the long term, Psychological Sciences may expand beyond these three specialties, although such predictions are hard to make at this time. Likely candidates for long term expansion would include any of the physiological specialties in Psychological Sciences, or Social Psychology. Much will depend on

the mix of interests represented on the faculty at that time. For example, some health psychologists are trained as social psychologists, and they may find it attractive to expand the social psychology offerings.

7. Interdisciplinary opportunities

Psychological Sciences currently envisions three primary venues for interdisciplinary collaboration. First, Psychological Sciences has been successful in seeking and hiring faculty who have overlapping interests that can support the Cognitive Science program, such as Yarrow Dunham, a developmental psychologist who has strong cognitive training and interests, and Jack Vevea, a quantitative psychologist who has developed quantitative models of cognitive phenomena.

Second, faculty who will be hired in Health Psychology will contribute to interdisciplinary collaboration with faculty in the School of Natural Science and the School of Engineering who are involved in health research at UC Merced. For example, Professor Wallander led the recent successful effort to bring an interdisciplinary NIH-funded Center for Health Disparities Research to UC Merced.

Third, faculty who will be hired in Quantitative Psychological Sciences will contribute to the need for expert statistical consultation among faculty in the School of Natural Science and the School of Engineering who are involved in the creation of a medical school. For example, at the request of the Dean of Natural Science, Professor Shadish wrote a document describing models for statistical consultation and training that could be used at UC Merced in the short to medium term future.

8. Outreach

Psychological Sciences strongly supports efforts to attract a diverse student body at both the undergraduate and graduate levels. Specific figures on the composition of the current student body are not available from SSHA. However, Psychological Sciences tends to attract a large proportion of female students, as well as of underrepresented ethnic groups. The composition of our undergraduate research teams, and of our graduate students, also reflects that (specifics available upon request). Finally, Psychological Sciences faculty routinely participate in outreach efforts. For example, Dunham and Song have served on the SSHA Recruitment and Retention Committee, and a number of faculty have participated in recruitment forums for Psychological Sciences, SSHA, or UC Merced. Similarly, Wallander has served as a faculty speaker for the Transfer Student Recruitment into Psychological Sciences.

9. Resources

9.1. Faculty

Psychological Sciences has 7 (15%) of SSHA's approximately 46 faculty. *By any metric, Psychological Sciences is drastically understaffed.* If faculty were allocated in proportion to the number of majors (39%), for example, Psychological Sciences would have 18 faculty.

2009-2010 Academic Year Searches (start date July 1, 2010). Psychological Sciences is currently searching two position:

1. Assistant Professor in Developmental Psychology, preferably specializing in infant development, cognitive development, or developmental cognitive neuropsychology. The advertisement for this position notes that selected candidates with interests in learning disabilities broadly defined may be eligible for an endowed chair. *Note this position was a Full Professor position initially allocated in 2005, then filled by Carol Tomlinson-Keasey, then searched in two subsequent years without being filled, and finally downgraded to Assistant Professor this year. Developmental Psychology is the only Psychological Sciences specialty without a tenured faculty member, and such a member is our highest priority for new positions.*
2. Full/Associate Professor in Health Psychology, preferably specializing in child and adolescent health, cultural influences on health, experimental approaches in health psychology, or the prevention and treatment of health problems common in the Central Valley such as obesity or poor prenatal care.

CAPRA's instructions for submission of strategic plans said it is not "necessary to describe very long-term strategic aims not related to current resource requests". Given this instruction, coupled with the bleak budget picture for 2009-2010, we do not submit long term hiring plans in this document, though they are available on request. For next year, the Psychological Sciences strategic plan calls for the following hires.

Requested Searches over the Next Three Years. This year's strategic plan requests hiring preferences over the next three years at four per year. We realize that UC Merced has never allocated four positions in a year to Psychological Sciences. Nonetheless, we request this because it recognizes how badly understaffed we are compared to other areas. It is what we need to begin to reduce our student/faculty ratio and our dependence on lecturers. If either of the current academic year searches fails to result in a hire, our first priority is to continue to search that position(s) as our first priority in the subsequent year. After those positions are filled, we request authorization to search the following positions, in order of preference:

1. Full/Associate Professor in Developmental Psychology. The specialty of this hire should be in child and adolescent development, but otherwise we will seek to hire the best candidate that either complements existing areas (cognitive development, social development), or that introduces new areas

such as developmental cognitive neuropsychology or personality development.

2. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.
3. Full/Associate Professor in Developmental Psychology. The specialty of this hire should be in child and adolescent development, but otherwise we will seek to hire the best candidate that either complements existing areas (cognitive development, social development), or that introduces new areas such as developmental cognitive neuropsychology or personality development. This hire will give Developmental Psychology as many tenured faculty as Health Psychology and Quantitative Psychology have been allocated.
4. Full/Associate Professor in Health Psychology specializing in one of the areas not already hired.
5. Full/Associate Professor in Developmental Psychology specializing in one of the areas not already hired.
6. Full/Associate Professor in Health Psychology specializing in one of the areas not already hired.
7. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.
8. Associate/Full Professor in Developmental Psychology specializing in one of the areas not already hired.
9. Assistant Professor in Health Psychology specializing in one of the areas not already hired.
10. Assistant Professor in Developmental Psychology specializing in one of the areas not already hired.
11. Assistant Professor in Health Psychology specializing in one of the areas not already hired.
12. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.

In each of these cases, if the UC administration does not allocate sufficient funds to hire tenured faculty, we would replace the Full/Associate Professor lines with lower rank lines.

If all are successful, these searches would yield the following distribution of faculty hires across developmental, health, and quantitative psychology at the end of this period.

Start Date	Developmental	Health	Quantitative
Current Academic Year	2	3	2
July 1, 2010	3	4	2
July 1, 2011	5	5	3
July 1, 2012	7	6	4
July 1, 2013	8	8	5

9.2. Space

Psychologists require one office per faculty member, and laboratory space. Quantitative Psychological Sciences is probably the least space intensive area, where an allocation of 200-300 square feet of lab space per faculty member will suffice. Health and Developmental are more space intensive, requiring 450-600 square feet of lab space. However, these are averages, and space needs vary within areas. Needs are larger for faculty with active grant funding; and some health and developmental psychologists have fewer space needs. Although space within the Classroom and Office Building is extremely tight, we have been assured by the administration that sufficient space for these labs will be available on campus when the Social Sciences and Management (SSM) building opens in 2011 or 2012.

Therefore, for the seven current Psychological Sciences faculty, about 2650-3600 square feet of lab space is needed on campus. If both current searches are successful, an additional 900-1200 square feet will be needed by Fall 2010, for a total of 3750-4800 square feet of lab space (plus one office each). The Classroom and Office Building does not have sufficient space to meet these needs; but the new Social Science and Management (SSM) building scheduled to open in 2011 or 2012 should contain sufficient space for the medium term future. Consequently, our existing faculty have agreed to use less space until SSM opens; and we are letting new hires know of the temporary space shortage. So far, all potential new hires have expressed willingness to wait until SSM opens to have their lab needs met.

9.3. Finances

Psychological Sciences has the following financial needs:

1. Psychological Sciences has been allocated the equivalent of three FTE Lecturers during the 2009-10 academic year. This support needs to be continued to maintain current enrollment, and can be expanded to increase enrollment. Upper division undergraduate PSY courses are capped at 80, and nearly all reach their caps, so demand clearly exists to support expanded enrollment.
2. Psychological Sciences requires an allocation of teaching assistantships commensurate to its enrollment. It currently receives such an allocation and anticipates this will continue.

Although these financial needs are funded mostly by the university, Psychological Sciences strongly encourages its faculty to obtain extramural grant funding to help meet these needs. Active grants currently include:

1. Shadish, W.R. (Principal Investigator). A d-estimator for Single Case Designs. Institute for Educational Sciences, U.S. Department of Education. $974,523 total costs (2010-2013)
2. Shadish, W.R. (Co-Investigator and Campus Director). “University of California Educational Evaluation Center”, University of California Multi-

Campus Research Program and Initiative, $2,200,000 total costs (2010-14). John Yun (UC Santa Barbara), Principal Investigator.

3. Song, A.V. (Principal Investigator). "The Role of Perceptions in Adolescent Tobacco Use". NIH/NIDA/LRP (Pediatrics), $44,496 (2008-2010).
4. Vevea, J.L. (Consultant). "Vocabulary Development through Writing." Department of Education, Institute for Educational Sciences. $1,402,533 total costs (2006-2009).
5. Vevea, J.L. (Consultant). "Explicit Scaffolding for Word Learning." Department of Education, Institute for Educational Sciences. $1,017,477 total costs. (2008-2011).
6. Vevea, J.L. (Co-Investigator). “Measuring Vocabulary Knowledge with Testlets: A New Tool for Assessment.” U.S. Department of Education, Institute for Educational Sciences. $2,036,502 total costs.
7. Wallander, J.L. (Co-Investigator). “Brain Research to Ameliorate Impaired Neurodevelopment-Home-based Intervention*,”* NICHD/NIH. $2,375,000 total costs (2006-2011). Wally Carlo, University of Alabama at Birmingham, Principal Investigator.
8. Wallander, J.L. (Consultant). “Healthy Passages: A longitudinal, community-based study of adolescent health,” Centers for Disease Control, $31,000,000 (thus far; renewed yearly with appx. $4,500,000) (1999-open ended). Frank Franklin, University of Alabama at Birmingham, Principal Investigator.
9. Wallander, J.L. (Co-PI). Center of excellence for the study of health disparities in the rural and ethnic underserved populations, National Institutes of Health/National Center for Minority Health and Health Disparities, $1,302,414, 2009-present.
10. Wallander, J.L., (Consultant). “Promoting Use of Effective Early Intervention Programs.” , NICHD/NIH, $745,243 total costs. Holly Kreider, Socimetrics, Principal Investigator.
11. Wallander, J.L. (Consultant). “Psychological Tests and Assessment Online Resource.” NICHD/NIH, $750,000 total costs, Tamara Kuhn, Sociometrics, Principal Investigator.
12. Hoyt, M.A. (Principal Investigator). "Health-Related Quality of Life in Young Men with Testicular Cancer", Lance Armstrong Foundation, $110,000 total costs, (2009-2010).
13. Hoyt, M.A. (Co-Principal Investigator). "Biobehavioral Factors and Quality of Life in Men with Prostate Cancer", UCLA Cousins Center for Psychoneuroimmunology, $17,000 total costs, (2008-2011). Annette Stanton, University of California, Los Angeles, Co-Principal Investigator.

Pending grants include

14. Song, A. V. (Principal Investigator). " Sociocognitive Factors in Adolescent Risk Behaviors", NIH/LRP (Pediatrics), $35,000 (2010-2012).
15. Song, A. V. (Co-Investigator). " Ethnic Variations in Addictive Behaviors among Emerging Adults", NIH/NIDA. $2,463,430 total costs (2010-2014). Nolan Zane, University of California, Davis, Principal Investigator.

16. Dunham, Y. (Principal Investigator). “Minimal Groups and the Development of Social Category Knowledge”. National Science Foundation, $442,973.

These grants are particularly helpful to support graduate students in research assistantships.

10. Summary of requests for new resources.

In summary, the Psychological Sciences Section requests the following new resources:

1. We request 4 new FTE faculty lines to begin July 1, 2011.
2. Assuming current searches are successful, we request 9 faculty offices plus whatever laboratory space is available in the Classroom and Office Building for Fall 2010; and we request 13 offices plus 4500-6000 square feet of laboratory space in the SSM building for Fall 2011, assuming that building is open by then.
3. We request continued allocation of Lecturer funds, with consideration to an increase in that allocation to the extent that substantial new ladder rank faculty allocations are not made.
4. We request continued allocation of teaching assistant slots proportional to Psychological Sciences student credit hour production.

Appendix I: CAPRA Criteria

CAPRA's criteria for evaluating strategic plans requests answers to the following items. Our answers are italicized below each criterion.

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors), plans to achieve excellence and how this will be assessed (including accreditation issues, if any).

   Psychology is the largest major in SSHA but has only 7 ladder rank faculty and the highest student/faculty ratio in SSHA. About 60% of Psychology undergraduate classes are taught by Unit 18 lecturers. Far more ladder rank faculty are needed to support the major. We have improved the major by adding more writing requirements (e.g., a new course WRI 101 specific to Psychology is now required of majors), and by redistributing TAs to support this effort. For WASC accreditation purposes, we have created Program Learning Outcomes and an assessment plan to regularly assess whether we achieve those outcomes.

2. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, plans to achieve international excellence and how this will be assessed, estimated student demand for graduate programs.

   Psychological Sciences currently has eleven graduate students. Student demand for graduate training in psychology is very high, with 34 of 55 applicants to SSHA being in Psychology as of January 22, 2010. Other campuses average 2.5 graduate students per faculty member, a standard likely to be met at UC Merced within a few years, as well. Additional ladder rank faculty are needed to continue to grow graduate training and research excellence.

   The Psychological Sciences faculty is near completion of a revised draft CCGA application for a Graduate Group in Psychological Sciences. The application outlines assessment plans for the new graduate group, both assessing students within the group on a regular basis, and assessing the Group itself periodically.

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs

   Not applicable.

4. If applicable, support of or synergy with cross-school or interdisciplinary programs or research.

   Psychological Sciences currently envisions three primary venues for interdisciplinary collaboration. First, Psychological Sciences has been

successful in seeking and hiring faculty who have overlapping interests that can support the Cognitive Science program, such as Yarrow Dunham, a developmental psychologist who has strong cognitive training and interests, and Jack Vevea, a quantitative psychologist who has developed quantitative models of cognitive phenomena.

Second, faculty who will be hired in Health Psychology will contribute to interdisciplinary collaboration with faculty in the School of Natural Science and the School of Engineering who are involved in health research at UC Merced. For example, Professor Wallander led the recent submission of the letter of intent for an interdisciplinary center at UC Merced within the system-wide UC School of Global Health; and Professors Wallander and Shadish are active members of the UC Faculty Medical School Advisory Committee.

Third, faculty who will be hired in Quantitative Psychological Sciences will contribute to the need for expert statistical consultation among faculty in the School of Natural Science and the School of Engineering who are involved in the creation of a medical school. For example, at the request of the Dean of Natural Science, Professor Shadish wrote a document describing models for statistical consultation and training that could be used at UC Merced in the short to medium term future.

5. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

   Psychological Sciences faculty regularly give lectures in CORE 1. At the lower division level, PSY 1(enrollment around 300, offered each semester) is an option for filling school general education requirements, and PSY 10 (enrollment around 176, offered each semester) is an option for filling the quantitative methods general education requirement. The majority of students in both these courses are not Psychology majors. Only PSY 1 is prerequisite to upper division PSY courses. Consequently these courses are heavily enrolled by non-Psychology major as filling upper division general education requirements outside the major.

Faculty and Space Resources

1. Overview of faculty workload issues, including current and anticipated shortfalls or imbalances, as well as the school workload policy, including the likely extent of reliance on lecturer appointments. Note that permanently required lecturer lines should be requested as such by schools.

   Each Psychological Sciences ladder rank faculty member teaches two undergraduate and one graduate course per year. Psychological Sciences has been allocated the equivalent of three FTE Lecturers during the 2009-10 academic year. Lectures teach more than half of our courses and produce more than half of our credit hours. We believe this is far too high, and that much of the lecturer resources should be replaced by ladder rank faculty.

2. Balance of tenured and untenured faculty, and opportunities for mentoring.
   Developmental psychology has two untenured faculty members, and badly needs a tenured faculty to provide mentoring as well as leadership for program development. Thus, the reduction of the developmental psychology full professor search to assistant professor this year is a continued blow to that program. This position should be restored. Health psychology and quantitative psychology currently have one and two tenured faculty, respectively, with health psychology searching for an additional tenured faculty member this year. The faculty aims to have at least 50% of its faculty tenured within each area so as to avoid burdening untenured faculty with service demands.
3. An updated description of the school's space planning and allocation procedures.
   Until recently, the SSHA Dean made all space allocations. The SSHA Executive Committee recently assumed the duties of a space committee, and presumably will develop its procedures this year. The Psychological Sciences faculty has worked closely with the SSHA Dean to ensure sufficient space is available to existing and new faculty. Though there is currently a significant space shortage in the Classroom and Office Building, the opening of the new Social Science and Management Building in 2011 or 2012 should alleviate this shortage.
4. Special resource issues related to faculty hiring, e.g. plans to hire faculty cohorts or special facilities needs for new hires.
   Faculty being recruited to Psychological Sciences are told clearly about the existing space shortage, and of the likelihood that their space needs cannot be fully met until 2011 or 2012. So far, most recruits have been willing to wait until then. Psychological Sciences faculty may make arrangements to share labs with newly hired faculty until then, assuming the nature of the research allows that and the new faculty permit it. Otherwise, no special resource issues exist.
5. Special issues relevant to achieving diversity of UC Merced's faculty.
   The Psychological Sciences faculty is committed to increasing its gender and ethnic diversity. Currently, two of seven current faculty are women and one of seven is a member of an ethnic minority group.

Additional CAPRA Criteria

1. Academic plans should include a 5 year description of specific goals (and associated objective metrics) associated with each program that is requesting new faculty lines. These goals can be based on external assessments (e.g. ABET accreditation or CCGA approval), specific program expansion (e.g. adding a new track or graduate emphasis), or quantitative target (e.g. supporting a particular student growth rate). Moreover, the overall academics plans should prioritize and provide a timeline for all such goals described in the plan.

The need for additional faculty lines in Psychological Sciences is based substantially on the need to reduce the high 50:1 undergraduate student to faculty ratio. The ideal goal would be to reduce it to about 21:1, the goal specified for UC Merced as a whole. Substantial progress towards that goal is easily measured.

A related goal is to reduce the ratio of the number of courses taught by lectures in the undergraduate Psychology major from its current 60:40 ratio of lecturer taught courses to ladder rank faculty taught courses to a more reasonable 20:80 ratio. This will require a substantial infusion of new ladder rank faculty.

2. Academic plans should explicitly address *strategic constraints* on the campus, such as the need to balance more and less costly programs, the availability of research and teaching space, and start up funds.

   Not only is Psychological Sciences less costly than most programs in Natural Sciences and Engineering, the high grant productivity of Psychological Sciences faculty brings more revenue to the university compared to most other SSHA programs. However, Psychological Sciences does require more research space and higher startup funds than most other SSHA disciplines, though this is partly offset by the higher grant productivity.

3. Academic plans should consider the full life-cycle of existing programs, describing target sizes over the next five or more years and plans to reach a sustainable level given current budget constraints.

   Psychological Sciences already generates more resources (e.g., State-provided faculty lines and FTE TA funds) than other programs in SSHA, and so sustainability is not an issue.

4. Academic plans should include estimated resource requests for program review and ongoing assessment.

   The Psychological Sciences WASC Assessment Report recently submitted for the January 31, 2010, deadline requested a budget of $2250 to continue the use of the ETS Major Field Test with volunteer graduating seniors. Over the next several years, more students will graduate under the requirement in the 2009-2010 catalog to take this test before graduating, which will require substantially more resources. A reasonable estimate would be $30-$50 per student, with 100 students graduating each year, costing $3-5000 per year. This cost is likely to increase over time as more psychology majors enroll and graduate.

5. Academic plans should describe plans for coordination or even consolidation of programs within or between schools or between graduate groups to make the most efficient use of current and proposed faculty lines. Proposed hires whose teaching will be primarily outside of their home program, need to be explicitly cited in the plans for the programs in which they will be teaching.

   No plans exist to consolidate Psychological Sciences with any program, and all Psychological Sciences faculty teach within the discipline.

6. Proposed new undergraduate and graduate programs must be included in academic plans *well in advance* of the year in which they will be proposed.

Moreover, plans for new programs must include year-by-year hiring goals to achieve the necessary size to create the new program. Finally, any proposed new programs used as the basis for new faculty lines must include memos from the cognizant school or graduate groups' Dean and Academic Planning Chair stating a multiyear commitment to give high priority to faculty hires for this new program. These memos must be included in the academic plan voted on by the school faculty.

The Psychological Sciences faculty are already offering the undergraduate major and the graduate training program within existing resources. Continued faculty hires at whatever rate is feasible in the current budget situation will allow us to expand the quantity and quality of both programs. The Psychology major has grown substantially every year since its inception, though that growth is likely to slow somewhat as other majors (e.g., Sociology, Political Science) develop. Anticipated faculty growth is based on anticipated undergraduate major and credit hour growth.

Additional Criteria Specified by the Provost

1. An evaluation of research opportunities that will add critical strength in the existing research programs or that will allow the campus to embark on new areas of research vital to our future.

   The Psychological Sciences faculty participates actively in the development of both existing and new programs pertaining to health, as outlined in the strategic plan. An example of new research directions is the collaboration between health psychology and quantitative psychology in developing a health psychology quantitative synthesis program.

   In addition, given that the faculty have very high grant productivity, and that Psychology has been identified as a hub discipline in science, investments in hiring new Psychological Sciences faculty will add critical strength to all of the existing Psychological Sciences research areas (developmental, health, quantitative).
2. An assessment of each position's importance to supporting existing graduate and undergraduate programs that will allow for the development of new programs of instruction in the future.

   The proposed new positions aim to support existing undergraduate and graduation programs in Psychological Sciences, not to develop new programs. The primary needs here are to (a) replace the over-reliance on lecturers with teaching by ladder rank faculty and (b) the allocation of ladder rank faculty positions that would allow reduction of the student:faculty ratio to a level commensurate with good pedagogical practice.
3. An analysis of how the FTE will be used to support the principles and delivery of the general education curriculum.

Psychological Sciences faculty provide substantial support in general education. Specifically, they regularly give lectures in CORE 1. At the lower division level, PSY 1(enrollment around 300, offered each semester) is an option for filling school general education requirements, and PSY 10 (enrollment around 176, offered each semester) is an option for filling the quantitative methods general education requirement. The majority of students in both these courses are not Psychology majors. Only PSY 1 is prerequisite to upper division PSY courses. Consequently these courses are heavily enrolled by non-Psychology major as filling upper division general education requirements outside the major.

4. A detailed assessment of the space needs for each of the FTE and any plans that will allow current allocated laboratory space to be used to accommodate additional hires.

   A detailed description of space needs is provided in section 9.2 above. Regarding sharing existing space, Psychological Sciences faculty will make such sharing arrangements as are necessary and feasible to accommodate new hires until the SSM building opens in 2011 or 2012. However, faculty at UC Merced are allocated relatively little laboratory space, far less than at any other UC campus. One faculty member has no space at all, most have one converted office (@135 sf), and only two have more than that. Even faculty with active grant programs receive no additional space for that purpose. So space available for sharing is limited.

Social Science & Management (SSM) Strategic Plan – 2010-2013

I. Introduction

The SSM Group within SSHA comprises the disciplines of Economics, Management, Political Science, and Sociology. At its core, the scholars within the SSM Group study how humans structure their lives and how interaction among people within the confines of these institutional structures shapes the path of social and economic progress. While human beings around the world are fundamentally the same when it comes to their biological make-up, there is significant disparity in their material well-being. A puzzle that has confronted social scientists since the origins of their respective disciplines is: why are some countries so wealthy, while others are so poor? Furthermore, what are the consequences, both internationally and domestically, of this disparity in material well-being across different groups of people?

Without structure, society would be chaotic. To overcome collective action problems, for example, people delegate authority to governments with powers to coerce. They exchange goods and services within formalized markets. They live their lives based on a set of principles defined by their religions. Entrepreneurs

raise capital and hire workers because they see economic opportunities in producing and selling goods and services to potential consumers. What unites the SSM faculty's research is the desire to understand how and why institutions are formed and evolve and how they affect social and economic progress over time and across place. Given the importance of institutions in shaping economic, political, and social outcomes, the dynamics of institutional selection and change is a critical area of academic exploration and research.

Naturally, scholars of different disciplines bring their own expertise to the fundamental questions at hand, but it is important to emphasize that the intellectual spillovers across economics, management, political science, and sociology is what facilitates our understanding of human progress. For example, as noted above, entrepreneurs try to capture economic opportunities by harnessing financial and human capital, yet the productivity and profitability of their firms depends on the formal and informal policies that govern the organization. In other words, the scholarly study of managerial decision-making and firm performance depends on an understanding of social structures – the expertise of sociologists. As a second simple example of the linkages across the social science disciplines, consider the role of education in advancing human progress. Economists have documented convincingly that education contributes importantly to economic growth and generates so-called positive externalities (i.e., educating a child not only benefits her, but others within society). Yet, how do people go about deciding whether or not to provide education for others' children and, if so, at what level? Understanding how people solve these collective action problems is the fundamental question that political scientists address. In sum, economists' ability to understand the path of economic growth relies on their political science colleagues' explanations of political decision-making. It is these natural linkages that make the SSM Group ideally situated to address the problems that society faces today, whether it relates to health disparities, stewardship of the environment, or poverty.

II. The Importance of SSM to UC Merced

One measure of the role that SSM plays within the university is to consider undergraduate education. Simply put, training in the social sciences and in business and management is extraordinarily popular among UC students. According to the most recent UCOP *Statistical Summary of Students and Staff* (Fall 2008, p. 30), 22 percent of bachelor's degrees were conferred in the "social sciences" (which exclude psychology) and six percent were conferred in "business and management." By contrast, nine percent of undergraduate students graduated with a degree in psychology, 15 percent in biological sciences, seven percent in engineering, six percent in "letters," and five percent in "fine and applied arts."

In Table 1 below we delve more deeply into the popularity of the respective majors within SSM across the UC campuses (UC San Francisco is excluded

from the analysis). One issue that complicates the analysis is that three campuses (Berkeley, Irvine, and Riverside) offer undergraduate majors in management, while the remaining five campuses offer an economics degree with a business/managerial economics track. Therefore, we include data on total economics majors, majors in the managerial and non-managerial tracks, and, when relevant, management students. We also provide data on psychology majors as a comparative benchmark.

First, it is worth noting that the unweighted average of Psychology majors across the UC campuses – 8.6 percent – conforms to the reported percentage of bachelor's degrees awarded across the system – 9 percent. Second, this detailed analysis of individual majors confirms that the vast majority of the 28 percent of bachelor's degrees in "social sciences" and "business and management" reported in the *Statistical Summary of Students and Staff* are generated by SSM disciplines. Specifically, economics and management educate an average of 12.2 percent of students across the system, political science trains 5.5 percent, and sociology 4.8 percent – a combined total of 22.5 percent. Therefore, as UC Merced develops into a mature campus and achieves steady-state, the data from other campuses suggest that nearly a quarter of all of our students will choose to affiliate with an SSM discipline.

A second measure of the importance of the SSM disciplines to the growth of UC Merced relates to the inter-/multi-disciplinary emphasis that is prevalent across the campus. This emphasis was initiated in the founding idea that research institutes would serve as the catalyst to bring scholars together to understand and solve the major problems facing society today. Indeed, the problems that society faces with regard to the environment, health, or energy – the foci of UC Merced's current institutes – are inexorably linked to economic, political, and social issues. To the extent that UC Merced's institutes seek to offer realistic solutions to the problems that society faces, it is our contention that the present institutes would be better served with heavier involvement from economists, political scientists, and sociologists. After all, the most practical and realistic solutions will be determined by their economic, political, and social ramifications. Put another way, scientists and engineers might well understand the causes of society's ills when it comes to the environment, health, and energy and offer realistic fixes, yet the ability to implement such solutions depends on their economic, political, and/or social costs and benefits. Without understanding these tradeoffs, scientists and engineers will conduct their research within a vacuum and their work will be confined to a narrow audience who value theory over practicality.

Table 1
Declared Undergraduate Majors in SSM Disciplines (& Psychology) Across the UC System

Majors	**UCB**	**UCI**	**UCR ***	**UCD**	**UCLA**	**UCSD**	**UCSB**	**UCSC**	**Averages**
Term	AY 08-09	Fall 09	AY 08-09	Fall 09	Fall 09	WINT 10	WINT 10	Fall 08	
ECON	5.0%	11.0 %	7.7%	6.5% ‡	8.9%	11.1 %	13.2 %	11.4 %	9.4%
Business ECON track	0.0	8.6	3.5	2.3	5.2	4.2	12.0	8.4	
Non-business ECON track	5.0	2.4	4.2	4.2	3.7	6.9	1.2	3.0	
MGMT (separate major)	3.7	1.6	17.7	n/a	n/a	n/a	n/a	n/a	
ECON+MGMT	8.7	12.6	25.4	6.5	8.9	11.1	13.2	11.4	12.2
POLI	5.3	4.5	6.5	3.8	6.9	5.9	5.8	5.0	5.5
SOC	2.9	8.2	7.7	2.6	3.6	1.9	6.4	5.2	4.8
PSYCH	4.0	9.8	9.9	6.8	9.5	6.7	11.0	10.5	8.6

Note:
* Data on Riverside majors was unavailable, so degrees conferred by major was used instead.
‡ The managerial economics program is offered by the Department of Agricultural & Resource Economics, while the economics degree is offered by the Department of Economics.
Sources:
UCB: http://opa.berkeley.edu/analysesandreports/MajorsAndDegreesByAcadProgram.pdf
UCD: http://budget.ucdavis.edu/data-reports/documents/enrollment-reports/students-multiple-year-comparisons/emjudsc_fcurr.pdf
UCI: http://www.oir.uci.edu/enr/IIA03-enr-by-major-and-class-stdng-2009-10.pdf
UCLA: http://www.aim.ucla.edu/enrollment/enrollment_programs_fall.asp
UCSD: http://registrar.ucsd.edu/ver2/dservices/thirdweek/WI10/REGBDM03.WI10.PDF
UCSB: http://bap.ucsb.edu/IR/reg_reports/W10-STATS.PDF
UCSC: http://planning.ucsc.edu/irps/majors/2008/Fall_UndergraduateMajorsDeclaredandProposed(HC).pdf
UCR: http://sara.ucr.edu/degrees/2008_09/degmaj.html

III. Resource Request

Faculty

The SSM disciplines are expected to be very popular majors for students in steady-state, are central to offering inter-/multi-disciplinary solutions to society's problems, and all seek to advance graduate training that can exploit UC Merced's unique intellectual culture. The SSM Group seeks to achieve a critical mass of at least 10 faculty in each of our core disciplines (economics, political science, and sociology) as soon as possible. At that level each can offer a robust undergraduate major and begin the process of introducing graduate programs. Given the requirements to offer core graduate training in our respective disciplines, each area must achieve a critical mass of approximately 10 faculty who can cover both the undergraduate program requirements and begin to roll-out the graduate core courses.

To achieve critical mass, the Economics, Political Science, and Sociology areas each request two FTE in each of the following three academic years – 2010-2011; 2011-2012; and 2012-2013.

The SSM faculty view three new lines (one each in Economics, Political Science, and Sociology) as being critical to our mission to grow our respective disciplinary programs based on current and expected student demand. Further, we request another three additional lines (one to each discipline) to build toward critical mass.

Of the three mission-critical lines noted above, the SSM faculty places Economics as the highest priority, with Political Science and Sociology then ranked equally second. The SSM group ranks the next three requested FTE equally among the disciplinary areas.

We place no emphasis at the present time on Management FTE. Given the inchoate state of the Management Bylaw 55 unit and the administrative confusion surrounding the program, the SSM Group will maintain curricular authority over the Management undergraduate program and will administer the instruction with lecturer support.

Lecturer & TA Support

The lack of qualified TAs is significantly impacting our respective curricula. Courses that might have been offered (e.g., SOC 010) cannot be because of a lack of qualified graduate students to hold discussion sections or to staff labs. We have been forced to change the way certain courses (e.g., ECON 001) are delivered because TA support does not exist for a full array of discussion

sections. In other upper-division courses, assignments have been truncated or eliminated because of a lack of TA support to advise students and to grade. In order to successfully provide the coursework required for our undergraduate majors, we must have trained and qualified graduate students (or lecturers) available to TA our classes.

Because our disciplines have not achieved a critical mass of faculty to offer credible graduate programs, we have experienced a significant shortage of graduate students capable of supporting our courses, especially the more analytically or quantitatively oriented ones. We propose that some funding that would otherwise support TAs be allocated to our areas to hire lecturers/TAs from outside UCM. We could easily recruit ABD graduate students or recent PhDs from UC Davis or Berkeley to teach for us, or even act as TAs. We have developed strong expertise in specific areas of research in our respective disciplines (applied microeconomics in Economics; institutions and voting behavior in Political Science; and social movements in Sociology) so it is conceivable that graduate students from around the UC system may see an advantage to spend a year or two in Merced to work with faculty.

The resource requests from the disciplines are as follows:

Economics – For AY 2010-2011, economics foresees a need for 14 full-time TA FTEs (5.0 for 300 students in ECON 001; 3.0 for 180 students in ECON 010; and 2.0 each for ECON 100, 101, and 130), split roughly equally across the two semester. At present, economics has two graduate students. Thus, our undergraduate instruction is heavily impacted because of the lack of TA resources. In addition, to satisfy our demand for courses, we expect the need for a full-time lecturer in Economics.

Political Science – To help meet the demand for Political Science courses, a full-time Political Science lecturer will be needed for the 2010-2011 Academic Year. Political Science also anticipates the need for 10 full-time TAs during the 2010-2011 Academic Year. Six will be needed in fall semester and four will be needed in the spring.

Sociology – In fall 2010 our proposed lower division courses will require 6.5 TA FTEs, and we anticipate needing a similar number in spring 2011. We will need one research qualified TA to cover research methods in the fall, and one to cover our statistics labs in the spring. Also, given student demand for courses, Sociology will require a full-time lecturer during the coming academic year.

IV. Strategic Plans of the Individual Areas

In the sections to follow, we delineate the strategic planning ideas of the individual areas.

IV.1 The Strategic Plan for Economics at UC Merced (2010-2013)

Vision for the Program

The Economics Program's vision is to establish UC Merced as a center for excellence in applied research that offers practical insights for policy-making and management decision-making. The focus on applied microeconomics implies that the Program will add faculty who will have positive spillover effects for other programs not only within the social sciences, but also across campus. For example, Economics will have natural synergies with the development of the Management Program, as well as with the campus institutes dealing with Health Sciences, Energy, and the Environment.

The Economics Program offers students an analytically and quantitatively rigorous course of study that prepares them for a variety of professional pursuits and advanced graduate study, especially in economics, management, public policy, and law. What makes Economics a particularly valuable course of study is that students learn how to: frame economic, political, and social questions that have relevance to their everyday lives; identify multifaceted explanations for the causes and the consequences of the major issues that face policy-makers and business leaders; and use economic models and data from multiple sources to propose solutions to the vexing problems that face society.

Consistent with the Program's objective to establish UC Merced's research prominence in Economics, building a graduate program will be critical.

Strengths of the Program

There are currently five faculty within the Economics Program, plus one assistant professor line that was "frozen" in 2008-2009. A senior inaugural line that was vacant since 2004 was finally filled last year with the recruitment of Rob Innes from the University of Arizona's Department of Agricultural and Resource Economics. Given the significant challenges in senior recruiting in Economics, not just at UC Merced but across the country, UC Merced's recent success in attracting Innes should be viewed as a significant accomplishment and an indicator of the early achievements of the Program.

Given the scarcity of available faculty resources and the slow process of Program building, the faculty have chosen to grow the Program strategically. In particular, as noted above, the faculty have chosen to create a niche in the area of applied economics, meaning that they study real problems that policy makers and business leaders face. At present, given our faculty's interests, we have developed specific strengths in labor economics, industrial organization, political economy and public policy, and economic history. In order to offer a high-quality undergraduate major in Economics, and eventually a graduate program, in the

coming years we will need to add in the areas of public economics, health economics, industrial organization, and international and development economics.

While our size is relatively small, our faculty have made great strides recently in attracting attention to the university and our burgeoning program. For example, three faculty (Kantor, Neumann, and Whalley) are affiliates of the National Bureau of Economic Research, a prestigious research organization in Cambridge, MA. Kantor and Whalley recently won an NSF grant to study the development of higher education in the United States during its most formative phase of growth around the turn of the twentieth century. For the past three years the faculty (in particular, Neumann, Whalley, and Winder) have been able to support an on-going seminar series in labor studies with the financial support of the UCOP Contreras Fund. While resources are limited for building the "soft" academic infrastructure of the campus, our faculty have taken the initiative in fund-raising to support the growth of the intellectual enterprise.

Further, our faculty serve in positions within their respective fields that bring positive attention to UC Merced's Economics Program. For example, Kantor serves on the steering committee of the All-UC Economics History Group (an MRU), is an elected trustee of the Cliometrics Society, and serves on the editorial board of the two leading journals in economic history. Further, Innes serves on the editorial board of the leading environmental economics journal.

Present Challenges

The most significant challenge facing the Economics Program relates to numbers. Our goal is to create a center of research and teaching excellence in applied areas of economics, which means that we should be moving toward the establishment of a graduate program. Unfortunately, our faculty size has been constrained over the past several years. Graduate training in economics is highly regimented, with graduates expected to have mastered microeconomic theory, econometrics, and at least two substantive fields (most universities also require mastery of macroeconomic theory). While our faculty expertise in certain applied areas has been well established and bodes well for training students in these areas, our lack of faculty expertise in microeconomic theory and econometrics inhibits our ability to offer core graduate training. Further, because there are very few terminal master's programs in Economics and because successful students elsewhere are highly reluctant to switch programs, we are required to "home-grow" our graduate students who are critical to our successful research and teaching programs. Indeed, one of the most significant problems that we face is the dearth of qualified TAs for our courses. We anticipate that our faculty size will need to reach 12-15 faculty before Economics can establish a full-fledged graduate program. At our present rate of progress, graduate training in Economics at UC Merced is perhaps a decade away unless resources are

devoted to building a faculty of critical mass that can serve the undergraduate major and minor in Economics, service the core courses within the Management program, and offer core and field graduate training. In the end, a large enough faculty base to support a graduate program enhances our ability to offer a quality undergraduate curriculum, conduct research, and attract faculty hires.

Interdisciplinary Opportunities

Applied economists work on a variety of problems that cross traditional disciplinary boundaries. Of course, economists bring a unique way of thinking and a certain set of analytical tools to bear on the questions at hand, but increasingly economists have turned to other disciplines to shed light on individual or collective decision-making. For instance, the recent growth of behavioral economics has come to rely on research in psychology and cognitive science to better understand how people make decisions. Further, since many economic outcomes depend on collective decisions, understanding the political process or understanding group decision-making (say within the family, for example) requires that economists join forces with political scientists and sociologists. The Economic Program currently has close ties with both the Political Science and Sociology programs. The Political Science faculty's strength in political institutions complements the Economics faculty's emphasis in political economy (that is, the endogenous relationship between economic and political outcomes). Further, the Sociology faculty's expertise in collective action and its growing emphasis in education serves as a complement to the Economics faculty's research on the development of higher education and our general interest in how individuals and groups make decisions.

The Economics Program is committed to building bridges across the campus in bolstering the synergies that exist between the disciplines. For example, many environmental, energy, or management issues have an economic component that requires an understanding of how individual and markets respond to incentives. Without untangling how people, firms, or society's respond to various resource constraints, we will be ill-prepared to answer the vexing problems that developed and developing economies face today. As an example of Economics support of trans-disciplinary initiatives, The County Bank Endowed Chair in Economics and the All-UC Economic History Group is co-sponsoring a UC Merced Political Science conference that seeks to understand the determinants and effects of federal fiscal decisions. Clearly, such political decisions have economic ramifications, so it is important to Economists that we understand the rationale behind these decisions.

Resource Request for 2010-2013

The Economic Program has immediate needs to bolster its faculty in several fields of micro-economic study in order to build intellectual breadth and depth, support a broader set of program offerings at both undergraduate and graduate

levels, and take advantage of cross-disciplinary initiatives on campus. Priority field areas are public economics, health economics, industrial organization, and international / development economics, each of which offers its own scope for exciting cross-campus synergies. In particular, a health / development economist can create links to the Health Sciences, an environmental economist can create links to SNRI and to the Energy Institute, and an international or industrial economist can link to the Management program. More substantively, we must bolster our faculty along the lines of microeconomic theory and econometrics before we can begin to contemplate a graduate program.

As a start, the Economics Program calls for the immediate thawing of its "frozen" position. This assistant professor position was created by the resignation of Giovanni Mastrobuoni. We were unable to fill the position in 2007-2008 because of an extremely competitive market in economics that year (i.e., we made multiple offers but were turned down). While we understand that the campus faced extraordinary budgetary circumstances last year, we remain deeply concerned about the perverse incentives that such "freezing" can cause. That is, if faculty fear that a position will be "frozen" or "stolen," then this will lead faculty to fill a position as quickly as possible, which could compromise quality. We believe firmly that faculty should feel secure that a position will be available until a high-quality candidate is identified.

The Economics Program requests six FTE over the next three years. The first three new faculty recruitments will focus principally on the priority field areas described above, and will produce the associated cross-campus synergies. These recruitments would represent our short-term objectives. The other three FTE will enable us to build strength in microeconomic theory and econometrics in an effort to move toward a graduate program.

IV.2 Strategic Plan for Political Science at UC Merced

Executive Summary

UC Merced's Political Science Group is building a strong research program. The Political Science Major has become one of the most popular majors on campus and with additional faculty a strong, distinctive Ph.D. program could be developed. Currently, there are six Political Science faculty lines (four faculty on campus, a new faculty member who will arrive this summer, and an ongoing search for an assistant professor). To further Political Science's research profile, capitalize on the momentum of recent hires, service the growing major, and develop a Ph.D. program, Political Science should be allocated one or two new faculty lines per year for the next five years. For the 2009-10 Academic Year, Political Science requests two assistant professor positions in the fields of political behavior and/or political institutions.

In considering this request, we believe that Political Science has a number of competitive advantages. First, the Political Science major continues to grow (it is currently the third largest major in SSHA) and undergraduate enrollment in Political Science classes is high. Second, Political Science is a particularly inter/multi-disciplinary field that is particularly well positioned to thrive and excel in UC Merced's unique environment. Third, while new hires in Political Science will need space, they will not have the same level of space needs as new faculty in the physical or psychological sciences. Fifth, the Political Science program will be a key contributor to studying "The Dynamics of Social and Economic Progress," one of the five research themes listed as central to UC Merced's Strategic Academic Plan.

Vision

Political Science at UC Merced is positioned to be at the forefront of the discipline in the coming years. Although we acknowledge the ambitious nature of this goal, Political Science is ideally situated to absorb the myriad ideas, theories, and methods intrinsic to interdisciplinary environments. In contrast to many other disciplines, Political Science has no core approach. It is a borrowing discipline. Indeed, cutting-edge, high-impact research in Political Science often grows from an idea or approach from another discipline, primarily Economics and Psychology/Cognitive Science. In an interdisciplinary environment, a Political Science program with ample resources is poised to bring new ideas and approaches to the discipline, thus cultivating a reputation for innovative and ground-breaking research.

A second current advantage enjoyed by our program is an absence of the epistemological divide that hampers many, if not nearly all, political science programs. We share a commitment to rigorous (primarily quantitative) social scientific research. Moving forward we will continue this approach for understanding and evaluating casual political phenomena. Many existing political science programs suffer from a lack of coherence and a great deal of conflict regarding the definition of political science and appropriate foci for research. The commonality of our focus will help accelerate the development of a very strong program.

If we are able to continue to hire well and fully take advantage of UC Merced's interdisciplinary opportunities, we believe we can develop one of the best Political Science programs in the West. There are few very strong Political Science departments or programs on the West Coast. Aside from a handful of standout programs such as UC Berkeley, UC San Diego, UCLA, Stanford, and Caltech, there is a significant step down in quality. With resources and shrewd planning, we should be able to develop into a highly competitive program. *Indeed, based on a survey of publications in the top three general interest*

journals in political science, the current UC Merced political science group has the highest rate of scholarly productivity in the entire UC system.[18]

Although Political Science should thrive in an interdisciplinary environment, it also contributes to other disciplines by providing novel and interesting research questions, alternative approaches grown from within and outside Political Science, and opportunities for collaborative research.

Political Science aims to be a large major at UC Merced, training students in traditional Political Science courses while blending elements of other disciplines relevant to the study of politics. It also aims to train graduate students in subfield specialties where coursework in other disciplines will lead to innovate research programs.

Mission

Political Science seeks to make innovative, substantial contributions to the discipline of Political Science through the generation and dissemination of outstanding scholarly research. It aims to train undergraduate and graduate students how to understand political phenomena using both theoretical and empirical approaches to the study of politics. In conducting research and training students, Political Science aims to draw on the intellectually rich environment of an interdisciplinary school.

Goals and Strategies

Political Science needs to do the following:

- Continue developing areas of research excellence
- Develop a graduate program
- Reinforce bridges to other disciplines
- Hire outstanding faculty with broad theoretical/methodological interests in political institutions and behavior across three of the traditional subfields (American politics, comparative politics, and international relations)

Research Opportunities and Funding

[18] The top three general interest journals are *American Political Science Review*, *American Journal of Political Science*, and *Journal of Politics*. To measure scholarly productivity, we divided the number of articles published in these journals by faculty in a given political science department by the number of total post-PhD years for the faculty. If we only include faculty who earned their PhD in 1998 or later, the UC Merced group ranks second, behind UC San Diego.

As a program not likely to achieve a faculty the size of UC Berkeley in the near future, it is crucial to develop areas of excellence while still providing undergraduates a broad curriculum. To achieve this goal, Political Science seeks to develop an emphasis on political behavior and institutions, two key general areas within the discipline. Within each of these areas, we will likely focus on hiring scholars with broad theoretical or methodological interests that bridge other disciplines.

In the area of political behavior, we seek to hire scholars doing research informed by general theories of judgment and decision making. In particular, voting behavior and public opinion research increasingly draws on theories found in cognitive Psychology and tests them using experimental methods. Scholars using these theories and approaches are doing innovative research in political behavior and we seek to be a discipline leader in this area. We anticipate that scholars in this area will likely form associations with Cognitive Science, Psychology, and Sociology faculty.

In the area of political institutions, we plan to hire scholars with research programs focusing on the selection and ultimate effect of the "rules of the game" governing the political processes. Given the relatively small size of the Political Science group for the foreseeable future, we seek scholars who are general institutionalists, as opposed to area specialists. For example, although we desire to hire faculty who research the politics of specific regions (e.g., European politics), the focus must be sufficiently broad to be of interest to political scientists working in other subfields. Thus, an ideal hire for Political Science in Comparative Politics would focus on broader questions pertaining to legislatures or political parties within a given country or region. Scholars with broad theoretical interests are also more likely to publish in well-regarded, mainstream Political Science journals and be able to flourish in an interdisciplinary environment. Such scholars will likely form linkages with the Economics and Sociology faculty.

Teaching opportunities, enrollment

The Political Science Major has become the third largest major in SSHA. The size of the major is not all that surprising given that Political Science is a popular major both nationwide and within the UC system. Over the last three decades in the U.S., more students have graduated with a degree in Political Science than in the related fields of History, Economics, or Sociology (American Political Science Association).[19] Political Science is also a sought after degree throughout the UC system. For example, Political Science is the second most popular major at both UC Berkeley and UCLA.[20] These data emphasize the high level of student demand for Political Science, both nationally and in the state of California.

[19] http://www.apsanet.org/section_589.cfm
[20] See UC Berkeley's "Assigned Majors by Academic Program" (http://opa.berkeley.edu/AnalysesAndReports/MajorsAndDegreesByAcadProgram.htm)

Multidisciplinary opportunities

Since Political Science often borrows ideas, theories, and approaches from other disciplines, it is poised to take advantage of interdisciplinary opportunities. In particular, contemporary political scientists often borrow from the fields of Economics and cognitive Psychology. As such, Political Science envisions hiring faculty that would be interested in developing programs integrating Political Science with these disciplines. Recently, Political Science and Cognitive Science faculty have begun collaborative research efforts. We hope to further develop this relationship. In addition, we would like to foster similar relationships with Economics, Psychology, and Sociology.

Resources

Faculty by area, projections (5 years): Currently, there are four Political Science faculty on campus (Hansford, Monroe, Nicholson, and Trounstine) who can teach a number of the existing Political Science courses, including Introduction to American Politics (POLI 1), Analysis of Political Data (POLI 10), Congress (POLI 100), The Presidency (POLI 101) Judicial Politics (POLI 102), Interest Groups and Political Parties (POLI 105), Urban Politics (POLI 106), Direct Democracy (POLI 109), Governmental Power and the Constitution (POLI 110), Liberty, Equality, and the Constitution (POLI 111), Voting, Campaigns, and Elections (POLI 120), and Public Opinion (POLI 125). Haifeng Huang, a recent hire (joining the faculty in July 2010), will be adding Theoretical Models of Politics (POLI 170) and Chinese Politics to the list of courses regularly taught.

To meet the demands of the growing major and develop a graduate track within SCS, Political Science needs more faculty. Political Science must be able to offer a variety of courses—and not develop a reputation for limited offerings—if it is to continue on its trajectory of becoming a large major. New faculty members in all subfields are required to give students a realistic opportunity for completing the major. Specifically, the introductory courses and required courses—not to mention graduate seminars—will quickly deplete the availability of faculty to teach upper division courses.[21] In addition, consonant with the core research mission of the University of California the Political Science group plans to develop a Ph.D. program. Even while leveraging resources in related fields, the Political Science faculty is only just teetering on sufficient size to begin to offer such a program.

Political Science should be allocated one to two positions per year over the next five years. Many, but not all, of these lines could be at the junior level

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and UCLA's "Undergraduate Profile, Fall 2005" (http://www.aim.ucla.edu/home/Undergraduate_Profile_Fall_2005_viewing.pdf).

[21] It should be noted that by requiring Political Science majors to take two upper division courses outside of Political Science, the major utilizes existing instructional strengths and resources.

since both Hansford and Nicholson are associate professors and Monroe and Trounstine are advanced assistant professors who should earn tenure soon (see *Faculty development* below). ***For the 2010-11 Academic Year, Political Science requests two assistant professor positions in the fields of political behavior or political institutions.***

Until these faculty members are hired, Political Science will continue to need a full-time lecturer to cover several courses. We view this as a short-term solution, though. To provide a quality major, develop a graduate program, and continue to build a strong research program we need to rely on ladder-rank faculty. As explained above, we will continue to focus on hiring faculty with broad theoretical interests in political institutions and political behavior.

Spaces, offices, labs: Our primary concern is office and lab space. All new faculty hires will obviously need office space. Should we be successful in hiring a political scientist doing experimental research, s/he would require laboratory space as well. Nicholson may also need a lab in the coming years. Depending on future hires, however, Political Science may propose a Political Science laboratory (or small set of labs) shared by Political Science faculty doing experimental research. Lack of space for Political Science faculty doing experimental work will harm efforts to recruit and retain faculty. Lab space will also be needed for the development of the graduate program. *We anticipate, however, that Political Science will not have the same space requirements as the physical or psychological sciences, which makes it easier to receive faculty lines during the current space shortage.*

Graduate program: We plan to bring in our first cohort of 5-6 PhD students (initially under the Social and Cognitive Sciences program) in the fall of 2011. It is critical that we be able to offer funding, specifically TAships, to these students in order to build our program.

Finances

Political Science does not have any extramural grants at this time. However, this is not all that surprising given that faculty in Political Science typically do not have extramural grants. Over the course of the coming year Hansford, Nicholson, and Trounstine plan to individually apply for National Science Foundation grants.

Specific Five-Year Plan

Research Profile

By 2015, Political Science aspires to achieve a reputation as a strong research program with top-notch faculty conducting cutting-edge research and training Ph.D. students for placement in research universities. Faculty (and, ultimately, graduate student) research will continue to regularly appear in the top political

science journals and book presses. While external funding possibilities in Political Science are quite limited, members of the faculty will have successfully competed for grant money.

Faculty Development

By 2015, there should be 13-15 Political Science faculty. Hansford and Nicholson should be Full Professors. Monroe and Trounstine should be Associate Professors. Other junior faculty should be well on their way towards earning tenure.

New faculty hires will work on behavior and/or institutions in three of the recognized subfields of Political Science: American politics, comparative politics, and international relations. We do not plan to hire faculty in the subfield of normative political theory (i.e., political philosophy). By focusing our hiring on just behavior and institutions in these three subfields we should be able to more quickly build internationally-recognized strengths in these areas. We will also strive to hire faculty who approach questions or problems from either a general (i.e., portable) theoretical or empirical manner. This type of scholar will most benefit from and contribute to the type of program being built in Political Science and the social sciences more generally.

Political Science is dedicated to hiring a diverse faculty. We added our first female faculty member (Trounstine) last summer. Our first Asian faculty member (Haifeng Huang) will arrive this summer. While the potential pool of minority applicants is quite small (e.g., the 2002 Political Science Ph.D. class was 4% African American, 3% Asian American, and 4% Latino),[22] we will continue our efforts to increase the diversity of our applicant pools.

Undergraduate Education

By 2015, the Political Science major should be one of the largest, if not the largest undergraduate major on campus. Our graduates should compete particularly well when applying to law schools and graduate programs.

Graduate Education

By 2015, there should be a stand-alone Ph.D. program in Political Science that is designed to provide graduate students with a relatively unique training that prepares them to make important, cutting-edge research contributions. In cooperation with other disciplines, this program will train students in political economy/institutions and political cognition. In the meantime, we will have admitted and begun training multiple cohorts of Ph.D. students under the Social and Cognitive Sciences Ph.D.

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[22] Lopez, Linda. 2003. "Placement Report: Political Science Ph.D.s and ABDs on the Job Market in 2001-2002." *PS: Political Science & Politics* 36(4):835-841.

IV.3 Sociology Strategic Plan 2010

Current Staff Resources in Sociology

We currently have three ladder rank faculty, a fourth arriving next fall, and are in the process of making an offer to an Assistant Professor candidate who specializes in gender and education, contributing to our focus on social inequality. In spring of 2010 we have one lecturer teaching three courses.

In the following section we outline some of our accomplishments from 2009. Then, after describing our goals and objectives, we provide an assessment of the personnel resources we will need to achieve our goals. The document concludes with an appendix containing our mission statement.

2009 Accomplishments

We successfully obtained University approval of our sociology major. It is currently awaiting WASC approval (Goal 1).

We contributed to the intellectual community at UCM in several ways. Sociology faculty participated in several extra-curricular events on campus and brought some inter-disciplinary speakers to campus during our mini-conference in the fall. We also brought in job candidates whose work cuts across area and would contribute to multiple programs and initiatives on campus. (Goal 1.2)

Student demand for our courses is high. We have the highest number of student minors in the college, and even without a major to declare, SSHA advising staff estimate that in fall ’09 we had 28 majors. Our courses always fill or come close to filling. (Goal 1.3)

We established our program learning outcomes and began assessment of sociology courses. (Goal 1.4)

Our faculty had a number of noteworthy scholarly accomplishments this year. We successfully hired a tenured Associate Professor who is well known for his work on Latin American social movements. One sociology faculty member (Van Dyke) is currently chair of a section of the American Sociological Association, and she recently published an article in sociology’s top journal, the American Sociological Review. Another (Beattie) recently obtained a book contract for a reader on the sociology of education. (Goal 2.1)

Goals and Objectives

Goal 1 (short term): Begin an undergraduate major in sociology.

We obtained approval for our undergraduate major from the university in spring 2009. In spring 2010 our goal is to obtain approval from WASC, and begin enrolling students in the major.

Objective 1: Involve faculty in core aspects of the undergraduate program.
Faculty will teach the required introductory, theory, research methods and statistics courses when possible since they are the cornerstone of the discipline and therefore of the major. Faculty experience and expertise will ensure that these core courses are rigorous and of high quality, and that students gain the foundation they need for success in the major. Student-faculty interaction in the core courses will guarantee that all students have lower division courses with faculty, and will help us recruit and retain students in the major.

Objective 2: Facilitate"communities of inquiry."
Sociology will be an active inter-disciplinary participant in undergraduate and graduate education. Because of the broad range of topics studied by sociologists, the discipline has a unique ability to speak to the constituent members of SSHA, as well as aid in developing multi-disciplinary programs. Sociology can immediately assist with the development of the Management Program, graduate program in Latino, Latin American and Iberian Studies, and Women's Studies. Sociology is also well suited to strong participation in other inter-disciplinary programs.

Objective 3: Draw students to UCM by addressing topics of interest.
Given UC Merced's unique location in the San Joaquin Valley, and Sociology's traditional emphasis on issues of inequality and power dynamics (particularly regarding class, race/ethnicity and gender), UCM Sociology has the potential to be not only a strong academic unit within SSHA, but a bridge to the other schools on campus and the larger community as well. In light of the socio-economic and demographic changes gripping the Central Valley in particular, and the State of California as a whole, Sociology has great potential to attract students at both the Undergraduate and Graduate levels. The program will be of interest to those interested in studying issues such as racial and ethnic dynamics within the rapidly changing California demographic landscape, how collective action and social movements rise and fall in concert with demographic change, the dynamics of neighborhood and community change given high levels of economic inequality, and the changing educational system. Due to their training and interests, Sociology graduates are likely to help further UC Merced's goals of providing research and public service to the region and beyond which will enhance the profile of both the university and the sociology program.

Objective 4: Continue program learning outcomes assessment.
We began assessment of our curriculum last year, with an evaluation of the undergraduate minor. We initiated assessment of the major (pending approval) in Fall of '09. Results of the assessment will be used to improve instruction and enhance program objectives.

Objective 5: Provide experiential learning opportunities for undergraduates.
A longer-term aim of our undergraduate program is to develop hands-on learning opportunities for our students. The program will provide opportunities for hands-on student research, and, eventually internships and service learning incorporated into the classroom. Sociology faculty have been involving undergraduate students in our research, and we plan on continuing to do so. In addition, we plan on offering upper division research methods courses for students that will require that they carry out their own research project. We hope to see evidence of success in student research training with students participating in research conferences and applying to graduate school. We would also like to incorporate service learning into the classroom within the next five years. Service learning will enhance our students' education by providing them with the opportunity to learn through direct experience, while also contributing to the local community.

Objective 6: Start an undergraduate sociology club.
Within a couple of years of approval of the sociology major, we would like to start an undergraduate sociology club. This club would provide students with opportunities to further their education outside of the classroom, with potential meetings organized around discussion of careers in sociology, applying to graduate school, applying sociology to the real world via analysis of film, and meetings with invited guests, typically well known sociologists from other institutions.

<u>Goal 2 (5-10 years): Establish a graduate program</u>.

Objective 1: Scholarly excellence in sociology at UC Merced.
Our plan for developing sociology at UCM involves building strength in a limited number of areas so that we can have several well staffed, rigorous areas of specialty fairly quickly. In this way, we will be able to offer high quality graduate training within five years. Sociology plans on growing along two axes. First, rather than attempting to cover the breadth of topics that sociologists study, we plan on emphasizing three traditional sociological issues: politics, inequality, and organizations and institutions. Thus far we have three faculty members who specialize in social movements, and therefore, we are well positioned to begin graduate training in this area. If we are successful in hiring Laura Hamilton this spring, we will be strong in gender and education. In the near term, we would like to further our strength in inequality and organizations by hiring a race and ethnicity or immigration scholar, and a health inequality scholar.

While building strong substantive areas, a secondary goal is to provide training in a range of research methodologies. We would like to have well rounded faculty expertise in a range of current data collection and analytic methodologies, including network analysis, geographic/spatial analyses, hierarchical modeling, new ethnomethodologies, and mixed (quantitative/qualitative) techniques.

Sociology is a discipline with both quantitative and qualitative methodological foci. A successful department will be one that addresses many of these key features of sociology.

Objective 2: Assist in the growth of other UCM graduate programs.
Due to the wide range of topics sociology studies, we have the potential to provide training relevant to a range of UCM graduate programs. Our plan for growth includes faculty hires that would contribute to UCM's Management Program, the interdisciplinary Health Disparities Center and minor in public health, and programs under discussion including Women's Studies and Ethnic and Racial Studies. Sociology also has the potential to contribute to other UCM programs, including Political Science, Economics, and Anthropology, among others.

Goal 3 (Long term): Join the other University of California Sociology Departments in attaining a national ranking in the discipline.

Sociology at UCM's long term goal is to develop into an elite, small Sociology department. Unlike UCLA and Berkeley, which have some of the largest departments in the country, we envision UCM developing similar to Stanford, with a few key areas of study, rigorous academic programs, a focus on developing analytical skills at the cutting edge methodologically, and with connections to the various multi-disciplinary programs throughout the university. The ultimate goal for this department is to be a top 50 department within 20 years.

Personnel Resources Needed to Achieve Goals

We anticipate rapid growth of our major. Student demand for our courses is high, and we have the highest number of minors in SSHA. Across the UC system, Sociology is close to Political Science in terms of number of undergraduate majors, and on some campuses, is nearly tied with Psychology. Thus, we predict that the major will rapidly become one of the most popular majors in SSHA. Therefore, additional faculty and graduate students will be required to staff the major over the next several years.

Faculty. Our strategy for hiring is based on establishing scholarly excellence and preparing to offer graduate training. We are requesting five faculty lines for the next three years, which will bring us up to 10 faculty. We propose a two-pronged approach for hiring. We want to recruit faculty in order to build our three substantive focus areas, and we also want to hire faculty with the skills we need to offer graduate training. In terms of substantive foci, in the next three years we would like to hire 2 sociologists who study social inequality focusing on race, ethnicity, immigration or gender. We also would like to hire 2 faculty to further strengthen our emphasis in inequality and organizations and who would contribute to initiatives on campus. We would like to hire a health sociologist,

and someone who studies either labor markets, education, or the family. Finally, we have identified a need for sociologists interested in teaching our planned Graduate Statistics and Graduate Theory courses. These scholars could have any substantive focus that fits with our three areas of emphasis. In the next three hiring cycles (beginning in AY 10/11) the hiring pattern would be:

10/11 — 2 lines
11/12 — 2 lines
12/13 — 2 lines

Each of these hires would contribute not only to sociology on campus, but to a number of other programs. New faculty would contribute to the public health program and Health Disparities Center, the emerging inter-disciplinary interest in race and ethnicity, and potentially other programs on campus.

Graduate students. In order to successfully provide the coursework required for our undergraduate major, we must have trained and qualified graduate students (or lecturers) available to TA our classes. This is an especially pressing need for our required Research Methods course (SOC 015) and Sociological Statistics course (SOC 010). Because our discipline has not started a graduate program, we rely on psychology, cognitive science and world cultures graduate students as TAs. However, as we experienced this year, there is a serious shortage of TAs available to staff our research methods and statistics courses. Initially for fall ’09, a literature student with no research training was assigned to TA our Research Methods course. Professor Van Dyke cancelled her spring statistics course because a full time qualified TA was not available. We cannot offer our undergraduate major without qualified staffing for these courses, and until we start a graduate program we must either have TAs from other disciplines or lecturers.

We request an increase in funding for sociology TAs to cover our required and lower division classes in fall ’10. Because we are not ready to begin offering graduate training and because there is a shortage of graduate students trained in research methods and statistics in SSHA, we propose that some funding for TAs be given to us to hire a lecturer or two from outside UCM. We could easily recruit an ABD graduate student or recent PhD from UC Davis or Berkeley to teach for us.

In fall 2010 our proposed lower division courses will require 6 ½ time TAs, and we anticipate needing a similar number in spring 2011. We will need one research qualified TA to cover research methods in the fall, and one to cover our statistics labs in the spring. We expect that the number of TAs we need will increase by 1 or 2 in the following year. We anticipate needing to offer additional sections of the research methods and statistics courses within the next 3 years as our major grows, and therefore, we will require 2 ½ time TAs who are trained in research methods and statistics each semester beginning in fall 2011.

IV.4 Strategic Plan for Management

The Management program at UCM services approximately 184 majors – it is the third-largest major – and is in high demand despite the absence of any faculty dedicated to the program. With an institutional commitment to the program, Management could become an important draw for new students to the campus, grow significantly in size and quality, and contribute to UCM's intellectual diversity and distinction. At present, only lecturer resources are available to support some courses in the program, and SSM faculty in SSHA (several Economics faculty and a cognitive scientist) provide programmatic support in the form of core course teaching, student supervision and program management. If the Management program is to continue, let alone expand and build into a successful enterprise on campus, new faculty hires are absolutely essential in the immediate future. SSM is enthusiastic about opportunities for expansion, but also wary of prospects for continued institutional starvation of this program. In this strategic plan, we present a way forward that gradually builds a distinguished faculty base for this program, while providing research synergies to the campus. We seek to hire faculty whose priority is management research and teaching, but we see considerable opportunity for interdisciplinary connections across the social sciences.

<u>On the Nature of Management Hiring</u>

All successful Management programs are built on the core disciplines that underpin Management training and research. Core fields are defined by existing Management disciplines with established bodies of teaching and scholarship in Schools of Management around the world. Five themes reflect these core fields: Finance; Marketing; Economics, Policy and Strategy (EPS); Organizational Motivation and Behavior (OMB); and Decision Science. The substance of each field is described below. These core fields also reflect the UCM student demands for management training, and the promises made by UCM to these students for management training.

In faculty hires in Management at UCM, we will seek excellence in the aforementioned core fields, enthusiasm for advancement of the Management program, and contribution to unique avenues of distinction for the campus. With this in mind, we envision a number of possible strategic focuses that would be particularly attractive in new Management faculty and help blaze the trail to fame and distinction for UCM's program:

1) Retail and Service Management
2) Health and Health Care Management
3) Global Management and Strategy
4) Energy Policy and Management
5) Environmental, Agricultural, Natural Resource and Biotechnology Management

6) Behavioral Economics, Finance, and/or Marketing

These strategic focus areas are also identified in view of desirable cross-campus synergies with inter-disciplinary institutes and research faculty, particularly in the Health Sciences, Energy, and the Environment (the SNRI). We expect new Management faculty to be involved in a number of these initiatives.

Although we will emphasize building a coherent program, future management faculty are likely to be drawn from a variety of disciplines in terms of their PhD training, reflecting the interdisciplinary nature of management research and education. To give a concrete example, when hiring a scholar in marketing, we will recruit across a broad set of disciplines and the successful recruit could be someone with primary training in marketing, psychology, cognitive science, sociology, economics, or systems engineering. Again, our goal is to recruit the finest scholars who will be dedicated to building excellence in management education and research.

Strategic Plan for Hiring

2010-11

Three UCM faculty lines are approved at present for Management. These are in the Provost's Pool, but have yet to be released for recruitment. Under our plan, these three lines would be opened for recruitment in 2010-11. The lines would all be open rank and open to all core Management fields delineated in this plan. SSM will hire into these lines with a view to excellence first and, second, to programmatic needs and strategic vision.

2011-2016

In each of the following five years, two additional Management faculty lines will be opened for recruitment, with the objective to bring faculty numbers and strength in line with anticipated program growth and institution building. With appropriate staffing, we envision the management undergraduate program growing to 500 students within the next decade, and the development of graduate programs in the suite of Management-related fields.

Strategic Plan for Course Development and Coverage, and Further Development of Teaching and Research Programs in Management

Most Management upper-division classes are staffed by lecturers. Absent new faculty hires, we will continue to staff current course offerings with lecturers in the short term, but will be unable to expand the array of classes offered. In this event, SSM, SSHA and UCM will need to reevaluate the viability of the Management program on campus and likely seek ways to close the program in an orderly fashion.

However, if the hiring plan is followed, there will be growth in course offerings in Accounting, Finance, Marketing, Real Estate, Health Management, International Economics and Global Management, Industrial Organization, Organizational Behavior, Behavioral Economics/Finance/Marketing, and other areas currently underserved in the present Management curriculum. In addition, there will be gradual development of Ph.D. programs and, assuming the interest of new faculty, Executive Education. Finally, with a critical mass of ladder-rank Management faculty, we enthusiastically anticipate the formation of an institute for management research that could be supported in part by endowment resources and draw in interested faculty from a variety of disciplines across the campus.

Core Management Fields at UCM

Finance

Finance addresses the ways in which individuals, business entities and other organizations allocate financial resources over time, with particular attention given to the art of decision making under conditions of uncertainty. Among central focuses of the Finance program will be

-the generation and analysis of financial information;
-methods to raise and allocate investment funds, including asset pricing, capital budgeting, investment strategy, and international asset management;
-the structure and regulation of financial institutions.

Marketing

Marketing is the process whereby demands for products, services and ideas are anticipated, managed and satisfied. The marketer does this by first analyzing the marketplace behavior of competitors and consumers and then designing product, promotion, pricing and distribution strategies that will be accepted in the marketplace. Economic, social, cultural and even political organizations increasingly recognize the importance of the marketing function in modern management. The Marketing program will focus on understanding, explaining and predicting consumer behavior and the effectiveness of various marketing strategies, and developing theoretical frameworks with which consumer choice can be better understood and more efficient and effective strategies can be designed.

Economics, Policy and Strategy

The EPS program will focus on the interaction of economic incentives, firm strategy, public policy and political economy, institutional design, and technology

management, including applications to antitrust, telecommunications, energy and the environment, airlines, health, banking, human resources, game theory, international trade, and strategy, both private and public. Key examples include

-International Economics: The effects of international trade and trade restrictions on prices and welfare; the determination of exchange rates and relative prices across countries; the economics of pollution havens, eco-dumping, international labor and environmental agreements, and international economic development.
-Industrial Organization: Strategy, pricing, and performance in imperfectly competitive markets, including the nature and effects of contracts, vertical and horizontal organization of production and retailing, and antitrust.
-Risk and Insurance: The intersection of Finance and Economics, including decision making under uncertainty, market failures in insurance, pricing risk, public decision making under risk, diversifiable vs. undiversifiable risk, and ethical issues in cross-generational choices under risk.
-Health Economics and Management: Economics of health care management and delivery from consumer decision making to doctor incentives, hospital management, innovation and marketing of pharmaceuticals and vaccines, and alternative health delivery systems.

Organizational Motivation and Behavior

Organizational behavior covers topics that include cross-cultural management, power and influence, negotiation, team and interpersonal processes, individual judgment and decision making, innovation, trust, organizational commitment, incentives, and leadership. Organization theory addresses contemporary theories about organizations (i.e., community and population ecology, institutional theory, networks, organizational learning and decision making) and applies them to understand new organizational forms, growth, adaptation, design, performance, survival, and evolution. At the individual level, the newly emerging field of behavioral economics investigates the cognitive, social, and emotion factors affecting buyers and sellers, how their judgments deviate from rational choices, and the consequent effect on the marketplace and allocation of resources. The OMB program will use rigorous experimental, empirical and theoretical tools to study these subjects.

Decision Science

The Decision Science field studies the use of computing technology, statistical methods and decision algorithms to manage information, complex organizations, product design, production, distribution and delivery. Subjects include Statistical Methods, Data Analysis and Decision Making, Operations Research, and Management Information Systems.

Appendix
Sociology Mission Statement

Using a "sociological imagination" involves acknowledging the structures and patterns that shape daily experiences, understanding the mutual influence of individual choice and social structures, examining social phenomena from various perspectives, and thinking critically about existing social arrangements. Sociologists use a variety of theories and rigorous research methods to understand the social world. Substantively, sociology at University of California, Merced uses these tools to focus on the role that social inequality, politics, and organizations play in shaping individual and collective social experiences.

In teaching, the Sociology program at UC Merced is committed to helping students develop the insights of a sociological imagination that will lead to a systematic understanding of society. In particular, we hope that students will obtain the skills they need to be critical consumers and careful analysts of social science research. We seek to enhance students' ability to communicate effectively both orally and in writing. We also expect that our students will develop a keen insight into the causes and consequences of social inequality. Through the study of sociology, students will therefore gain many concrete skills that are helpful for a broad range of rewarding careers or future graduate studies.

Through our research, we generate scientific understanding of important local, national, and international social problems. To help explain and solve both theoretical and practical issues confronting society, we seek interdisciplinary partnerships from across our campus and elsewhere. Our intention is to draw from our own and related disciplines to create cutting-edge knowledge about social life. We value scholarship that contributes to important debates within our discipline as well as to more far-reaching discussions that cross disciplinary boundaries or are taking place outside the academy.

In our service to the university, the discipline, the community and beyond, we seek to use our scientific understanding of the social world to help enrich public policies and public discourse.

We seek to make our program a lively intellectual environment that fosters innovative thinking among faculty and students alike. Finally, we strive to be collegial and respectful in our interactions with those around us.

Strategic Plan for the Social and Cognitive Sciences Graduate Group

From: Michael Spivey, Social and Cognitive Sciences Graduate Group Chair
To: Mark Aldenderfer, Dean of Social Sciences, Humanities, and Arts

Introduction

The Social and Cognitive Sciences Graduate Group was initiated about five years ago with the intention that it would function as a "temporary incubator" for more specifically-focused CCGA-approved stand-alone graduate programs that were expected to emerge from it. (CCGA stands for the UC-system-wide Coordinating Committee on Graduate Affairs, which reviews proposals for graduate programs.) During this time period, the SCS grad group has housed graduate students in a variety of disciplines that roughly fall under the broad rubric of Social and Cognitive Sciences. Approximately 45% of these students are best characterized as Cognitive Science-related PhD students (with emphases on computation and perception), roughly 45% of them are best characterized as Psychology-related PhD students (with emphases on health and development), and the remaining 10% comprise a sparse collection of Economics-, Political Science-, and Sociology-related PhD students. Given this history and this make-up, it is a non-trivial task to formulate a coherent strategic plan for this diversely-constructed "incubator" graduate group. Developing a strategic plan for the next few years of the Social and Cognitive Science graduate group is further complicated by the fact that it is currently in the process of bifurcating largely into two stand-alone graduate programs: Cognitive and Information Sciences and Psychological Sciences.

Results of "Incubation" Process and Timeline

Before describing the new FTE hires that would best meet the needs of this temporary incubator graduate group, allow me to describe the timeline of this impending bifurcation process. Both the Cognitive and Information Sciences CCGA proposal and the Psychological Sciences CCGA proposal are currently under review at this time. The scenarios below describe possible sequences of events for this bifurcation process. In each scenario, it is assumed that the two CCGA proposals will *eventually* acquire approval (perhaps after multiple revisions and FTE growth). Therefore, it is to be expected that at some point, the small number (about 10% and shrinking, as they graduate) of SCS PhD students who would not be transferring to either of those stand-alone programs (students who are crucial to the TAing needs of majors like Sociology, Economics, and Political Science) should be able to have a new graduate group chair who will reshape the SCS graduate group into a disciplinary program with a more specific and coherent focus. And in time, that group too could grow into its own CCGA-approved stand-alone graduate program (perhaps not unlike CalTech's Social Science PhD program).

Scenario 1: If both proposals are approved by CCGA, notification of approval should take place in fall of 2010. During spring of 2011, there may still be some additional approval stages imposed by the WASC accreditation process (Western Association of Schools and Colleges). Therefore, even if both proposals go through their approval processes swimmingly, these two stand-alone graduate groups may not truly be independent entities until approximately the summer of 2011. Still, with regard to new FTE hires, this scenario has both grad groups up-and-running (and transferring their respective SCS graduate students into them) before the arrival of new faculty that were interviewed and

hired in spring of 2011. Thus, the strategic hires proposed by the respective strategic plans of the Cognitive and Information Sciences bylaw unit and the Psychological Science bylaw unit will apply to those two stand-alone graduate groups.

Scenarios 2a and 2b: If one of these two grad group proposals is approved by CCGA and WASC several months before the other one is, then the approved group will be allowed to form its new stand-alone grad program while the not-yet-approved group will continue to constitute the bulk of the SCS grad group for the 2011-2012 academic year. The hiring priorities of the relevant bylaw unit that remains closely affiliated with SCS (either Psychological Sciences or Cognitive and Information Sciences) will then apply as the appropriate hiring priorities for the SCS grad group. (If it is the Cognitive and Information Sciences grad group that gets approved earlier, then I will step down from grad group chair of SCS and recommend to you someone from the Psychological Sciences group.)

Strategic Hiring

As noted in the scenarios above, some of the following SCS hiring priorities will be moot by the time new faculty are arriving in the fall of 2011, because one or both of the primary components of SCS will have branched off as their own grad programs. Nonetheless, it is worth outlining here what those hiring priorities, in those different scenarios, would look like.

Scenario 1: If both the Cognitive and Information Sciences grad group and the Psychological Sciences grad group acquire full approval around summer of 2011, then the SCS grad group will immediately adopt the same hiring priorities as those already proposed by the SSHA bylaw unit comprised of Management, Economics, Sociology, and Political Science.

Scenario 2a: If the Cognitive and Information Sciences grad group acquires approval several months before the Psychological Sciences grad group does, then for the 2011-2012 academic year, the SCS grad program's hiring priorities will mirror those of the Psychological Sciences bylaw unit (with emphases on Developmental Psychology, Health Psychology, and Quantitative Psychology). By the 2012-2013 academic year, one should expect that the Psychological Sciences grad group proposal will acquire its approval, and Scenario 1 above will be in place.

Scenario 2b: If the Psychological Sciences grad group acquires approval several months before the Cognitive and Information Sciences grad group does, then for the 2011-2012 academic year, the SCS grad program's hiring priorities will mirror those of the Cognitive and Information Sciences bylaw unit (with emphases on Cognitive Science and Technology, Cognitive Neuroscience, Computational Linguistics, and Philosophy of Mind). By the 2012-2013 academic year, one should expect that the Cognitive and Information Sciences grad group proposal would acquire its approval, and Scenario 1 above would be in place.

MEMO

FROM: Ignacio López-Calvo, World Cultures Graduate Group Chair
TO: Mark Aldenderfer and Sam Traina
RE: World Cultures Graduate Group Strategic Plan

This memo is a one-year strategic hiring plan for the World Cultures Graduate Group. It is based upon the positions proposed in the three-year Humanities and World Cultures plan. That plan focused primarily on the needs of undergraduate majors. For this reason, we have decided to consider the list of hires submitted for the HWC plan and re-prioritize them with the graduate group in mind. The following rank-ordering is based upon these principles.

The most important strategic goal for graduate group hires is to hire colleagues who create synergies with current faculty and students. The highest priority new hires are those who can serve in committees for current graduate students' dissertations and qualifying exams along with current faculty. The World Cultures Graduate Group Strategic Plan priority listing is the following:

1. **(Unranked) Chicano History**

This urgent priority position is not ranked because it is a replacement for a current FTE.

2. **Transatlantic Colonial Latin American/Golden Age**

Based on the research areas of current graduate students and the emerging strengths of the graduate group, the highest priority for the World Cultures Graduate Group is to reinforce our current expertise in Hispanic Studies. Colonial Latin American literature is critical for many of our graduate students and is our highest ranked request.

3. **International World Heritage**

World Heritage is a signature UC Merced program that is not replicated at other campuses. Our one World Heritage faculty member is currently chairing a large number of committees, and other students are working on digital humanities and/or public culture with other graduate group faculty. An additional hire in this field will serve these students and build upon an emerging area of strength in our program.

4. **Nineteenth Century US West/Environmental History**

Many of our graduate students work on American History and Literature and on Environmental History and Literature. This proposed hire serves those students and builds areas of strength in both American Studies and Environmental Studies.

5. **GASP Latin American Art History and Theory**

Along with the proposed Colonial Latin America/Golden Age position, this hire will help to create a multidisciplinary core of Hispanic Studies students and faculty.

6. **Colonial US History**

Along with the Nineteenth Century US History position, this hire is essential to an American Studies focus. Along with our existing faculty expertise on the Early Modern Atlantic World and the Mayan empire, as well as the proposed Colonial Latin America position, it reinforces an innovative transnational and interdisciplinary focus on the colonization of the Americas.

All these faculty lines are crucial for the improvement of our current graduate group as they will complement the work of our current faculty and will help both current and prospective graduate students. We trust that you will try to get the necessary FTEs for all these hires.

Thank you in advance

Appendices

Appendix 1a, b, c: Positions requested in tabular form

Appendix 2: Majors, programs, and graduate groups

Appendix 3: SSHA future space needs (office and research)

Appendix 1a SSHA Table of Requested FTE, Year 1 of 3, 2010-11
EVC Target: 7 Number of positions requested: 11 priority 1

Colonial American

Priority	Name	Level	Primary Major	Secondary Major	Primary Graduate Group	Est. Startup Costs	Space	Other considerations
1	Developmental Psychology	Associate/full	Psychology		Psychology (in review)	100K	Office + new lab in SSM	Enrollment coping/graduate overlap
1	Quantitative psychology	Assistant	Psychology		Social and Cognitive Sciences	80K	Office new lab in SSM	Enrollment coping/ graduate overlap
1	Cognitive science and technology	Assistant or associate	Cognitive Science		CIS (in review)	125K	Office + new lab in SSM	Program building/graduate overlap
1	Public economics	Assistant	Econ		Social and Cognitive Science		Office (SSM)	Participation in management major
1	Heritage management and conservation	Associate	World Heritage		World Cultures	80K	Office + new lab in SSM	Build capacity for future; World Heritage has one ladder faculty
1	Quantitative methods	open	Sociology		Social and Cognitive Sciences	50K	Office (SSM)	Program building

Appendix 1a SSHA Table of Requested FTE, Year 1 of 3, 2010-11
EVC Target: 7 Number of positions requested: 11 priority 1

1	English Renaissance	Assistant	English/literature		World Cultures	50K	Office (COB)	Program building
1	Political behavior	Assistant	Political Science		Social and Cognitive Science	80K	Office+ new lab in SSM	Program building
1	Literature/Spanish lingusitics	Assistant	Spanish		World Cultures	50K	Office (COB)	Program building; Needed for minor in Span, as well as major
1	Colonial American Histotry	Full	History		World Cultures	50K	Office (COB)	Program building
1	Biological anthropology	Assistan	Anthropology		QSB	100k	Office + 800 sq ft lab (SSM)	Program/major development

Appendix 1b SSHA Table of Requested FTE, Year 2 of 3, 2011-12
EVC target: 7; Number of positions requested: 9 priority 1

Priority	Name	Level	Primary Major (current or planned)	Secondary Major	Primary Graduate Group	Est. Startup Costs	Space	Other considerations
1	Music studies; Asian music	open	Arts (GASP)		World Cultures	50K	Office (SSM)	Program building
1	Cognitive neurosciences	Assistant	Cognitive Science		CIS (in review)	200K	Office + new lab in SSM	CIS is in the process of developing a graduate group
1	Health economics	open	Economics		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Modern Latin America/Mexico 20th C	Assistant	History		World Cultures	50K	Office (COB)	Program building

Appendix 1b SSHA Table of Requested FTE, Year 2 of 3, 2011-12
EVC target: 7; Number of positions requested: 9 priority 1

1	Romantic Victorian Literature	Full	Literature		World Cultures	50K	Office (COB)	Program building
1	Comparative politics	Assistant	Political Science		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Developmental Psychology	Associate or full	Psychology		Psychology (in review)	100K	Office + lab in SSM	Psychology is in the process of developing a graduate group
1	Health psychology	Associate or full	Psychology		Psychology (in review)	100K	Office + lab in SSM	Psychology is in the process of developing a graduate group
1	Race Ethnicity Immigration	Open	Sociology		Social and Cognitive Sciences	60K	Office (SSM)	Program building

Appendix 1c SSHA Table of Requested FTE, Year 3 of 3, 2012-13
EVC Target: 7; Number of positions requested: 9 priority 1

1	Visual Culture/Transnational pre-20th C	Open	Arts (GASP)	History	World Cultures	45K	Office (COB)	Program building
1	Sustainable architecture	Assistant	Arts (MAP)		World Cultures	60K	Office (SSM)	Program building
1	Industrial organization	open	Economics		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Post-Colonial Lit in English	open	Eng/Creative Writing		World Cultures	50K	Office (COB)	Program building
1	Philosophy of mind	Assistant	Philosophy	Cog Sci	CIS (in review)	50K	Office (SSM)	Program building
1	Political institutions	Assistant	Political Science		Social and Cognitive Sciences	60K	Office (SSM)	Program building

Appendix 1c SSHA Table of Requested FTE, Year 3 of 3, 2012-13
EVC Target: 7; Number of positions requested: 9 priority 1

1	Health psychology	Associate/full	Psychology		Psychology (in review)	100K	Office+ new lab in SSM	Program building
1	Quantitative psychology	Assistant	Psychology		Psychology (in review)	80K	Office+ new lab in SSM	Program building
1	Health sociology	open	Sociology		Social and Cognitive Sciences	60K	Office (SSM)	Program building

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Anthropology	F08	18	852	496	880	660		Robin deLugan	None	**Biological anthropologist 2010-11**
								Kathleen Hull		
								Holley Moyes		
								Linda-Ann Rehbun		
Arts	n/a	n/a	1,340	188	1,337	328		Dunya Ramicova	None	**Sustainable architecture 2012-13**
Cognitive Science	BA F06; BS F07	77	1,076	1,076	1,093	1,093		Chris Kello	None	**Cognitive science and technology 2010-11**
								Teenie Matlock		**Cognitive neuroscience 2011-12**
								David Noelle (50%)		
								Michael Spivey		
								Evan Heit		
Economics	F07	45	1,395	923	1,208	1,208		Robert Innes	None	**Public economics 2010-11**
								Shawn Kantor		**Health economics 2011-12**
								Todd Neumann		**Industrial organization 2012-13**
								Alex Whalley		
								Katie Winder		
FLAN	n/a	n/a	1,516	228	1,508	216		Virginia Adan-Lifante	None	**Literature/Spanish lingustics 2010-11**
GASP	n/a	n/a	664	492	248	248		Keven Fellezs	None	**Music studies/Asian music 2011-12**
								ShiPu Wang		**Visual culture, pre-20th C 2012-13**
Geography	n/a	n/a	0	0	4	4		Yihsu Chen (50%)	None	
								Anthonly Westerling (50%)		
History	F07	72	1076	620	1068	584		Susan Amussen		**Colonial American history 2010-11**
								Sean Malloy		**Modern Latin America/Mexcio 2011-12**
								Ruth Mostern		
								Sholeh Quinn		
								Greg Herken (ret. 6/30/10)		

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Literature	F07	70	779	415	776	456		Gregg Camfield	None	**English Renaissance 2010-11**
								Jan Goggans		**Literature/Spanish lingustics 2010-11**
								Ignacio Lopez-Calvo		**Romantic/Victorian literature 2011-12**
								Manuel Martin-Rodriguez		**Post-colonial literature 2012-13**
								Cristian Ricci		
Management	BA F04/BS07	170	1032	0	1032	0		None	None	**Three FTE in Provost's pool**
Philosophy	n/a	n/a	581	52	608	141		Peter Vanderschraft	None	**Philosophy of Mind 2012-13**
								Jeff Yoshimi		
Political Science	F07	145	1580	1169	1531	756		Thomas Hansford	One (completed)	**Political behavior 2010-11**
								Nathan Monroe		**Comparative politics 2011-12**
								Stephen Nicholson		**Political institutions 2012-13**
								Jessica Trounstine		
								Haifeng Huang (7/1/10)		
								Courtenay Ryals Conrad (7/1/10)		
Psychology	F06	340	1580	1169	5624	2922		Michele Chouinard	Two (in progress)	**Developmental psychology 2010-11**
								Yarrow Dunham		**Quantitative psychology 2010-11**
								Michael Hoyt		**Developmental psychology 2011-12**
								William Shadish		**Quantitative psychology 2011-12**
								Anna Song		**Health psychology 2012-13**
								Jack Vevea		**Health psychology 2012-13**
								Jan Wallander		
								Jr. Developmental Psych		
								Sr. Health psychologist		
								Sr. Public Health?		
Sociology	F10	n/a	1738	426	1244	568		Irenee Beattie	One (completed)	**Quantitative methods 2010-11**
								Nella Van Dyke		**Race/ethnicity/migration 2011-12**
								Simon Weffer		**Health sociology 2012-13**
								Paul Almeida (7/1/10)		
								Laura Hamilton (7/1/10)		
World Heritage	n/a	n/a	128	128	128	0		Maurizio Forte	None	**Heritage management/conservation 2010-11**

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013	
World Cultures Graduate Group	2004						21			Transatlantic Colonial Latin American History/Golden Age	
										International World Heritage	
										19th C US West/Environmental History	
										Latin American Art History	
										US Colonial history	
Social and Cognitive Sciences Graduate Group	2004						27			**Developmental psychology 2010-11**	
										Quantitative psychology 2010-11	
										Developmental psychology 2011-12	
										Quantitative psychology 2011-12	
										Health psychology 2012-13	
										Health psychology 2012-13	
										Cognitive science and technology 2010-11	
										Cognitive neuroscience 2011-12	
Explanaiton of enteies in this section	FTE requests in bold correspnd either exactly or closely the the FTE requests by the majors and programs.										

Appendix 3: **SSHA Future Space Needs (Office & Research)**

Future SSHA Faculty

	Faculty	Discipline	Office location	# Offices Needed	Lab Space location		Research space (sq ft)	
2010-2011					Dry	Damp	Dry	Damp
	Developmental psych	Psych	SSM	1	1 (SSM)		600	
	Quantitative psych	Psych	SSM	1	1 (SSM)		450	
	Cog sci/technology	Cog Sci	SSM	1	1 (SSM)		750	
	Public economics	Econ	SSM	1				
	Heritage management	WH	SSM	1	1 (SSM or COB)		600	
	quantitative methods	Soc	SSM	1				
	English renaissance	Lit	COB	1				
	Political behavior	Poli Sci	SSM	1	1 (SSM)		400	
	Spanish lit/ling	Lit/FLAN	COB	1				
	Colonial American Hist	History	COB	1				
	Biological anthropology	Anth	SSM	1		1 (SSM)		800
2011-12					Dry	Damp	Dry	Damp
	Music studies	Arts (GASP)	COB	1				
	Cognitive neuroscience	Cog Sci	SSM	1	1 (SSM)		750	
	Health economics	Econ	SSM	1				
	Modern Latin America	Hist	COB	1				
	Romantic/Victorian lit	Lit	COB	1				
	International relations	Poli Sci	SSM	1				
	Developmental psych	Psych	SSM	1	1 (SSM)		600	
	Health psychology	Psych	SSM	1	1 (SSM)		600	
	Race/ethnicity/immigratio	Soc	SSM	1				
2012-13					Dry	Damp	Dry	Damp
	Visual culture	Arts (GASP)	COB	1				
	Sustainable architecture	Arts (MAP)	SSM	1	1 (SSM)		400	
	Industrial organization	Econ	SSM	1				
	Post-colonial lit	Lit	COB	1				
	Philosophy of mind	Philosophy/Cogs	SSM	1				
	American politics	Poli Sci	SSM	1				
	Health psychology	Psych	SSM	1	1 (SSM)		600	
	Quantitative psych	Psych	SSM	1	1 (SSM)		450	
	Health sociology	Soc	SSM	1				
Total new offices needed				21 in SSM; 8 in COB				
TOTAL new research space needed				**12**	11	1		

UC Merced CAPRA (Committee on Academic Planning and Resource Allocation)
Guiding Criteria for Evaluating Academic Plans from Schools and Graduate Groups

Strategic planning is an annual process which begins with faculty in all units, including schools, graduate groups, and research institutes, creating plans for the development and growth of research and academic programs. These plans are used as the basis for formal resource requests developed in the Deans' offices in collaboration with the faculty. The resource requests and strategic plans are then sent to the Executive Vice Chancellor (EVC) who passes them to CAPRA for formal review. CAPRA then develops recommendations based on the following guiding criteria to the EVC who makes the final resource decisions.

Changes for AY 09-10

UC Merced is continuing its growth trajectory, although in this time of limited resources this growth must be strategic, balancing research excellence and program growth. Although a significant number of undergraduate majors have been initiated (>18), we have only one CCGA-approved graduate program. The ongoing UC budget challenges will require more careful planning to ensure that each new faculty line addresses the campus' most critical needs for both undergraduate and graduate programs. Moreover, planning must move from a year-by-year process to a multiyear year process to allow proper staging of new majors and research programs. For these reasons, CAPRA is requesting the following *additional* criteria for AY09-10 and future academic plans (the AY08-09 criteria are below).

1. Academic plans should include a 5 year description of specific goals (and associated objective metrics) associated with each program that is requesting new faculty lines. These goals can be based on external assessments (e.g. ABET accreditation or CCGA approval), specific program expansion (e.g. adding a new track or graduate emphasis), or quantitative target (e.g. supporting a particular student growth rate). Moreover, the overall academics plans should prioritize and provide a timeline for all such goals described in the plan.
2. Academic plans should explicitly address *strategic constraints* on the campus, such as the need to balance more and less costly programs, the availability of research and teaching space, and start up funds.
3. Academic plans should consider the full life-cycle of existing programs, describing target sizes over the next five or more years and plans to reach a sustainable level given current budget constraints.
4. Academic plans should include estimated resource requests for program review and ongoing assessment.
5. Academic plans should describe plans for coordination or even consolidation of programs within or between schools or between graduate groups to make the most efficient use of current and proposed faculty lines. Proposed hires whose teaching will be primarily outside of their home program, need to be explicitly cited in the plans for the programs in which they will be teaching.
6. Proposed new undergraduate and graduate programs must be included in academic plans *well in advance* of the year in which they will be proposed. Moreover, plans for new programs must include year-by-year hiring goals to achieve the necessary size to create the new program. Finally, any proposed new programs used as the basis for new faculty

lines must include memos from the cognizant school or graduate groups' Dean and Academic Planning Chair stating a multiyear commitment to give high priority to faculty hires for this new program. These memos must be included in the academic plan voted on by the school faculty.

Guiding Criteria

CAPRA expects that yearly academic planning decisions will be done primarily by faculty in schools, graduate groups, and institutes through an update of their Strategic Plans and submission of an annual Academic Resource Plan from the schools. CAPRA requests that the Academic Resource Plan be concise and focused on specific requests and their justification. For example, relatively established academic areas, tied to a major, are not expected to submit long, general descriptions of their disciplines to CAPRA, nor is it necessary to describe very long-term strategic aims not related to current resource requests. Note that each school and graduate group should continue to update and refine their full Strategic Plans, and these plans should be provided to CAPRA in support of, and as justification for, the Academic Resource Plan.

CAPRA requests that each school submit four tables: one with prioritized FTE requests for the current academic, another with the prioritized FTE requests for the following academic year, one with a list of current and planned majors and graduate groups for the next two years, and one with their proposed space needs. (See Appendices 1-3 for examples.) The tables should be consistent with each other and the text of the plans. Note that multiple positions may be assigned to the same priority level (e.g., 1st, 2nd, 3rd tier).

Each school may format its Academic Resource Plan in whatever style is suited to its needs, as long as it provides CAPRA with the necessary information to ensure effective allocation of FTEs and space across the campus. It is expected that schools' planning documents will address realistic resources needed to attract and accommodate new FTEs and the future growth of their activities, including estimates of: cost of startup packages; laboratory space requirements; office space needs of associated research staff and graduate students; special infrastructure needs (library holdings, IT, central facilities, animal room, clean room, fume hoods, heating/cooling, electrical, regulatory compliance staff, etc.)

In addition, the Academic Resource Plan should include text justifying the FTE requests in terms of their support of research programs/graduate groups and undergraduate majors (or have links to the appropriate sections of the school Strategic Plans).

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, the number of *essential* courses not being currently taught, the proposed timeline for applying for CCGA approval (if not yet completed), plans to achieve international excellence and how this will be assessed, and current and estimated future student demand for graduate programs.
2. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors). Include an estimate of the number of faculty to create a viable major, the number of *essential* courses are not being currently taught, the role of

lecturers in the current program, as well as plans to achieve excellence and how this will be assessed (including accreditation issues, if relevant).

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs,
4. If applicable, support of, or synergy with, cross-school or interdisciplinary programs or research.
5. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

Faculty and Space Resources

1. Overview of faculty workload issues, including current and anticipated shortfalls or imbalances, as well as the school workload policy, including the likely extent of reliance on lecturer appointments. Note that permanently required lecturer lines should be requested as such by schools.
2. Balance of tenured and untenured faculty, and opportunities for mentoring.
3. An updated description of the school's space planning and allocation procedures.
4. Special resource issues related to faculty hiring, e.g. plans to hire faculty cohorts or special facilities needs for new hires.
5. Special issues relevant to achieving diversity of UC Merced's faculty.

How this information will be used. CAPRA will place heavy emphasis on prioritized FTE requests voted on by the faculty and justified by the Strategic Plans of the school and associated graduate groups. In addition, CAPRA will consider other information, such as availability of resources; consistency of a school's plan with the plans of other schools, graduate groups, and institutes; other campus-wide strategic initiatives; status of ongoing searches, balance of tenured and untenured faculty and balance of faculty across schools; student enrollment information; other information from school deans. Using this information, CAPRA will make recommendations to the EVC/Provost regarding categories of new faculty lines (e.g., 1st, 2nd, 3rd tier).

Revised November 20, 2009

CAPRA: Michael Colvin (Chair)
Wolfgang Rogge (Vice-Chair)
Evan Heit
Chris Kello (GRC)
Susan Amussen (UGC)
Martha Conklin (ex-officio)

Appendix 1**: Sample Table of Requested FTEs**

Table of Requested FTEs, Year 1 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

Table of Requested FTEs, Year 2 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

This table was approved by a vote of the School of _____ faculty on (date).

Notes: This table should reflect school priorities, although it is possible that multiple positions will be assigned to the same priority level. Additional considerations such as opportunity hires, spousal hires, diversity issues, should be noted where relevant, with further description in the text of the plan.

Appendix 2: **Sample Table of Majors and Graduate Groups**

Name	Established or Planned Start Date	Number of students (08-09)	Student Credit Hours (08-09)	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Examples						
Anthropology	9/08	n/a	100	3 (Anderson, Smith, Jones)	1 (Cultural Anthropology)	1 (Biological Anthropology)
Economics	Established	33	400	4 (Johnson, Rogers, Lopez, Stein)	2 (Applied Microeconomics, tenured + untenured)	1 (Applied Microeconomics-health)
History	Established	35	350	2 (Randall, Walker)	1 (US History)	1 (Latin American History)

Appendix 3**: Space Needs and Planning**

Name	Offices on campus (number)	Lab space on campus (sq ft)	Total campus space (sq ft)	Space at Castle (sq ft)	Space at other location (specify)
Current total (9/2009)					
New space for AY09-10 hires					
Total for AY09-10					

UC Merced
EVC/Provost Summary: Faculty Recruitment

Total 2009-10 FTE Recruitment: 13

	Percentage	Number of FTEs	(up to) Salary	Benefits	Start-UP Packages	Total
School of Engineering	23%	3	$ 281,400	$ 53,466	$ 1,500,000	$ 1,834,866
School of Natural Science	38%	5	$ 456,300	$ 86,697	$ 3,500,000	$ 4,042,997
School of Social Science, Humanities and Arts	38%	5	$ 426,200	$ 80,978	$ 1,000,000	$ 1,507,178
			$ 1,163,900	$ 221,141	$ 6,000,000	
					TOTAL	$ 7,385,041

Notes:
Off scale appointments will be negotiated with the EVC/Provost at the appropriate time.
There are several pending recruitments; provisions held centrally until formal approval given by the EVC/Provost.
For appointment date beginning 7/01/10

UC MERCED AUTHORIZATION TO CONDUCT A LADDER FACULTY SEARCH

Recruitment Year: **2009-10** **CycleType:** Annual [X] Off-Cycle [ ] Re-recruit [ ]

School: Engineering

Discuss Space Needs and Accommodation:

Source of FTE **Provision #**

Open Provision in Division *(for currently occupied positions fill in below)* **:**

Name/Rank of present occupant: _____ Vacancy Date: _____

Create from Authorized Central Funds:

Senior Position in the School of Engineering; CSE/EE	200-02-0111
Junior Position; Mechanical Engineering	200-08-0140
LPSOE; Computer Science and Engineering	200-08-0107

Appointment Level and Salary

		Rank	Step(s)	Salary Range	Off-Scale Approved
School Request:					
EVC Approved:					
Senior Position	**up to**	Professor	V	$116,600	
Junior Position	**up to**	Asst Professor	IV	$82,400	
LPSOE	**up to**	Asst Professor	IV	$82,400	
Total Range for Salaries				$281,400	

Benefits $53,466

Faculty Start-up:	**Central Resources**	**Division Contribution**	**Total**
Individual	$1,500,000		$1,500,000
TOTALS	**$1,500,000**		**$1,500,000**

(Based on existing scale of $600,000 for two positions and $300,000 for the LPSOE)

TOTALS

Ongoing Resources (salaries and benefits)	$334,866
One time Resources (start-up)	$1,500,000

Approved for Search

_____ *Executive Vice Chancellor* _____ *Date*

Routing: EVC/Provost _____ Acad. Personnel _____ Campus Budget Office _____

Note: Schools are asked to manage within the approved budget. The salaries are considered a range to provide flexibility and are factored as 'up to' dollar amount. Unused dollars will be returned to central resources.
The start-up is quoted as a total to give the Schools flexibility within the recruitments.
Off scale appointments will be negotiated with the EVC/Provost.

UC MERCED AUTHORIZATION TO CONDUCT A LADDER FACULTY SEARCH

Recruitment Year: **2009-10** **CycleType:** Annual [X] Off-Cycle [ ] Re-recruit [ ]

School: Natural Sciences

Discuss Space Needs and Accommodation:

Source of FTE **Provision #**

Open Provision in Division *(for currently occupied positions fill in below)* **:**

Name/Rank of present occupant: _____ Vacancy Date: _____

Create from Authorized Central Funds:

Junior Position; Computational Chemistry	250-08-0147
Junior Position; Applied Math	new position
Senior Position; Physics	250-07-0124
Junior or Senior; Biology	250-07-0124
Director of the Systems Biology Institute	250-07-0119

Appointment Level and Salary

		Rank	Step(s)	Salary Range	Off-Scale Approved
School Request:					
EVC Approved:					
Junior Position	**up to**	Asst Professor	IV	$73,200	
Junior Position	**up to**	Asst Professor	IV	$73,200	
Senior Position	**up to**	Professor	V	$103,300	
Junior or Senior	**up to**	Professor	V	$103,300	
Director	**up to**	Professor	V	$103,300	

Total Range for Salaries $456,300

Benefits $86,697

Faculty Start-up:	**Central Resources**	**Division Contribution**	**Total**
Individual	$3,500,000		$3,500,000
TOTALS	**$3,500,000**		**$3,500,000**

(Based on existing scale of $700,000 per positions)

TOTALS

Ongoing Resources (salaries and benefits)	$542,997
One time Resources (start-up)	$3,500,000

Approved for Search

_____ *Executive Vice Chancellor* _____ *Date*

Routing: EVC/Provost _____ Acad. Personnel _____ Campus Budget Office _____

Note: Schools are asked to manage within the approved budget. The salaries are considered a range to provide flexibility and are factored as 'up to' dollar amount. Unused dollars will be returned to central resources.
The start-up is quoted as a total to give the Schools flexibility within the recruitments.
Off scale appointments will be negotiated with the EVC/Provost.

UC MERCED AUTHORIZATION TO CONDUCT A LADDER FACULTY SEARCH

Recruitment Year: **2009-10** **CycleType:** Annual [X] Off-Cycle [ ] Re-recruit [ ]

School: Social Sciences, Humanities, and Arts

Discuss Space Needs and Accommodation:

Source of FTE **Provision #**

Open Provision in Division *(for currently occupied positions fill in below)* **:**

Name/Rank of present occupant: _____ Vacancy Date: _____

Create from Authorized Central Funds:

Open Position; Sociology	new position
Junior Position; Political Science	new position
Junior Position; Psychology	300-02-0001-07
Junior Position; Anthropology	300-07-0034-08
Senior Position; Psychology	300-08-0145

Appointment Level and Salary

		Rank	Step(s)	Salary Range	Off-Scale Approved
School Request:					
EVC Approved:					
Open Position	**up to**	Professor	V	$103,300	
Junior Position	**up to**	Asst Professor	IV	$73,200	
Junior Position	**up to**	Asst Professor	IV	$73,200	
Junior Position	**up to**	Asst Professor	IV	$73,200	
Senior Position	**up to**	Professor	V	$103,300	

Total Range for Salaries $426,200

Benefits $80,978

Faculty Start-up:	**Central Resources**	**Division Contribution**	**Total**
Individual	$1,000,000		$1,000,000
TOTALS	**$1,000,000**		**$1,000,000**

(Based on existing scale of $200,000 per position)

TOTALS

Ongoing Resources (salaries and benefits)	$507,178
One time Resources (start-up)	$1,000,000

Approved for Search

_____ *Executive Vice Chancellor* _____ *Date*

Routing: EVC/Provost _____ Acad. Personnel _____ Campus Budget Office _____

Note: Schools are asked to manage within the approved budget. The salaries are considered a range to provide flexibility and are factored as 'up to' dollar amount. Unused dollars will be returned to central resources.
The start-up is quoted as a total to give the Schools flexibility within the recruitments.
Off scale appointments will be negotiated with the EVC/Provost.

UNIVERSITY OF CALIFORNIA, MERCED

CAMPUS BUDGET COMMITTEE
Charge to the Committee
Convened in 2009-10 for 2010-11 Planning

The Campus Budget Committee is established to further enhance the annual budget process and to ensure that the relationship between the mission of the university and budgetary decisions is reinforced. The Budget Committee is designed to facilitate a more consultative and transparent approach to the allocation of University resources. The Committee includes broad campus representation, so as to provide the Chancellor with input from representatives of the campus community. In addition to providing recommendations on the distribution of new funding (focus on State and State Specific Funds), members will also provide perspective and feedback on a variety of internal economy issues important to the continued financial strength of the university.

The Executive Vice Chancellor/Provost and the Vice Chancellor for Administration will serve as co-chairs for the Committee. Staff to the Committee includes the Assistant Vice Chancellor, Academic Affairs, and the Budget Office.

Committee members will include:

Co-chairs: EVC/Provost and the VC for Administration
Chair of the Academic Senate
Chair of CAPRA
Staff Assembly President
Associate Vice Chancellor, Student Affairs
Graduate Student Representative
Undergraduate Student Representative (Chair of the Student Fee Advisory Committee)

The term of office will be one to two years with staggered appointments made by the Co-chairs.

The Campus Budget Committee is charged with guiding the strategic budget process for the campus and with aligning campus funding priorities with the overriding principles. The annual budget that is developed will be consistent with strategic academic directions, responsive to campus needs, and in keeping with the overarching goals of UC Merced.

Members will be asked to examine issues from a University-wide perspective and to offer informed and thoughtful deliberations for full discussion. Members will participate in meetings to discuss and endorse the annual CALL letter, review the annual budget requests, frame questions for annual hearings with campus units, and offer ideas regarding funding strategies and policies. The Committee will also discuss metrics that will provide accountability measures, allow for comparable studies, and outline reporting requirements. Members will solicit input from constituencies as appropriate.

The State's fiscal outlook is critical to the process and the Committee will be provided with the most up to date information on the budget situation in California and with responses and directives from the Office of the President. This context will provide structure for aligning short term budgetary decisions with long term strategy for building financial flexibility.

The Committee will be asked to assess its effectiveness each year, and to provide regular analysis of the process in order to allow for continual renewal and enhancement as the campus grows.

UNIVERSITY OF CALIFORNIA, MERCED

CAMPUS BUDGET COMMITTEE
Principles for the Allocation of Funds

The principles established for the 2009-10 process:

1. Provide funding for the lead Deans to meet priority staffing needs in order to serve increased numbers of faculty and students. Enhance support for student academic services; foster specialized support services required by the enhanced graduate student enrollments, and expand academic personnel and curriculum support.

2. Invest in support functions that provide important services for faculty, as well as support for the shared governance process. Support the faculty in their efforts to secure extramural funding in order to build on the remarkable success to date in research activities. Provide for services that enable and allow faculty to focus on research and teaching.

3. Provide funding to advance the efforts of the campus to achieve 'Initial Accreditation' from the Western Association of Schools and Colleges (WASC). The process requires that the campus give attention and adherence to the WASC accreditation standards specifically related to undergraduate and graduate degree programs.

4. Invest in the success of a diverse student body, faculty, and staff; provide enhanced support and mentoring services that will ensure academic success for UCM students and career success for our faculty and staff. Support strategic enrollment management efforts in order to meet the target goals as outlined in the Long Range Enrollment Plan.

5. Provide funding to foster and enhance the internationalizing of the campus. By their very nature UC campuses are international. They attract students and scholars from throughout the world, and they provide the vehicle whereby our students can achieve significant enhancements of their education in another country. The continued growth of international students and faculty requires the development of an Office of International Students and Scholars that can provide the services for students and faculty. The development of an Education Abroad Program for students at UC Merced will broaden the academic possibilities for students and provide significant enhancements to their education.

6. Fund mandatory and contractual cost increases to maintain or improve the quality of services and facilities for the entire campus community. Invest in efforts that will maximize campus resources with the possibility of a substantial return on investment, such as for purchased utilities via successful sustainability efforts.

7. Strengthen the internal economy of the campus with the aggressive pursuit of any new stream of funding available, and by fostering exemplary fiscal stewardship. This can be done with a series of successful resource management strategies based on key milestones and accountability. Promote an open and transparent budget process on campus in order to build a broadly consultative process.

8. Provide funding for critical campus planning and permitting efforts in order to meet the challenges of full-scale development of the Phase II plans. The next Phase of the campus' development must ensure that the expanding infrastructure will guarantee that UC Merced will be a leading research university of the 21st century.

9. Invest in the development of key systems and tools, such as a Campus Data Warehouse and COEUS, in order to provide sophistication and efficiencies in data retrieval and management which in turn positively impacts the campus-at-large. The ability to identify and track patterns of enrollments and majors and to provide relevant historical information effectively feeds all campus planning efforts, from curriculum development to space planning. The ability to support extramural proposal development and effectively manage faculty grants post-award, benefits the reputation of the campus, as well as provides directed research funding that in turn enhances graduate student education.

UNIVERSITY OF CALIFORNIA, MERCED

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OFFICE OF THE ACADEMIC SENATE
MICHAEL COLVIN, CAPRA CHAIR
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5200 NORTH LAKE ROAD
MERCED, CA 95311
209) 228-7930; fax (209) 228-7955

June 8, 2010

To: Gregg Camfield, Chair WASC Steering Committee

From: Michael Colvin, CAPRA Chair

Re: Description of CAPRA's Process and Data Sources for Recommending Faculty Lines to the EVC

In accordance with UC Merced Bylaw II.4.A, the Committee on Academic Planning and Resource Allocation (CAPRA) "Confers with and advises the Chancellor on policy regarding academic and physical planning, budget, and resource allocation, both annual and long range." During the first six years that UC Merced has been an independent division, CAPRA has developed a procedure for annual academic planning that involves the following steps:

1. During the fall semester, CAPRA confers with the Executive Vice Chancellor (EVC) and develops a written set of criteria that will be used to evaluate the Academic Plans submitted from each school. These criteria are transmitted to the schools by the EVC along with the EVC's memo and a proposed planning timeline. [See attachment 1 for the CAPRA criteria distributed in AY09-10.]
2. Academic plans are developed by the schools, including a rank-ordered request for faculty FTEs. In recent years, an explicit faculty vote on each plan (including the faculty FTE prioritization) has been requested by CAPRA. The plans are submitted by the schools to the EVC during the spring semester. In most years this submission occurs in mid-to-late February, but this was much later in AY09-10, due to the arrival of new Deans in two of the schools in January, 2010. As part of the strategic planning process, the schools are encouraged to seek input from relevant graduate groups and other research units (such as Organized Research Units).
3. CAPRA reviews the submitted plans, checks the plans for completeness in addressing the CAPRA criteria, and develops a list of questions for the schools which is then transmitted back to the schools. At this time CAPRA also requests a status report on the ongoing faculty searches in the schools.

4. Based on the Academic Plans, the responses to its questions, as well as student enrollment data, CAPRA develops a list of faculty hiring recommendations that is submitted to the EVC.

The considerations that CAPRA uses in developing its recommendations are precisely those described in the CAPRA Criteria [attachment 1]. These criteria are meant to provide information to balance near and long-term research goals, teaching needs at the undergraduate and graduate level, the balance of senior versus junior faculty on campus, and resource limitations, including start-up funding and research space.

The primary source of data that CAPRA uses in evaluating the schools' Academic Plans is the data in the plans themselves, which typically are between 70 and 200 pages in total length. Additionally, CAPRA reviews information from the UC Merced Institutional Planning and Analysis Office (IPA), both from the IPA website and occasionally in direct requests to the IPA (or to the IPA via the Deans' offices). This data includes the total enrollments in majors and the faculty workload in terms of student contact hours broken down by discipline. [See Attachment 2].

For the last several years, the faculty FTE hires recommended by CAPRA have closely followed the original prioritized requests made by the individual schools. There have been some differences between the school requests and CAPRA recommendations, but these changes have usually been the result of information on the recruitments occurring after the submission of the academic plan, for example removing a recommended new hire if a closely related recruitment failed or if an advance hire (such as a spousal hire) occurred and used that FTE line.

CAPRA's goal each year is to complete the review of the Academic Plans and submit its recommendations to the EVC/Provost before the end of the spring semester (although this sometimes slips by a few weeks) which is enough time for the EVC to send final hiring decisions to schools before the faculty hiring season starts in late summer.

cc: CAPRA
Senate Director Sims
CAPRA Analyst Paul

UC Merced CAPRA (Committee on Academic Planning and Resource Allocation)
Guiding Criteria for Evaluating Academic Plans from Schools and Graduate Groups

Strategic planning is an annual process which begins with faculty in all units, including schools, graduate groups, and research institutes, creating plans for the development and growth of research and academic programs. These plans are used as the basis for formal resource requests developed in the Deans' offices in collaboration with the faculty. The resource requests and strategic plans are then sent to the Executive Vice Chancellor (EVC) who passes them to CAPRA for formal review. CAPRA then develops recommendations based on the following guiding criteria to the EVC who makes the final resource decisions.

Changes for AY 09-10

UC Merced is continuing its growth trajectory, although in this time of limited resources this growth must be strategic, balancing research excellence and program growth. Although a significant number of undergraduate majors have been initiated (>18), we have only one CCGA-approved graduate program. The ongoing UC budget challenges will require more careful planning to ensure that each new faculty line addresses the campus' most critical needs for both undergraduate and graduate programs. Moreover, planning must move from a year-by-year process to a multiyear year process to allow proper staging of new majors and research programs. For these reasons, CAPRA is requesting the following *additional* criteria for AY09-10 and future academic plans (the AY08-09 criteria are below).

1. Academic plans should include a 5 year description of specific goals (and associated objective metrics) associated with each program that is requesting new faculty lines. These goals can be based on external assessments (e.g. ABET accreditation or CCGA approval), specific program expansion (e.g. adding a new track or graduate emphasis), or quantitative target (e.g. supporting a particular student growth rate). Moreover, the overall academics plans should prioritize and provide a timeline for all such goals described in the plan.
2. Academic plans should explicitly address *strategic constraints* on the campus, such as the need to balance more and less costly programs, the availability of research and teaching space, and start up funds.
3. Academic plans should consider the full life-cycle of existing programs, describing target sizes over the next five or more years and plans to reach a sustainable level given current budget constraints.
4. Academic plans should include estimated resource requests for program review and ongoing assessment.
5. Academic plans should describe plans for coordination or even consolidation of programs within or between schools or between graduate groups to make the most efficient use of current and proposed faculty lines. Proposed hires whose teaching will be primarily outside of their home program, need to be explicitly cited in the plans for the programs in which they will be teaching.
6. Proposed new undergraduate and graduate programs must be included in academic plans *well in advance* of the year in which they will be proposed. Moreover, plans for new programs must include year-by-year hiring goals to achieve the necessary size to create the new program. Finally, any proposed new programs used as the basis for new faculty

lines must include memos from the cognizant school or graduate groups' Dean and Academic Planning Chair stating a multiyear commitment to give high priority to faculty hires for this new program. These memos must be included in the academic plan voted on by the school faculty.

Guiding Criteria

CAPRA expects that yearly academic planning decisions will be done primarily by faculty in schools, graduate groups, and institutes through an update of their Strategic Plans and submission of an annual Academic Resource Plan from the schools. CAPRA requests that the Academic Resource Plan be concise and focused on specific requests and their justification. For example, relatively established academic areas, tied to a major, are not expected to submit long, general descriptions of their disciplines to CAPRA, nor is it necessary to describe very long-term strategic aims not related to current resource requests. Note that each school and graduate group should continue to update and refine their full Strategic Plans, and these plans should be provided to CAPRA in support of, and as justification for, the Academic Resource Plan.

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Each school may format its Academic Resource Plan in whatever style is suited to its needs, as long as it provides CAPRA with the necessary information to ensure effective allocation of FTEs and space across the campus. It is expected that schools' planning documents will address realistic resources needed to attract and accommodate new FTEs and the future growth of their activities, including estimates of: cost of startup packages; laboratory space requirements; office space needs of associated research staff and graduate students; special infrastructure needs (library holdings, IT, central facilities, animal room, clean room, fume hoods, heating/cooling, electrical, regulatory compliance staff, etc.)

In addition, the Academic Resource Plan should include text justifying the FTE requests in terms of their support of research programs/graduate groups and undergraduate majors (or have links to the appropriate sections of the school Strategic Plans).

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, the number of *essential* courses not being currently taught, the proposed timeline for applying for CCGA approval (if not yet completed), plans to achieve international excellence and how this will be assessed, and current and estimated future student demand for graduate programs.
2. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors). Include an estimate of the number of faculty to create a viable major, the number of *essential* courses are not being currently taught, the role of

lecturers in the current program, as well as plans to achieve excellence and how this will be assessed (including accreditation issues, if relevant).

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs,
4. If applicable, support of, or synergy with, cross-school or interdisciplinary programs or research.
5. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

Faculty and Space Resources

1. Overview of faculty workload issues, including current and anticipated shortfalls or imbalances, as well as the school workload policy, including the likely extent of reliance on lecturer appointments. Note that permanently required lecturer lines should be requested as such by schools.
2. Balance of tenured and untenured faculty, and opportunities for mentoring.
3. An updated description of the school's space planning and allocation procedures.
4. Special resource issues related to faculty hiring, e.g. plans to hire faculty cohorts or special facilities needs for new hires.
5. Special issues relevant to achieving diversity of UC Merced's faculty.

How this information will be used. CAPRA will place heavy emphasis on prioritized FTE requests voted on by the faculty and justified by the Strategic Plans of the school and associated graduate groups. In addition, CAPRA will consider other information, such as availability of resources; consistency of a school's plan with the plans of other schools, graduate groups, and institutes; other campus-wide strategic initiatives; status of ongoing searches, balance of tenured and untenured faculty and balance of faculty across schools; student enrollment information; other information from school deans. Using this information, CAPRA will make recommendations to the EVC/Provost regarding categories of new faculty lines (e.g., 1st, 2nd, 3rd tier).

Revised November 20, 2009

CAPRA: Michael Colvin (Chair)
Wolfgang Rogge (Vice-Chair)
Evan Heit
Chris Kello (GRC)
Susan Amussen (UGC)
Martha Conklin (ex-officio)

Appendix 1**: Sample Table of Requested FTEs**

Table of Requested FTEs, Year 1 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

Table of Requested FTEs, Year 2 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

This table was approved by a vote of the School of _____ faculty on (date).

Notes: This table should reflect school priorities, although it is possible that multiple positions will be assigned to the same priority level. Additional considerations such as opportunity hires, spousal hires, diversity issues, should be noted where relevant, with further description in the text of the plan.

Appendix 2: **Sample Table of Majors and Graduate Groups**

Name	Established or Planned Start Date	Number of students (08-09)	Student Credit Hours (08-09)	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Examples						
Anthropology	9/08	n/a	100	3 (Anderson, Smith, Jones)	1 (Cultural Anthropology)	1 (Biological Anthropology)
Economics	Established	33	400	4 (Johnson, Rogers, Lopez, Stein)	2 (Applied Microeconomics, tenured + untenured)	1 (Applied Microeconomics-health)
History	Established	35	350	2 (Randall, Walker)	1 (US History)	1 (Latin American History)

Appendix 3**: Space Needs and Planning**

Name	Offices on campus (number)	Lab space on campus (sq ft)	Total campus space (sq ft)	Space at Castle (sq ft)	Space at other location (specify)
Current total (9/2009)					
New space for AY09-10 hires					
Total for AY09-10					

University of California, Merced
School of Engineering
Five-Year Strategic Plan (SP2015)

1. Introduction and Overarching Goals

The UC Merced School of Engineering (SoE) five-year Strategic Plan (SP2015) is outlined herein. The forwarded plan is based on an overarching strategy, which is summarized in Figure 1.

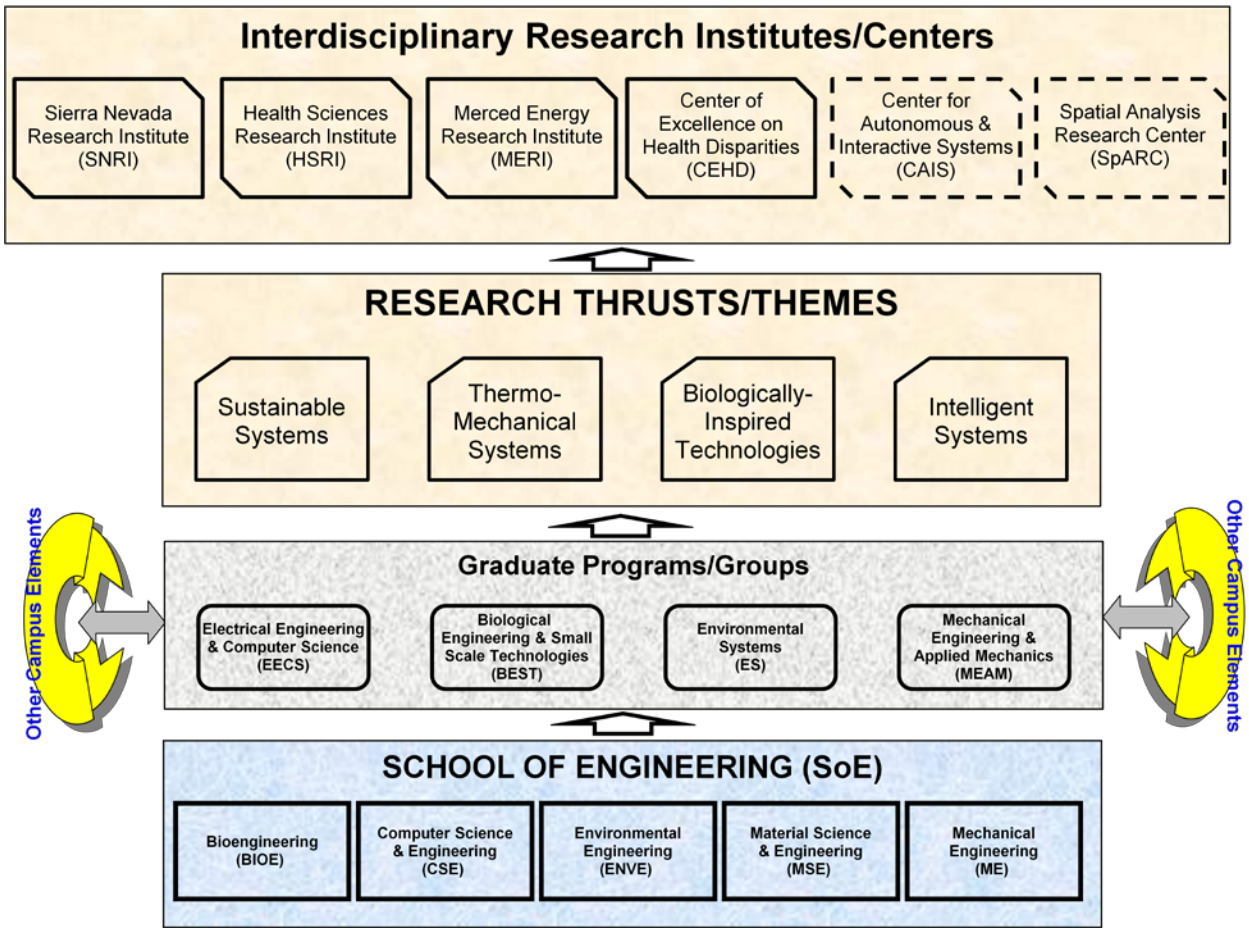

Figure 1. Guiding Strategy for the School of Engineering Strategic Plan.

The SoE faculty is organized in disciplinary groups, which align with their educational and research-related backgrounds as well as the current undergraduate SoE majors. The SoE faculty, along with faculty members from other schools, support four graduate groups/programs that are currently overseen by the SoE. Principal research and graduate program thrusts are organized in four broad interdisciplinary areas: 1) Sustainable Systems, 2) Thermo-Mechanical Systems, 3) Biologically-Inspired Technologies, and 4) Intelligent Systems. These emphases align the existing campus interdisciplinary institutes or centers, and new centers being proposed in the near future. The overarching strategy of the SoE faculty is consistent with the campus' 2009 Strategic Academic Vision.

This plan was formed by the SoE Resources Committee by synthesizing 1) input obtained during formal faculty meetings (bi-weekly), 2) information obtained from relevant research institutes and graduate groups, and 3) document exchange-review cycles that occurred from December 13, 2009 through February 15, 2010.

The SoE remains the smallest of the three Schools with a faculty numbering 31, or 26 regular full-time equivalents (FTE) when accounting for split and administrative appointments. This number constitutes about 26% of the ladder-rank faculty at UC Merced. Of the 31 faculty members, 14 are tenured and 17 are tenure-track. This faculty oversees 5 undergraduate majors and is affiliated with 4 graduate groups.

First and foremost, SP2015 reaffirms the SoE faculty commitment to building a world-class research university for the creation of new knowledge and the development of new technologies. The key success factors to achieve this goal are to: (1) hire the highest quality faculty (measured by their impact publications, awards, fellowships, service on editorial boards, etc.), (2) attract high quality graduate and undergraduate students, and (3) receive exceptional external funding.

However, we recognize the currently severe constraints on growth, especially with respect to faculty research space, startup funding, and the ongoing economic downturn in California. The status of the SoE and its assessable short-term goals for research and teaching are summarized in the following sections.

2. Proposed Milestone Goals

2.1. Research Goals

The SoE faculty continues to compete effectively for extramural support. Thus far during the 2009-2010 AY SoE faculty have been responsible for $0.8M to $2.3M per month of extramural funding, roughly 50 to 90% of the total campus award funding in a given month (Figure 2).

The SoE intends to improve upon this impressive effort in terms of both extramural funding and graduate student enrollment, both of which are a function of faculty size. Thus, additional FTEs are proposed in research areas that are either highly complementary to existing research strengths and increase multi-

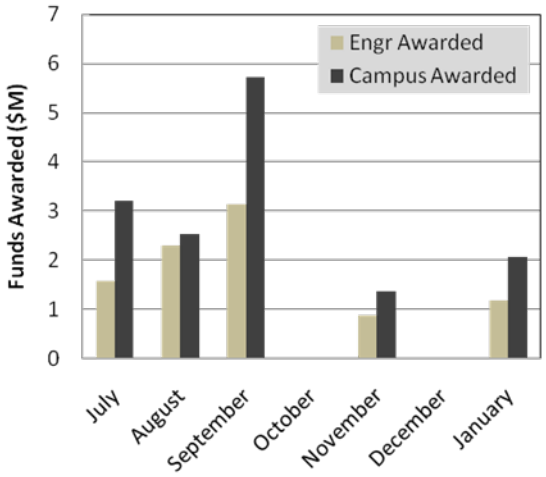

Figure 2 - Monthly contract and grant awards to SoE versus UCM Campus (data source: UCM Sponsored Research monthly activity reports).

disciplinary research opportunities. Although SoE investigators are rapidly becoming space-limited, they remain highly productive in terms of sponsored research. In the current academic year, SoE faculty have already exceeded $9M in awards, an amount which may be somewhat inflated by the availability of economic recovery funds in FY 2009-2010. However, it is realistic to expect an average of approximately $250,000 per year per SoE faculty member in absence of recovery funds from current and anticipated investigators. This average is similar to the current one and may be conservative as junior faculty mature and become more successful in acquiring grants. In addition, establishment of new interdisciplinary research centers (see Goal 2) is also expected to increase funding levels. However, it is important to note that space limitations in the near term may temper these affects.

SoE-Goal 1. **SoE investigators will maximize return on available facilities in the near term (SE2, Castle, and the academic surge building) by successfully competing for sponsored research awards amounting to more than $40M (direct + indirect cost) over the next 5 years.**

Interdisciplinary research and educational programs are central to the overall development of the UC Merced campus. During this planning horizon, the EECS faculty group intends to establish two new interdisciplinary centers, the *Center for Autonomous and Interactive Systems (CAIS)* and *Spatial Analysis Research Center (SpARC)*. Both of these centers are directed towards the Intelligent Systems thrust and the result of the maturing and growth of the CSE faculty, and collaborations with key researchers in our sister schools.

SoE-Goal 2. **SoE investigators will establish two new interdisciplinary research centers aimed at increasing research strengths and funding in the intelligent systems research thrust area.**

2.2. Graduate Enrollment Goals

Commensurate with the achieved research funding, the SoE faculty is also responsible for a significant fraction of the graduate student population, as about 76 of the 224 graduate students are affiliated with engineering faculty (34%). This represents an 11% graduate/total student fraction, compared to the other campus units (5.3%).

A projection goal for future PhD student productivity by the SoE faculty is shown in Figure 3. This projection assumes that the SoE faculty will grow at a rate of 4 regular FTE/year (full and partial FTEs), that each faculty member supervises an average of 3 PhD students, and that each junior and senior faculty member will graduate 0.20 and 0.40 PhD/year, respectively. These production rates are low relative to UC system wide productivity, which ranges from amout 0.8 to 1.0 PhD/faculty/yr, and may therefore be conservative. However, most of the graduate programs at UCM are at the developing stage and the typical rate of progress toward degree is not yet well-documented. Base on these estimates,

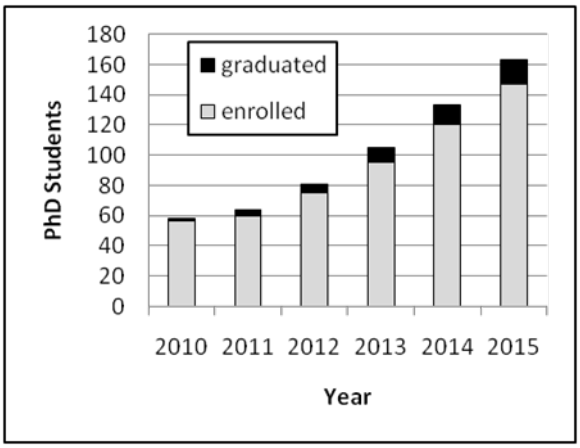

Figure 3. Projected PhD student enrollment by SoE investigators from AY 2009-10 (actual enrollment) to AY 2014-15.

the SoE faculty support the following School goal:

> ***SoE-Goal 3.*** **SoE investigators will be mentoring more than 160 PhD students and these students will complete 15 or more doctoral degrees during AY 2014-15.**

2.3. Undergraduate Educational Goals

Engineering majors remain popular at UCM, with several of the largest majors on campus being Mechanical Engineering (ME, 4th largest), Computer Science Engineering (CSE, 5th), and Bioengineering (BioE, 7th). We anticipate that these majors will continue to show strong enrollments. We also envision plans for increasing enrollments in other majors. For example, an expanded emphasis in Environmental Engineering (EnvE) on sustainably infrastructure is expected to create more interest in this major. Also, our Material Science & Engineering (MSE) faculty is building ties to the Bioengineering and Mechanical Engineering (bio- and energy materials) programs to strengthen their enrollments. Through prudent enhancement of these majors, the overall undergraduate enrollment goal is as follows:

> ***SoE-Goal 4.*** **SoE undergraduate majors will maintain its current fraction of undergraduate enrollment (approximately 18%), achieving a total enrollment of 950-1050 by AY 2014-15.**

Our main short-term undergraduate educational focus in the SoE is to (1) stabilize the curriculum in a sustainable manner so as to render short-term accreditation (ABET) is feasible, and (2) positioning ourselves for enrollment growth through modification of existing majors. One new major is being planned in the near term, the B.S. Engineering degree. However, as currently planned, this new major will have few resource implications because it will be designed to reside within the other majors. The motivation for this is that the ABET accreditation process is more feasible for this basic engineering major, and we anticipate that we can apply for accreditation approximately one year after the major is approved. Other majors for which accreditation is important (EnvE, ME), will follow later as they become able to expand their respective curricula. This leads to our second short-term SoE goal:

> ***SoE-Goal 5.*** **SoE will develop the B.S. Engineering degree program without encumbering new resources, and achieve ABET accreditation for this program by 2013, regardless of future faculty recruitment. Given successful faculty recruitment at the rates discussed herein, ME and EnvE will become ABET-accredited by 2015.**

Although no new majors are planned in the near term (beyond the B.S. Engineering mentioned above), we do recognize the need for an Electrical Engineering (EE) component in our curriculum. Initially, we plan to recruit faculty into the EECS group and charge them with creating an "emphasis area" within the existing CSE major. In fact, as the EE emphasis becomes more evident, we may decide to modify this major's name. When we have a sufficient faculty to support it, we can then develop the separate EE major.

To support the ambitious research and educational goals outlined above, additional FTEs in the form of regular faculty and lecturers will be needed. Given the near term resource constraints, recruitment must be highly strategic. The FTE recruitment plan proposed by the SoE is front-loaded over the next three years to insure against failed searches; it corresponds to an overall recruitment effort of 15 regular ladder faculty members, 5 cross-school positions, and 5 lecturers over a five-year period. It also assumes that all SoE administrative appointments are adequately compensated with respect to school teaching allocations. Projecting these assumptions over the next five years, accounting for regular promotions, leads to the projection shown in Figure 4. The SoE faculty will be composed of 55 regular faculty and lecturers (31 tenured (senior) faculty, 18 tenure-track (junior) faculty, and 6 full-time lecturers).

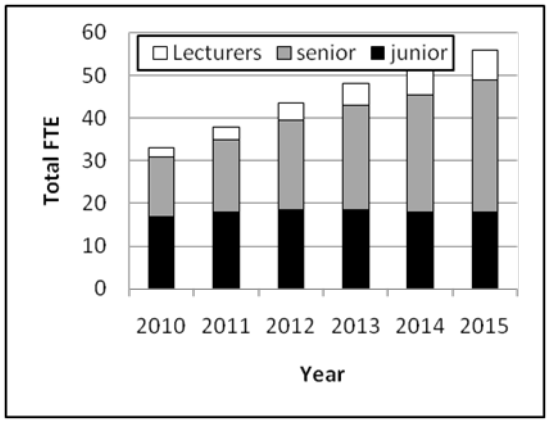

Figure 4. Projected SoE faculty number and distribution over the next 5 years.

In support of the aforementioned School goals, SoE proposes a steady hiring plan that respects short-term resource constraints. First, to immediately enhance program stability and existing research strengths in concomitance with the campus' Strategic Academic Vision, the SoE proposes 12 regular FTEs and 5 lecturers with potential security of employment (LPSoE)—see Table 1. Each of these positions is discussed further in program-specific context in Section 4 of this plan. The SoE faculty recognizes that this goal extends them beyond the three positions allocated for 2010-11. Each of these positions will require relatively modest startup and space as searches will focus on computational investigators. Furthermore, critical needs in all of these groups imply that "over-searching" is prudent as insurance against failed searches.

In addition to SoE FTE recruitment, and in order to enhance SoE synergy with other academic and research units, particularly the UCM management program, we propose the cross-unit hires summarized in Table 2.

Table 1. Summary of FTE Requests by the School of Engineering for the next three AYs.

Position	Graduate Research Program(s)[1]	Undergraduate Program(s)[2]
AY 2010-2011		
SoE-1. Computer Systems	EECS primary; MEAM, ES secondary	CSE
SoE-2. Energy Storage Technologies	MEAM primary; BEST, ES secondary	ME
SoE-3. Energy Materials	BEST primary; MEAM, ES secondary	BioE/MSE/ME
SoE-4. Physiological Modeling	BEST primary; MEAM secondary	BioE/MSE/ME
SoE-5. Stochastic Modeling	MEAM primary; ES secondary	ME/EnvE
SoE-LPSoE-1. EECS Lect.[3]	NA	CSE
SoE-LPSoE-2. Fundamentals Lect.	NA	ENGR
SoE-LPSoE-3. EECS Lect.	NA	CSE

[1] Recommended search committee to include primary (chair) and secondary graduate group or institute representations.
[2] Undergraduate teaching assignments will be in areas of greatest need at the time of the hire.
[3] A candidate for SoE-LPSoE 1 is currently under consideration.

	AY 2011-2012	
SoE-6. Computer Science Theory **SoE-7. Air Pollution Modeling** **SoE-8. Mechatronics** **SoE-9. Ecological Engineering**	EECS primary ES primary, MEAM secondary MEAM primary, EECS secondary ES primary, BEST secondary	CSE ME/EnvE ME/CSE EnvE
SoE-LPSoE-4. Lab/Design Lect. **SoE-LPSoE-5. Fundamentals Lect.**	NA NA	ENGR ENGR
	AY 2012-2013	
SoE 10. Intelligent & Adaptive Control **SoE 11. Environmental Biotechnology** **SoE 12. Computational Materials** **SoE 13. Biosensor Development** **SoE 14. Medical Imaging**	EECS primary, MEAM secondary ES primary, BEST secondary BEST primary, MEAM secondary BEST primary, EECS secondary BEST primary, EECS secondary	CSE/ME BioE/EnvE MSE/BioE/MEAM BioE/CSE/EnvE BioE/CSE

Table 2. Proposed cross-unit positions for the upcoming three AYs.

Position	Graduate Research Program(s)	Undergraduate Program(s)
	AY 2010-2011	
Cross 1. Information Management **Cross 2. Natural Resource Management** **Cross 3. Sustainable Building**	EECS, SNRI, UCMERI, QSB, Mgmt ES, SNRI, UCMERI, Mgmt ES, MEAM, BEST, Mgmt	CSE/Mgmt EnvE/ESS/Mgmt MSE/ME/EnvE
	AY 2011-2012	
Cross 4. Virtual Environments **Cross 5. Technology Management** **Cross 6. Media Arts & Technology**	EECS, SCS EECS, BEST, QSB EECS, CIS, World Cultures	CSE/Cog Science Engr/Mgmt CSE, Arts

3. Summary of Goals

A visualization of the milestone goals outlined in this Strategic Plan is presented in Figure 5. It is evident in reviewing this milestone chart, that the primary goal that must be achieved by the School of Engineering is growing the faculty. Unfortunately, the lack of research/office/instructional in the near term severely restricts faculty growth. Thus, the highest priority, both in the near-term and long-term, for the School of Engineering as well as the campus in general, must be to obtain additional research and instructional space to grow the faculty and the emerging student population.

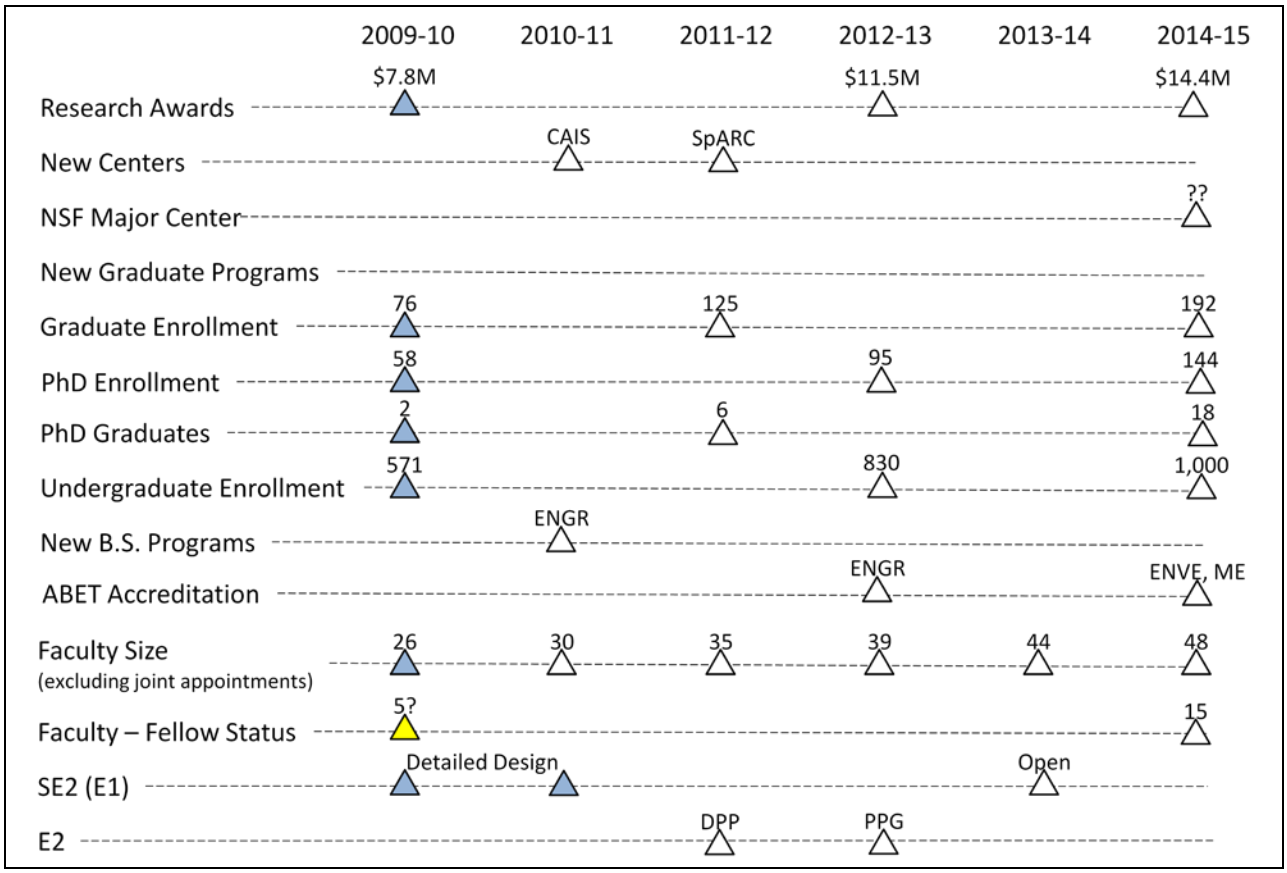

Figure 5. Milestone Goal Timeline for the School of Engineering

Appendix: Program-Specific Vision, Goals, and Rationale for FTE Requests

Electrical Engineering and Computer Science (EECS)

EECS Overview - The EECS faculty offer a popular undergraduate major in Computer Science & Engineering (CSE), as well as graduate degrees under the EECS and ***Cognitive & Information Science (CIS)*** program. EECS faculty members have diverse research interests with areas of investigation in artificial intelligence, computational neuroscience, computer animation and graphics, computer vision, machine learning, speech processing, robotics, and distributed networked systems.

These research themes frequently share a focus on ***intelligent systems***, and this focus has been consciously adopted by the group to build research excellence in a specific intellectual area. The EECS faculty regularly collaborates with colleagues in other fields across the UCM campus, contributing to interdisciplinary work in computational biology, environmental systems, and cognitive science. Indeed, the group has a strong bond to the CIS program, with several funded research projects spanning this cross-campus gap. The EECS program is critical to the success of UCM, playing a central role in implementing the campus' strategic focus on "Cognitive Science and Intelligent Systems", as highlighted in its *Strategic Academic Vision* document.

EECS Teaching Programs – The undergraduate CSE major is designed to provide students with both breadth and depth in the exciting and rapidly expanding fields of: *Computer Science* - the study of computation, including algorithms and data structures, and *Computer Engineering* - including hardware, software and network architecture. CSE is the 4th largest major on campus with an enrollment of 161 in AY 2009-2010). Given awareness of and demand for this major, undergraduate enrollment is expected to continue to grow as long as space and faculty are added to the program. From this perspective, it will soon become important to examine the tradeoff between increase in enrollment and selectivity for this program.

EECS Goals

EECS Research Goals - The EECS group has identified two main research goals, which it will pursue over the course of **t**he next five years:

- **Achieve High Levels of Research Productivity -** The EECS group seeks means to enable their faculty to achieve levels of research productivity comparable to researchers at other leading research universities. To assess progress toward this goal, counts of peer-reviewed journal publications and peer-reviewed conference publications.
- **Receive International Recognition as a Leader in "Intelligent Systems" -** Anecdotal accounts have already been reported of members of the broader academic computer science community recognizing UCM's strength in "intelligent systems". Our goal is to be recognized as an international leader in this field.

These goals may be refined over the course of the next five years, particularly with regard to how progress is evaluated. In an effort to both increase research productivity and receive international attention, the EECS group has adopted two more immediate goals. First is establishing the *Center for Autonomous and Interactive Systems (CAIS)*. This UCM Centralized Research Unit (CRU) has recently been proposed by EECS faculty members Stefano Carpin and Marcelo Kallmann. The center will coordinate shared resources and facilitate interdisciplinary research activities involving intelligent

systems. The EECS faculty expects to establish CAIS formally as a UCM CRU before the end of the 2010–2011 academic year. Second, EECS faculty member Shawn Newsam is actively developing the *Spatial Analysis Research Center (SpARC)* as a CRU. SpARC is a highly interdisciplinary focus that encompasses faculty from SSHA, NS, and other engineering faculty (Environmental).

EECS Teaching Goals - One of the leading goals of the EECS program is the **establishment of a CCGA approved EECS graduate program** and corresponding graduate group. There are a number of obstacles that must be overcome to accomplish this goal, including:

- The number of EECS research faculty must be increased to achieve a critical mass. At minimum, the group is expected to need 11–12 faculty members. If the current open senior position search is successful, and one new faculty position is created for EECS in each of the next three years, this minimal number can be reached by the end of the 2012–2013 AY.
- The number of senior EECS research faculty must be increased. Currently, the EECS faculty includes only one tenured member, and that individual has a heavy administrative burden (i.e., he is the Chancellor of UCM). Between the filling of a currently open senior position and the expectation of a number of successful promotions in the years to come, it is expected that at least a third of the EECS faculty will be senior by the end of the 2012–2013 AY.
- A curriculum of core graduate courses must be designed and regularly taught. These courses must span the fundamental topics central to a graduate education in EECS. The shaping of this curriculum is already underway. The recruitment of additional tenure-track faculty will be needed to ensure that these courses are offered on a regular basis, however. If planned requests for new EECS faculty positions are met, and if hiring for these positions is successful, a graduate curriculum of this kind could be ready by the 2012–2013 AY.
- A comprehensive CCGA proposal must be prepared. Given the additional faculty resources that will be requested, it is expected that the EECS faculty will have adequate time to prepare this proposal over the 2012–2013 AY.

In summary, successfully preparing a viable CCGA proposal by the end of the 2012–2013 academic year is a reasonable goal, but meeting this goal will require the allocation of additional faculty positions to EECS, at least one junior tenure-track position per year, as described later in this document.

The EECS **undergraduate CSE degree program** is currently established and has already produced graduates. With continued support for 2–3 EECS lecturers, and the creation of at least one additional tenure-track position, there are adequate labor resources to offer the current complete CSE curriculum. The EECS faculty has identified a number of important ways to improve the current curriculum, however, and these improvements will be needed to produce an undergraduate CSE program of international stature. The EECS faculty has identified the following goals with respect to undergraduate education:

- To modify the CSE curriculum, and augment the set of courses regularly offered, so as to produce an undergraduate training experience that is comparable in quality to those offered at our sister campuses.
- To continue to plan for a degree program in *Electrical Engineering (EE)*, beginning with an EE emphasis area with the CSE degree program, and (given adequate resources) to begin to implement this emphasis area

The quality of an undergraduate program is difficult to measure objectively. One might be tempted to use common university rankings, such as those provided by *U.S. News & World Report*, to evaluate such a program, but these rankings are often misleading. An alternative is to seek formal accreditation through an educational accreditation agency, such as ABET. The accreditation process is resource-demanding, however, and many leading computer science programs in the world do not seek accreditation. Thus, while ABET accreditation may eventually be sought, particularly if an electrical engineering major is

introduced, there are *no* plans to seek such accreditation during the upcoming five years. Lacking such an accreditation process, the EECS faculty could engage in a self-study activity, including the solicitation of input from distinguished faculty at our sister campuses, to formally evaluate progress toward a quality CSE degree program.

Priorities - The achievement of many of these goals depends upon the successful recruitment of new tenure track faculty members. The goals will be met naturally as newly hired faculty members do the jobs that they were hired to do. Still, situations may arise in which these goals are competing for resources or are otherwise at odds with each other. In preparation for these contentious situations, the EECS faculty has prioritized these goals as follows:

1.1.1.1. The establishment of a CCGA approved EECS graduate program.
1.1.1.2. Meeting our research goals.
1.1.1.3. Improving the curriculum for the CSE major, and complete the planning for an EE major.

EECS Current Academic Resources - The EECS group currently consists of 7.5 tenure-track faculty members and 2 lecturers. Of the tenure-track faculty, only one is tenured, and that individual has substantial administrative responsibilities (i.e., he is Chancellor of UCM). One member of the EECS faculty has a split appointment with SSHA, providing 0.5 FTE to EECS. Lecturers play a critical role in providing lower division computer programming classes, including classes for CSE majors (CSE 30/31), classes for all engineering majors (CSE 20/21), and even a class for students in other schools (CSE 5).

EECS Current Academic Resources – The current EECS group consists of 6.5 assistant professors. One faculty position and one LPSoE are being searched during AY 2009-10 in EECS. The EECS program currently occupies offices (converted to dry lab space) and 1 dry lab suite in Science and Engineering I.

EECS Envisioned Program by 2020 – We envision that the EECS program will comprise 13-15 ladder faculty members and 3-4 lecturers by 2020. The number of undergraduate (CSE, and potentially EE majors) will be around 300. We expect to have 50-60 graduate students in EECS program.

EECS Resource Requirements 2010 – 2015 – More facilities are needed for the EECS program to maintain its standard in teaching quality and research excellence as enrollments grow, and to develop an undergraduate EE program. Appropriate space allocation (dry lab) will be necessary for the recruiting of additional faculty members.

EECS Academic Resources Request (FTEs)

A five year plan has been fabricated for the hiring of new EECS faculty. That plan involves the following positions:

- **Computer Systems (SoE-1)**. During the 2010–2011 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Systems**. The successful candidate for this position will conduct research related to the design and analysis of complex computer systems. Potential research areas include, but are not limited to: computer architecture, distributed sensing and monitoring, mobile computing, networking, operating systems, privacy and security, & ubiquitous computing. This position is critical for establishing international respect as a leading computer science program, as any strong computer science program will be expected to include a solid foundation in systems. Furthermore, this new faculty member is needed if a reasonable range of foundational graduate program core classes are to be offered on a regular basis. Such courses will be needed to produce a viable CCGA proposal. In addition to supporting EECS program needs, this position will likely produce fruitful cross-campus collaborations, though the nature of these collaborations is difficult to predict, given the ubiquity of complex computer systems in virtually every contemporary field of

inquiry. While laboratory space needs can vary widely among computer systems researchers, candidates who focus on software solutions are expected to require relatively small labs.

- **CSE Lecturer Team (SoE-LPSoE-1, SoE-LPSoE-3).** Lecturers are needed to cover lower division EECS classes, serving CSE majors, all engineering majors, and students from other schools. It may not be necessary to allocate any new positions to fill this need, as at least 2 Lecturers are currently employed in support of the EECS program. Indeed, a Lecturer with Potential Security of Employment (LPSoE) position was previously created, and we are currently attempting to fill that position. Should the current efforts fail, the EECS group recommends that such a position be re-advertised and filled promptly, supplying an individual who can manage all of the lower division CSE courses while teaching several of them. An additional 1 to 2 Lecturers will be needed to cover the remaining lower division courses. These positions should be made relatively permanent (i.e., LPSoE) in AY 2010-11 and 2011-12, at the latest, as we are extremely vulnerable in this area given the large number of students required to take these courses and the difficulties associated with rapidly identifying temporary lecturers in this area.

- **Computer Science Theory (SoE-6)**. During the AY 2011–2012, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Science Theory**. The successful candidate for this position will conduct research in the mathematical foundations of computation. Potential research areas include, but are not limited to: computational complexity, computational game theory, computational geometry, computational learning theory, cryptography, networking theory, numeric optimization, & numerical analysis. This position is critical for establishing international respect as a leading computer science program, as our current faculty lacks a theoretician. This hire will also be expected to contribute to the EECS graduate program core curriculum, providing students with a graduate level survey of computer science theory. Contributions are also expected to the CSE undergraduate degree program, strengthening this program by providing automata theory, complexity theory, and other foundational courses.

- **Intelligent & Adaptive Control (SoE 10)**. During the 2012–2013 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Intelligent & Adaptive Control**. The successful candidate for this position will conduct research on the design and analysis of control systems, making use of methods from artificial intelligence, control theory, cybernetics, machine learning, and/or robotics. Potential application areas include, but are not limited to: active sensing, environmental control, intelligent transportation systems, mechatronics, power management, & robotics. This position is important for building the EECS program's reputation in "intelligent systems". This hire will also be expected to contribute to the set of EECS graduate courses, speeding preparations for a CCGA proposal submission. Note that this position also will contribute to the campus-wide focus on "Cognitive Science and Intelligent Systems", as highlighted in the *Strategic Academic Vision* of the University of California, Merced. Finally, since the field of control theory traditionally spans computer science, electrical engineering, and mechanical engineering, there is good reason to expect this position to additionally support the mechanical engineering programs in the School of Engineering.

- **Senior EECS FTEs.** During the 2013–2014 and 2014–2015 academic years, the EECS group proposes returning to efforts to recruit senior faculty members in EECS. Considering the difficulty that UCM has had in attracting senior EECS faculty, it is considered unwise to unnecessarily restrict the research focus of this position. Instead, any strong senior EECS researcher who can demonstrate synergy with established EECS faculty would be considered.

Strengths commensurate with developing the EE emphasis area within the CSE program, and eventually the EE degree program, would be particularly attractive at this point.

EECS Interdisciplinary and Cross-School FTE Requests

In addition to positions focusing on EECS priorities, the EECS group suggests a number of interdisciplinary, potentially cross-school, positions, including:

- **Information Management (Cross 1).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Information Management**. This position would involve research into database systems, decision support systems, automated information retrieval, and/or other technologies that are critical to modern Management Information Systems (MIS). The successful candidate would bring highly relevant technological expertise to UCM's evolving business management program, while offering core computer science knowledge to CSE majors. The creation of this position could substantially increase the employment prospects of UCM graduates, as database design and related skills continue to be in extremely high demand. Also, opportunities for industrial funding of research are expected to be (relatively) abundant in this domain.
- **Virtual Environments (Cross 4).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Virtual Environments**. The successful candidate for this position would conduct research on tools and applications for virtual reality systems, constructing digital "worlds" and facilitating seamless and fruitful interactions between these virtual spaces and human users. Application areas include, but are not limited to: computer game design, educational and training software, digital heritage, and social networking. This interdisciplinary domain lies at the intersection of fields like computer graphics and animation, human-computer interaction, human perception and motor control, human communication (including both natural language and gestural communication), and the humanities. This position would build on existing collaborations between faculty in EECS, faculty in Cognitive & Information Science, and other faculty in the School of Social Sciences, Humanities, and Arts (SSHA). With the help of this additional faculty position, these cross-campus research collaborations could quickly evolve into high-profile, innovative, and unique interdisciplinary programs, providing students with various backgrounds hands-on training in this rapidly growing field. With regard to EECS programs, this position could contribute to a "computer games" track in the CSE major, which would be expected to swell the ranks of undergraduates pursuing that degree.
- **Media Arts & Technology (Cross 6)**. The EECS group proposes the creation of a new interdisciplinary faculty position at the Associate Professor level focusing on **Media Arts & Technology**. The successful candidate for this position would develop and/or use innovative technologies in the service of artistic expression. The basis for such a program already exists in EECS, with two faculty members conducting research in related areas (3D modeling, computer graphics, computer animation, image-processing, digital libraries, multimedia). This position could seed programs in media arts and technology — programs that could easily become very popular at both the undergraduate and graduate levels. UCM's proximity to the San Francisco Bay Area, which has a tradition of art and technology interaction, would provide an additional stimulus for such programs. The space requirements for this position are expected to include modest dry lab space for a research studio and space for a motion-capture system, which could be shared among several of the faculty.

EECS Space and Special Equipment Requests

The EECS short- and long-term space needs will be fulfilled by existing dry lab space in Science & Engineering 1 and proposed dry/computational space in Science & Engineering 2. No special equipment is needed at this time.

Bioengineering

Bioengineering Overview - Bioengineering is a highly interdisciplinary field in which the techniques, devices, materials and resourcefulness of engineers are used to address problems in biology and healthcare; and lessons from biology are used to inspire design and inform progress in engineering. During the past 40 years, this synergy between biology and engineering has led to a wide range of implantable materials, diagnostic devices, sensors and molecular characterization techniques, and it has produced tools that greatly expedited the sequencing of the human genome. Along with these practical innovations has come a rapidly increasing need for personnel with the necessary hybrid skills to capitalize on them; undergraduate bioengineering programs have proliferated alongside the continued growth of bioengineering research.

The current bioengineering faculty members are affiliated with the **BEST** and **QSB** graduate programs. The faculty constitutes a strong research core which, with a few additions, can develop into a nationally competitive research cluster. The current faculty members have a wide range of expertise in physiological engineering, tissue engineering, regenerative medicine, biophysics and etc. The BioE faculty is committed to expand the research scope in the major to complement the research area of the current faculty.

The undergraduate major in **Bioengineering (BioE)** is designed to provide students with both breadth and depth in two exciting and rapidly expanding fields: tissue engineering and nano-bioengineering. The nano-bioengineering track reflects the strong synergy that exists between the "nano" and "bio" themes in engineering and science. The name also highlights an initial focus on things molecular, supramolecular, cellular and material, which will allow the program to draw efficiently on the talents of the biologists, chemists, physicists and other UC Merced faculty in basic engineering and science programs.

BioE Teaching Programs – Currently BioE program has only three faculty members. It is extremely difficult to deliver a major and a graduate program (BEST) with such few people. A consolidation effort has been made to prioritize the class offering in BioE. The plan will reduce the total required credits and incorporate electives from other areas (e.g., Mechanical and Materials Science Engineering) to maintain their undergraduate major while continuing to develop their graduate research program.

BioE Goals

BioE Research Goals – The research goal for BioE program is to maintain high level of federal and national funding as well as to publish peer-reviewed research articles in reputational journals.

BioE Teaching Goals – Bioengineering is a field including expertise in areas such as drug delivery, tissue engineering, medical imaging, physiological modeling, molecular engineering, biomechanics, bioinstrumentation and medical device developments. With sufficient faculty available, more diverse courses can be offered to undergraduate and graduate students in order to provide a comprehensive and broad bioengineering education experience. The teaching goals will be the program learning outcomes of the BIOE major reflect seven of UC Merced's eight guiding principles of general education.

BioE Current Academic Resources – One full professor and two assistant professors. BioE program currently has wet lab around 1.5 suites in SE1 building.

BioE Envisioned Program by 2020 – We envision BioE Program will have 7 to 9 faculty members. The number of undergraduate program will be around 150 to 200. We expect to have 20 to 25 graduate students in the BEST program.

BioE Resource Requirements 2010 – 2015 – More faculty members (3 more) are needed for BioE program to maintain its standard in teaching quality and research excellence. Appropriate space allocation (both wet and dry lab) will be beneficial for the recruiting of these additional faculty members.

BioE Academic (FTEs) Requests

To deliver the BIOE undergraduate program, 26 program specific credits have to be offered. These credits do not include engineering fundamentals courses, service learning, freshman seminars, or graduate courses. They also do not allow for multiple offerings of any course in an academic year.

BIOE has currently only 3 existing faculty positions that cannot realistically deliver 26 BIOE related credits (lecture and laboratory courses) in the foreseeable future. Using a model in which a faculty member would typically offer one fundamental/core course, one specialist/upper division course or one graduate course in a year (plus a freshman seminar and/or mentor a service learning team), it is clear that BIOE does not have the minimum number of faculty FTEs to deliver the major. In addition, BIOE is part of BEST (Biological Engineering and Small-scale Technology) graduate group and has to cover two required graduate courses and sufficient advanced elective classes (3-5) for BEST students.

Given the current limitation due to the economical recession, a minimum of three FTE are urgently needed as identified by the faculty in BIOE (listed in the priority order):

- **Physiological Modeling (SoE-4) -** We have been experiencing unprecedented advances into the complex nature of biological systems in recent years. Current advances in biology, genomics, proteomics, cellular level modeling methods, simulation capabilities, new technologies for imaging and measuring biological phenomena and molecular level interfacial characterization tools present the engineering community with unique opportunities to advance the understanding of these biological or even ecological systems to deliver desired functions. Currently the lack of involvement of engineering has hindered the complete understanding of the complex biological systems. Furthermore, there is a need to understand how the desired or additional functionality can eventually be accomplished and integrated over larger scales and complexities from cellular, organism to ecosystem level. Systematic modeling incorporating various engineering concepts such as optimization, database management, control and network formation based on large body of experimental results would lead to complete understanding of the non-linear nature of biological systems. Being an interdisciplinary field between engineering and biology, BioE has a strategic advantage in engineering to address this unique challenge and opportunity.

  Current the faculty members in bioengineering at UCM are experimentally oriented researchers. Modeling expertise at multiple levels is needed to tackle more complex biological projects. This requested multiple-scale modeling position will be at junior (assistant professor) level. This faculty member is expected to collaborate with the current faculty members to link various research areas to study specific biological/physiological problems from system point of view. This position will develop quantitative modeling and simulation methods that faithfully represent the complexity of biological/ physiological systems based on experimental data and deal creatively with the hierarchical and nonlinear nature of living systems. This position will integrative knowledge from various research fields to serve a focal point for faculty members from NS, ME and BIOE to collaborate on projects that cannot be addressed from the view point of a single discipline.

- **Recombinant Sensor Development (SoE 13) –** Recombinant protein sensor development has made tremendous progress in recent years. Various protein sensors that report wide range of physiological and biochemical information inside cells have been created. These protein sensors exhibit many different spectral characteristics depending on the need of the application. The area of recombinant sensor development is, by nature, cross disciplinary in that it employs cell culture methods combined with appropriate organic chemistry, biophysics, molecular biology, genetic

engineering, non-linear optics as well as nano-bioengineering. Moreover, this sensors can be genetically engineered in animals or gene delivered by electroporation or adenoviral transfection.

The Recombinant Sensor Development position could also compliment and synergize with the research of a number of faculty in the areas of Biophysics, Physiological Engineering, Stem Cells, Vascular Tissue Engineering, Nanotechnology, and Microfluidics/Microchip design. We expect that this faculty hire would contribute to our growing graduate program in BEST and Quantitative and Systems Biology Depending the particular area of research, this faculty position could possibly contribute to helping build a Stem Cell Clean Room Facility at UCM. We propose this position to be appointed at senior level (Associate or above).

- **Medical Imaging (SoE 14) -** Recent developments in optical/imaging techniques (such as ultrasound, MRI, PET, CT or IR imaging) clearly indicate the enormous potential of Medical Imaging in clinical applications. The imaging sciences are in the midst of a profound revolution that stems from new and fundamental advances in imaging, tissue engineering, biophysics, physiology and molecular and cellular biology. This is due in large part to the new technology and quantitative approaches developed in the disciplines of chemistry, physics and engineering. Due to its highly multidisciplinary nature, Medical Imaging technology presents a unique opportunity for Engineering at UCM. Our unique campus environment is an ideal location to cultivate Medical Imaging technology. This research area will apply tools in optics, physical chemistry, physics, computer sciences, electronics, nanotechnology and analytical chemistry for medical applications. The development of such technology enables many bioengineering research and clinical applications. Currently, there is no faculty with medical imaging background in BioE program. This proposed new hire will expand the research capacity and course diversity in our program. Medical Imaging research area represents an outstanding opportunity to involve faculty members in natural sciences, optical physics, bioengineering, materials science and engineering, mechanical and electrical engineering/computer sciences in a cross-disciplinary project.

  This position would compliment and synergize with the research of a number of faculty in many areas of research. Therefore, this position compliments the growing needs for graduate programs such as BEST or Quantitative and Systems Biology. It is proposed that this position will be designated at the rank of full professor.

BEST Interdisciplinary and Cross-School FTE Requests - none

BEST Space and Special Equipment Requests – none

Environmental Engineering

EnvE Overview - The San Joaquin Valley has experienced substantial population growth and with it the scarcity of water and deterioration of air quality. Today, the San Joaquin Valley harbors the most polluted air in the United States causing adverse health effects particularly among children and the elderly. Most lakes are gone, rivers have dried up and water diverted from the Sierra Mountains has been channeled into a vast agricultural irrigation system and drinking water supply for the nearby and distant urbanized centers. With climate warming, less and less rain is expected to fall in the mountains, already causing great distress in the Valley. Consequently, there is a great need to research stressors of environmental systems in the Sierra Nevada/San Joaquin Valley and to develop engineering as well as social and policy solutions to restore and maintain the beauty and natural resources of this part of California. Today, California faces challenges of how to sustain and restore natural systems as these stressors – climate change and drought, air pollution, intense agricultural production and population growth – put ever-increasing demands on both the San Joaquin Valley and Sierra Nevada ecosystems.

Environmental engineers and hydrologists within the Environmental Systems graduate program are distinguished from other environmental professionals through their focus on problem solving, design and implementation of technological or management systems. Environmental engineers search for creative and economical ways to use resources efficiently, limit the release of residuals into the environment, develop sensitive techniques to track pollutants once released and find effective methods to remediate spoiled resources. They serve as the vital link between scientific discovery, technological development and the societal need for protecting human health and ecological integrity. In the coming decades, environmental engineers will increasingly be called upon to address broader issues of environmental sustainability by minimizing the release of residuals through altered production processes and choice of materials; by capturing the resource value of wastes through recovery, recycling and reuse; and by managing natural resources to meet competing societal objectives.

Environmental Teaching Programs - The undergraduate major in ***Environmental Engineering (EnvE)*** prepares students for careers in both industry and government agencies concerned with managing water, energy, public health and the environment. The program also provides an excellent foundation for further study in Earth science, engineering, business, management, law and public health. The curriculum provides students with a quantitative understanding of the physical, chemical and biological principles that control air, water and habitat quality and sustainability on Earth, along with expertise in the design, development, implementation and assessment of engineering solutions to environmental problems. The program emphasizes a highly interdisciplinary approach to environmental engineering, combining a strong theoretical foundation with field studies, laboratory experiments and computations. Core courses within the major provide students with a firm foundation in the physical and life sciences and the ways that they apply to energy, hydrology, air and water quality issues.

In addition to serving its majors, the EnvE program provides a large service course for SSHA in terms of EnvE 10 The Environment in Crisis (Gen Ed science and laboratory units for non-science and engineering majors). The program also offers an upper division writing-intensive environmental policy course, EnvE 118 Global Change, which may be modified in the near future to serve as an acceptable substitute for CORE 100.

The ***Environmental Systems (ES)*** graduate program is one of the first and truly interdisciplinary graduate programs jointly with the School of Natural Science (SNS). The program offers individualized, research-based courses of study leading to the M.S. and Ph.D. degrees and is the first and only graduate program at UCM that achieved UC system approval. Through the interdisciplinary ES graduate group, ENVE is affiliated with the Sierra Nevada Research Institute (SNRI), the powerhouse for ecological and environmental research geared towards sustainability of the Sierra Nevada and San Joaquin Valley.

EnvE Research Programs - Environmental engineering graduate research is an integral and complementary part of the interdisciplinary environmental systems program at UC Merced administrated jointly by faculty from the School of Engineering and School of Natural Science. The role of environmental engineering is to connect and translate research into workable environmental engineering solution. Environmental engineering has three main focus areas:

Hydrology - Hydrology focuses on the sources, balance and use of water in both natural and managed environments, including precipitation, mountain snowpack, river runoff, vegetation, water use and groundwater. Both the physical and chemical aspects of the water cycle are included. Water resources are experiencing unprecedented stresses, owing shifts in temperature and precipitation patterns associated with climate change, as well as shifts in land use and land cover in response to growing populations.

Water quality - The water quality area focuses on engineering solutions to water and waste issues, including measurement technology, water quality assessments, treatment systems and remediation of contaminated waters. Physical, chemical and biological aspects are included.

Air Pollution - This focus area investigates solutions to air quality in a regional setting. Air pollution focuses on issues arising from primary emissions within different regions of the United States. Recent

areas of research included: Pittsburgh, Baltimore, and the San Joaquin Valley and its precursor airflow corridors. A key focus is on particulate matter released from primary direct emission point and fugitive sources as well as the atmospheric chemical gas-to-particle conversion added by photochemistry.

S**ustainable Energy -** Current research focuses solutions to energy problems, both regionally and globally. Solar energy research includes the development of medium-temperature solar thermal collectors and a project to initiate the development of a novel cost-effective concentrating photovoltaic system.

Environmental Policy - Policy effect of climate change on wildfires and effect of emission trading systems due to interaction between environmental policies and industry activities.

Environmental Geographical Information System - Application of geospatial techniques in solving large-scale ecological and geographical problems, with emphasis on the effects of invasive species, climate change, and human disturbance on terrestrial ecosystems.

EnvE Goals

1. Grow Research by Focused Investment in Faculty Hires in Key Areas - Similarly to all academic programs at a growing new university that has been hit by this economical depression, the environmental engineering program growth is delayed, resulting in reduced research synergism in key areas that have to overcome in order multiply the impact of the current research endeavors.

2. Obtain ABET accreditation for EnvE Undergraduate Program by 2015 - The growth of our undergraduate program as well as the quality of students is substantially reduced because the program is not ABET-accredited. To achieve the level of breath and depth needed for our environmental program to pass the accreditation hurdle as well as to serve our ES graduate program and conduct world class research, additional faculty are urgently needed that will fill key gaps in expertise and research. As soon as the environmental engineering program is accredited, more and better prepared students will join our program that would otherwise not come given the professional implications of having an undergraduate engineering degree from a not accredited institution.

3. Enhance interdisciplinary and cross-disciplinary research initiatives - The graduate program, ES, environmental engineering faculty are associated with is truly cutting across disciplines, including SNS and SSH. The ES program is highly link with research and academic activities under the umbrella of SNRI. Already several EnvE faculty are partners in the UC Merced Energy Research Institute (MERI). The Health Science Research Institute (HSRI) was founded in 2009 and is expected to involve faculty members across many disciplines, including EnvE. O thers are associated with the UC Merced Spatial Analysis and Research Center. As the university grows in faculty numbers, diversity, capabilities, and space, more cross-disciplinary research initiatives will natural follow. Here, the metric of success will be measured by (a) faculty linkage and number of interdisciplinary research that otherwise could not have been obtained, and (b) total competitive research funding of these centers and initiatives.

4. Maintain high-level of research productivity - Scholarly productivity is a key outcome measure together with national and international reputations of our faculty researchers. To fuel further high level of research productivity, potential research links that are currently not available due to the missing expertise have to be filled with strategic faculty hires.

5. Develop Civil and Sustainability Engineering - The world is changing quickly. Already, with the global challenges of climate change, population growth, and diminishing resources, the need emerges to face these challenges and develop new sustainable technology, housing, materials, transportation systems, and energy systems. To face these challenges, civil engineers with a deep conviction towards sustainability have to be educated, providing the SoE at UCM with a great potential of building an undergraduate program in civil/sustainability engineering. To have a viable Civil engineering undergraduate program, at least three focus areas are needed. Here at UC Merced, we already have environmental engineering and hydrology. What is needed to complete a viable undergraduate program is hires in the areas of sustainable structures, building materials, and transportation systems.

ENVE Outcome Metrics

3.1. Research Assessment

- Funding increase
- Funded and unfunded graduate research projects
- Graduate degree production increase
- Number of publications in peer reviewed journals and journal impact factor

3.2. Education Assessment

- Substantial enrollment increase (comparably staffed Civil & Environmental Engineering programs nationwide are roughly double the size of the current Environmental Engineering program).
- The EnvE program assessment plan includes continual course and program level assessment vehicles culminating in a periodic self-evaluation and review by the Accreditation Board for Engineering and Technology (ABET).
- Number of undergraduate students participating in research.
- Number of doctorial students and graduation rates.
- Number of woman, minority and U.S. citizen graduate applicants.

EnvE Current Academic Resources – Six full professor (2 of which have full administrative appointments), one associate professor, and four assistant professors (2 of which have 0.5 appointments in SoE), for a total count of 7 FTE. This group occupies wet and dry lab research space in SE 1.

EnvE Resource Requirements 2010 – 2015 – In the short term, two more faculty members (ecological engineering, air pollution modeling) would greatly assist the EnvE program as it moves toward ABET accreditation and would also better position the EnvE and Environmental System group to compete for interdicisplinary research projects. Several other faculty lines shared with the management program efforts would also help to initiate the sustainability effort discussed below. Appropriate space allocation (both we and dry lab) will be beneficial for the recruiting of these additional faculty members.

EnvE Envisioned Program by 2020 – We envision that EnvE program (by then, the Civil & Sustainability Engineering) will have 10-12 faculty members (including split appointments). The number of undergraduate program will be around 150-200. We expect to have 60-80 graduate students in the ES program.

ENVE Resources Requirements 2010 – 2015 – Critical academic resource requests are based on (1) need to obtain critical faculty numbers to achieve ABET accreditation, (2) continued build up of research capacity in existing research areas, and (3) responding to global challenges, sustainability engineering faculty is needed to respond to novel research needs and societal demands.

ENVE Academic Resources (FTEs) Request - For the next 5 plus years, environmental engineering group has two areas of need: (1) filling gaps that currently limit the teaching and research, and (2) expand into sustainable engineering/civil engineering. Given the limited space and resources available for the next years due to the recession, the priority has been placed on filling gaps in our existing research and teaching programs and delay the buildup of sustainable engineering until 2015. The top four priorities of FTE positions for 2010-13 are as follows:

- **Ecological Engineering or Ecohydrology (SoE-9) -** We recommend an assistant or associate level search for a faculty member who uses engineering principles to design **sustainable systems that integrate human activities with the natural environment**, with particular emphasis on the linkage between hydrologic and ecological systems. Possible areas of research emphasis include interactions among hydrologic, biogeochemical, physiological, and soil processes; hydrologic

ecosystem services, integrating water quality, water cycling; spatial analysis and scaling. Use of remote sensing, field-based measurements, laboratory experiments and modeling are all of interest. As a discipline, ecohydrology addresses the bi-directional regulation of hydrologic and ecological processes, e.g., the flow regime and pollutant levels of water in wetlands regulate the species and the populations that live in the ecosystem, while ecological processes in the wetland regulate the timing and magnitude of water and nutrient fluxes through the system. Ecological engineering involves the design, construction, restoration and management of aquatic and terrestrial ecosystems that have value to both humans and the environment, using principles from engineering, ecology, economics, and natural sciences. The extensive and large-scale ecosystem restoration efforts planned in the Central Valley provide excellent opportunities for both natural laboratories, and research support through applications partnerships with local landowners and conservation entities. Similar efforts are being carried out across the Western U.S. This position would have collaborative opportunities and synergy with Campbell, Bales, Conklin, Harmon, Guo in SoE and Aguilar, Dayrat, Keepers, O'Day, Traina in SoNS.

- **Air Pollution Modeling, Management and Control (SoE-7) -** We recommend an assistant or associate professor position, preferably someone with both a management and technology focus in the area of air quality engineering. A background in mechanical engineering is desirable. This position could focus on engineering design of systems, technology for air pollution control, or modeling and impacts of air pollution. California's Central Valley offers an excellent natural laboratory for research to devise air pollution control systems. Organic and inorganic particulates, persistent organic pollutants, and precursor gases for ozone formation are produced during routine agricultural practices and weekday commutes. These pollutants are lofted into the atmosphere to interact with other chemicals or microbes and are eventually deposited in the respiratory systems of humans and animals, as well as on plant leaves. The resulting effects on human and ecosystem health are devastating. A significant air pollution-related research effort aimed at the understanding and mitigating the escalating air quality problems in the Central Valley, Sierra Nevada, and elsewhere has already been initiated in the Environmental Systems graduate group. This new position could also be helpful in understanding the effects of air quality on climate and of climate policy on air quality. This position is central to our developing strength in the air pollution area, and is an excellent complement to research by Rogge, Traina, Westerling.
- **Environmental Biotechnology (SoE 11) -** We recommend an assistant or associate professor position who has extensive experience in urban and agricultural wastewater treatment, advanced treatment techniques, remediation, and expertise in toxicology. This person could also contribute to environmental bioengineering. The San Joaquin Valley is one of the fastest growing areas within the US and likewise harbors the most intensive agricultural industry in the Nation. Consequently, not only the quantity of water is an issue, but also the quality of water for households, crops growing and animal husbandry in large concentrated animal feeding operations. A great portion of the wastewater produced during agricultural activities is more or less released to the environment with little or no treatment.

ENVE Cross-School FTE Requests

- **Natural resource management** (**Cross 2**) **-** It is recommended that a tenured faculty member at the full or associate professor level be hired in this area. It is expected that this person would help lead the planning for a natural resources management track within the proposed management program and eventual School of Management. A research emphasis on water, forest, or range would complement existing faculty and help fill an important niche in the UC system. This person could also contribute to planning for a Center for Spatial Analysis that is being investigated by faculty in SoE and SSHA, contribute to developing a Geography degree at UCM, and contribute to refocusing of the Earth Systems Science degree in the School of Natural

Sciences. At the graduate level, a number of discussions have taken place around starting a program in Public Lands Management, with linkages to the NPS, USFS and other land-management agencies; and this person could also anchor that program. This position should complement Hart, who has some expertise in this area, having been on the faculty in natural resource programs for 19 years before coming to UCM; Hull, who has 20 years experience in cultural resource management, and potentially UCM's World Heritage program.

Materials Science and Engineering

Materials Science and Engineering (MSE) applies fundamental principles of physics and chemistry to designing materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical and other properties. Increasingly, innovative materials are being developed with the benefit of lessons that have been learned from nature. Examples include armor based on the structure of abalone shells and rats' teeth, optical materials that owe a debt to sea urchin spines and peacock feathers, high-performance ballistic fibers modeled on spider silk, self-cleaning surfaces copied from lotus leaves, and strong, reusable adhesives that emulate the behavior of gecko feet. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall cost of the ingredients and processes used to produce particular materials, the effects of the environment on materials, the effects of materials and materials processing on the environment, and characterization of materials structure and properties. Because MSE embraces skills from physics, chemistry, mathematics and biology, it is especially appealing to anyone who enjoys interdisciplinary studies and who seeks to apply such knowledge to solving practical engineering problems.

Energy and sustainability have both been identified as leading research priorities for the School of Engineering and the UC Merced campus, while plans are underway to consolidate the SOE undergraduate curriculum to offer a more streamlined set of courses at the undergraduate level and expand course offerings at the graduate level. Strategic planning for MSE is focused on 1) building critical materials expertise into the energy and sustainability research themes of UC Merced, and on 2) supporting instructional programs *across SOE* and *the campus* at the undergraduate and graduate levels.

Energy and Sustainability Materials Research - Rising industrialization of developing countries in response to economic globalization since the late 1980s and population growth have contributed greatly to an unsustainable demand for energy and raw materials for manufacturing. China, in particular, is on track to become the top manufacturing nation in the world by 2020, and by some estimates has already become the world's second largest economy after the United States. This manufacturing capacity, initially spurred by export demand, is increasingly geared towards meeting the internal demands of a rising middle class in a nation in excess of 1.3 billion people.

Among the plethora of possibilities for materials research in energy and sustainability that exist, some key areas that are synergistic with present efforts by other disciplines in SOE and across campus have been identified for development within MSE over the next 5-10 years. These include 1) energy materials, 2) sustainable manufacturing, and 3) sustainable building.

Energy Materials - Although energy materials research has many disciplines that contribute to it, the relationship between structure-properties-processing-application is a special focus of Materials Science and Engineering that gives it a strong engineering design component that is particularly relevant to the energy industry where many new technologies have not been adopted due to cost, processing, maintenance or other engineering constraints. Tto leverage the existing strength of UC Merced in non-imaging solar optics and other energy conversion technologies involving high temperature processes, as well as in nanotechnology, we propose to focus faculty hires in the areas of high temperature materials (relevant to receiver materials for high-temperature solar concentrators and solid-oxide fuel cells), nano-enabled energy technologies, and modeling of processing pathways for the synthesis of new metastable energy materials. The first two areas are experimental in nature, but have only modest dry laboratory

space needs due to our ability to leverage existing shared resources in nanofabrication and characterization. The third area is theoretical in nature and only requires computational resources that are available through shared faculty computer clusters on campus or national computational facilities.

MSE at UC Merced already has a primary research thrust in energy materials, however at present there are only 3.4 faculty in MSE (one faculty member, Christopher Viney, has administrative responsibilities as the Vice-Provost for Undergraduate Education and as the Dean of College One). Jennifer Lu studies the synthesis of carbon nanotubes and other nanostructures and nanomaterial-based composites for photovoltaic , battery, and energy-scavenging applications. Lilian Davila models the structure of silicates to understand and predict their properties, and her results have been applied to studying diffusion in 17 silica zeolites (applicable to sequestration of nuclear waste) using computer simulations and thermochemistry data, failure mechanisms of optical lenses at the National Ignition Facility at LLNL (nuclear fusion studies), and silica nanowires (hydrogen and energy storage, biological and chemical sensing with NEMS). Christopher Viney's research fits into the broad concept of energy materials and sustainability, in that bioinspired materials guide us towards efficient, sustainable use of matter and energy through environmental benign processing routes. Valerie Leppert specializes in materials characterization in the electron microscope, which is pertinent to all fields of energy materials research.

Sustainable Manufacturing - Sustainable Manufacturing seeks long-term alternative technologies, processes, materials, chemicals, and/or products so as to reduce pollution and waste, and create sustainable solutions. Its practice requires expertise in environmental regulations, recycling, life-cycle assessment, economic analysis, green chemistry and toxicology. Sustainable Manufacturing practice is rapidly becoming a necessity for companies engaged in manufacturing and several programs have recently begun cropping up around the country to meet industrial demand for training in this emerging field. Since the field is just developing, there is an opportunity at UC Merced to create a competitive research program in Sustainable Manufacturing that leverages the Sierra Nevada Research Institute and existing research and instructional programs in Environmental Systems, Biological Engineering and Small-Scale Technologies, Mechanical Engineering and Applied Mechanics, Computer Science and Quantitative Systems Biology, as well as the nascent School of Management.

To build a sustainable manufacturing program, expertise is needed in <u>life cycle and cost-benefit analysis of materials and manufacturing processes</u>, and <u>modeling of synthesis routes (often bio- or geo-inspired) to new metastable materials that reduce the use of energy and rare metals</u>. Both areas of research are computational in nature and have modest space and resource needs that can be met by shared faculty computer clusters or national computational facilities.

Sustainable Building - Sustainable building is an emerging area of interest for resource conservation, with a growing number of government agencies offering incentives for its practice. In addition, sustainable building is one of two research areas for the FY2010 Emerging Frontiers in Research and Innovation (EFRI) research program funded by the National Science Foundation. (The EFRI program was established by the Directorate for Engineering at NSF to focus on important emerging areas of research in a timely manner.) Green building materials are an important component of sustainable building practices that offer reduced construction costs, reduced maintenance and replacement costs over the life of the building, energy conservation, improved occupant health and productivity, and lower costs due to flexibility in design for specific occupants. The research emphases described above for sustainable manufacturing and energy materials can also contribute to a sustainable building focus in MSE. For example, a faculty with expertise in material lifecycle and cost-benefit analysis can contribute analysis of the resource efficiency of proposed green materials, while expertise in energy materials can contribute to the identification and development of cost-effective methods of conserving or harvesting energy in buildings. In addition, we would like to <u>build expertise in structural materials with MSE</u> to further the development of new green building materials that reduce the use of nonrenewable resources and environmental degradation. This position can be computational in nature or requiring only modest dry laboratory space due to shared materials synthesis and characterization equipment in MSE.

MSE Support of Instructional Programs - The 3.4 faculty allocated to Materials Science and Engineering have designed an efficient curriculum with five required MSE courses for undergraduate MSE students that allows the program to still make a significant contribution to several instructional programs in engineering and across campus.

In additions to serving their major and the BEST graduate program, the MSE faculty is making extensive contributions to engineering as a whole and general education. With consolidation of the undergraduate engineering curriculum in order to offer an ABET accredited General Engineering degree with specialist tracks and further streamlining of courses for the MSE major, it is expected that contributions to programs outside of MSE and the BEST graduate program will increase. Only two courses (MSE-111 and MSE-119), each offered every two years, will exclusively serve MSE majors in the future (this represents 1/7 of the MSE teaching capacity each year). Every other course offered by MSE will satisfy requirements for engineering students in other majors or in the general engineering program. MSE-111 is needed for the BEST graduate program, because graduate students for BEST are drawn from diverse disciplines and need some training in materials processing via the graduate cross-listed course for MSE-111, BEST-211 (CRF to be submitted to GRC). MSE-119, with a focus on modeling of mechanical properties, may additionally be of interest to other majors. MSE faculty will continue to contribute to General Education.

Outcome Metrics

Resources Requirements

Academic resource requests for MSE are based on the discipline's contribution to energy and sustainability research themes at UC Merced, its contribution to instructional programs across SOE and general education, its undergraduate and graduate teaching needs, and its contribution to student recruitment and retention through the COINS undergraduate research program (described above).

MSE Academic Resources (FTE) requests

- **Energy Materials (SoE-3) -** We are requesting an FTE at the Junior/Senior level to be housed in MSE for High Temperature Energy Materials, specifically ceramic materials, as priority for Year 1. This person will contribute to research efforts in energy conversion technologies (e.g. receiver materials for solar concentrators and solid oxide fuel cells) and secondarily, to a possible future program in sustainable building. He or she can also contribute to MSE, Engineering, and General Education instructional responsibilities as detailed in MSE's 5 year strategic plan. This position (the only experimental one that MSE is requesting over the next 3 years) has modest dry laboratory space needs and start-up costs due to shared characterization facilities (DTA, DSC, AFM, XRD, TEM, SEM). The only major experimental need is likely to be for high and mid temperature furnaces for synthesis and processing that can be accommodated on laboratory benches and venting to the hood exhaust system (this equipment does not need to be placed in a hood, it only requires hook-up to the hood ventilation system). Space needs and start-up costs are detailed in the SOE FTE request table.
- **MSE-6: Computational Materials (SoE 12) -** An FTE in computational materials at the Junior/Senior level, centered on modeling of metastable materials processing is requested as a priority in Year 3. This hire would contribute to ongoing efforts in energy and sustainability through the design of new materials for energy and replacement materials for manufacturing/building sustainability. Modeling assists the development of new materials through identifying efficacious metastable pathways for materials synthesis and processing that may be inspired by nature, as well as identifying new processing techniques that can be used to improve the recyclability of materials (pressure fabrication of hard plastics vs. thermosetting that allows recycling of hard plastics, for example). There are also collaborative opportunities with cognitive science that explore the use of materials visualization for materials teaching and

learning. Since this is a computations position no experimental laboratory space is needed (only space to house computers and researchers). Start-up costs are minimal, with shared computer clusters or national computational facilities available. Specific space needs and start up costs are detailed in the SOE FTE request table.

- **Sustainable Manufacturing Management (Cross 3)-** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow the establishment of a Sustainable Manufacturing Management program (described in more detail in the 5 year strategic plan) that can leverage existing courses across multiple instructional programs. This leadership position requires a tenured faculty member at the full or associate professor level. Appropriate disciplinary backgrounds for this position include industrial engineering, engineering economics, management and/or economics, environmental engineering, or materials engineering. A research emphasis on lifecycle and/or cost-benefit analysis would complement existing faculty expertise in the Schools of Engineering and Natural Sciences. The ideal candidate would have a proven track record in connecting engineering economic analysis to research in environmental systems, toxicology, or materials engineering, as well as the social science and policy aspects of sustainable manufacturing. The space and start-up needs for this position are modest, as it is theoretical in nature. Specific needs are detailed in the SOE FTE request table.

MSE Cross-School FTE Requests

- **Technology Management (Cross 5) -** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow establishment of a Technology Management program that can leverage existing courses across multiple instructional programs in Engineering and Natural Sciences.

Mechanical Engineering

Overview – The Mechanical Engineering faculty at UCM are affiliated primarily with the **Mechanical Engineering and Applied Mathematics** (**MEAM**), but several ME faculty are also affiliated with the BEST, and ES graduate programs. The ME faculty are dedicated to the education of a new generation of mechanics researchers, applied mathematicians and/or researchers of ME-related areas who aim to master the fundamentals of the mechanical sciences (which include disciplines such as continuum mechanics, rheology, fluid mechanics, heat and mass transfer, energy conversion, etc.) while being exposed to the forefront of research techniques, methodologies and equipment to solve problems that are relevant to modern society (green energy, mechanical modeling and synthesis, robotics and mechatronics, control systems, etc.).

Mission Statement - The mission of the MEAM program at UC Merced is to provide a modern, comprehensive, and interdisciplinary educational experience to its students with the objective of preparing them for successful careers in the current and dynamically changing professional environment. To achieve this mission, the MEAM program strives to accomplish the following educational objectives:

Program Educational Objectives

1. To provide a solid background on the pertinent mathematical, physical, chemical and engineering concepts that make up the foundations of the broad disciplines of mechanical engineering and applied mechanics, as well as on their closely associated fields;

2. To provide our students with the knowledge to correctly apply natural laws to the creative formulation and solution of engineering problems through the use of analytical, computational and experimental techniques;
3. To expand the reach of research in mechanical engineering and applied mechanics to non-traditional areas by continually seeking to incorporate new methodologies and research findings to our graduate curriculum.

Research

Mechanical Engineering and Applied Mechanics represent two distinctive but overlapping research areas that together form some of the most fundamental pillars of the academic enterprise. While the various disciplines that compose the field of Applied Mechanics are associated with rigorous and rapidly developing branches of human thought, Mechanical Engineering is currently undergoing a fundamental transformation at several distinct levels. At the design level, computer aided engineering and fast prototyping automated tools are revolutionizing the way new products are conceptualized, evaluated and deployed into the market. At a more fundamental level, computational methods that are based on judicious use of advanced concepts in Applied Mechanics (including stochastic evolutionary methods, uncertainty analysis, artificial cognition, etc.) have expanded the portfolio of research methodologies much beyond the usual designer-based experience. Today, Mechanical Engineering is evolving into a discipline where more emphasis is placed on teaching a machine how to design, other than using the machine to optimize a pre-selected design. In other words, instead of using the engineering methodology to optimize a pre-existing concept, MEAM research is transitioning to a new paradigm where only the goals and constraints of the object are known to the designer, and a stochastic algorithm uses a variety of advanced computational methods to explore the complete space of solutions that satisfy the goals and constraints of the problem at hand.

The MEAM group at UC Merced emphasizes this new approach to Mechanical Engineering, and therefore is unique among all UC campuses in placing a much higher emphasis on advanced computational methods. Formed in August of 2007, the MEAM group is composed of eleven faculty members from various disciplines, including Mechanical Engineering, Electrical Engineering, Physics, Applied Mathematics and Computer Science and Engineering.

3.3. **Research Themes of MEAM Program -** As mentioned above, there are many exciting research opportunities within the context of the MEAM program, and we have prioritized research areas that would better complement and add value to the overall research and educational mission of UC Merced. The chosen research themes also add a unique flavor to our program not only within the UC system, but also in comparison to other programs in the nation. The MEAM program will initially focus on two major themes, which are described below.

Energy Systems (I)— Mechanical engineering is a core discipline for the development of energy conversion technologies, and the MEAM program at UC Merced is well poised to take the lead on the renewable energy initiative in our campus. Professors Winston, Sun, Coimbra, and Diaz have all established track records in research funding in the energy research area. There is very strong synergy between the MEAM graduate program and the Merced Energy Research Institute (MERI), as well as with UC CITRIS (Center for Information Technology Research in the Interest of Society) and the new CITRIS initiative C-GRACE (CITRIS Global Research Alliance for Climate and Energy). Within the Energy Systems theme, the main areas of activities of the MEAM program include: solar concentrators, solar availability mapping, renewable fuel conversion, fuel cell technology, concentrator controls, direct solar conversion, and solar power applications to environmental health monitoring. The MEAM program has several overlapping research projects with other graduate groups within the energy systems theme, including Environmental Systems (ES) and Electrical Engineering and Computer Science (EECS). The MEAM faculty has been very successful in attracting sizeable research grants in this area.

In the next five years, we would like to build a strong focus on energy research, and shall explore the research topics including solar energy, wind energy, building efficiency, building energy sensor network, and energy storage technologies.

Biologically Inspired Technologies (II) — Although one of the primary goals of this MEAM research theme is in the development of advanced computational methodology, there is important synergy with experimental methods in bio-controls, mechatronics, multi-scale material properties, and complex fluids that will enable the maturation of this area into a new paradigm of engineering design. A strong computational component on novel genotype optimization methods will allow us to explore bio-inspired solutions beyond the traditional bio-mimetic approach. However, it is the concurrent and parallel experimental development of advanced materials (and the associated understanding of complex constitutive relations) that will enable the development of a full spectrum of engineering solutions for complex problems for engineered materials (as opposed to biological materials). An important component of the MEAM strategic plan is to build critical mass in this research theme. There is a very good opportunity for future collaboration between several graduate programs at UC Merced in this area, including Biological Engineering and Small Technologies (BEST), Electrical Engineering and Computer Science (EECS), Quantitative and Systems Biology (QSB), and Applied Mathematics (AM).

The two research themes above reflect a sensible compromise between depth, breadth, impact and quality of MEAM research. Equally relevant is our effort to combine the needs of the very popular undergraduate program in Mechanical Engineering with the development of a strong research program in MEAM.

Synergistic Growth with ME Undergraduate Program - The mechanical engineering (ME) undergraduate major was launched during Fall 2006 accepting only freshman students. The plan was to start accepting transfer students only in the Fall 2008. However, a large number of current upper division students at UC Merced have approached ME faculty or the engineering student counselors to explore the possibility of transferring to the ME major before they complete their degree. By now, ME has become one of the most popular engineering majors at UC Merced. In Fall 2009, we had 176 ME students, the largest group among all the majors in Engineering, with only five faculty. ME also has currently the largest student-to-faculty ratio in the SoE by a large margin.

To evolve into a top ME program, it is absolutely necessary to develop a strong and comprehensive foundation in key areas, with a sufficient number of faculty to build a modern program with state-of-the-art research infrastructure. In addition, because ME is a key component of any modern engineering academic program in serving key and foundational needs for many engineering sub-disciplines. Delaying the hiring of ME faculty will dramatically constrain the growth of our engineering program and could significantly impair the image and reputation of the ME program and the School of Engineering as a whole.

Currently, ME provides service to other majors by teaching a number of engineering fundamentals courses that include: ENGR 57 (Dynamics), ENGR 151 (Strength of Materials), ENGR 130 (Thermodynamics), ENGR 135 (Heat Transfer), and others. This situation increases dramatically the teaching load of ME faculty.

From the outset, there was a concerted effort to provide a seamless experience to SOE undergraduate students interested in pursuing post-graduate education in the MEAM program. The MEAM program offers research opportunities for students interested in projects at the interface between Complex Analysis, Mechanics, Manufacturing, Bio-Inspired Engineering, Applied Computational Sciences, Mechatronics, Advanced Materials, Energy Conversion, and Controls. Due to the interdisciplinary nature of the topics covered in MEAM courses, a number of these courses serve graduate students from many different disciplines. This also increases the teaching load of ME/MEAM faculty. For instance, in the

past the following courses were populated by graduate students from other programs: ME 135/ES 235 (Heat Transfer), MEAM 201 (Advanced Dynamics), ME 210 (Linear Controls), and MEAM 251/ES 237 Viscous Flows.

There are currently five FTE positions filled in mechanical engineering (listed here in order of hiring): Professor Diaz, Professor Coimbra, Professor Sun, Professor Modest and Professor Ma. The expertise of the current faculty covers a relatively unbalanced portion of the overall research area in Mechanical Engineering and Applied Mechanics since 4 out of the 5 faculty hired have main expertise in Thermofluids, and only one faculty (Prof. Sun) has expertise on Solid Mechanics.

Outcome Metrics

Resources Requirements - For the next five years, a total of ten desired positions have been identified and described below in descending level of priority for both the ME and the MEAM programs):

1) Computational Engineering (I and II)
2) Energy Storage Technologies (I)
3) Mechatronics (I and II)
4) Buildings Energy Efficiency (I)
5) Nonlinear Analysis (I and II)
6) Bio-Controls (II)
7) Bio-Inspired Mechanics (II)
8) Computational Fluid Dynamics (I and II)
9) Turbulence (I and II)
10) Complex Systems (I and II)

In addition, four instructors will be needed to cover the engineering fundamentals and capstone design.

For AY 2010-2013, the program is requesting ***three lecturers*** **(SoE-LPSoE-2, SoE-LPSoE-4, SoE-LPSoE-5)**. Two will concentrate on the engineering fundamentals (ENGR) courses that serve all programs in the SOE, and the other on ME electives that may serve BIOE, ES, ME, MSE and CSE students. The final lecturer will help faculty to develop and deliver the capstone and other design-related courses.

The top three priorities of regular faculty FTE positions for 2010-13 are as follows:

- **Computational Engineering with emphasis on Stochastic Optimization (SoE-5) -** This senior/junior position is an important and strategic area of research in ME. It will cover, but will not be limited to, development of numerical schemes to treat problems in structural, thermal-fluids and energy systems. It can relate to parallel computing and high performance algorithm development applied to engineering problems. The undergraduate program in Mechanical Engineering will benefit with courses such as FEA and CAE. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.
- **Energy Storage Technologies including Turbulence Modeling (SoE-2) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, design and analysis of energy storage devices, thermal fluids, turbulence, and high temperature mechanics of materials. The undergraduate program in Mechanical Engineering will benefit with courses such as strength of materials, and the capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Material Science, Computer Science and Engineering, and Applied Mathematics.

- **Mechatronics (SoE-8) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, dynamics, control systems, and sensor network and optimization with an emphasis on applications to building energy efficiency. The undergraduate ME program will benefit with courses such as dynamics, vibration and control, and capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.

Resource Needs for MEAM and ME Programs

There is a minimum number of specialized faculty members required to deliver a comprehensive program such as Mechanical Engineering in parallel to a successful graduate program in MEAM. Although we are falling short of the projected need for FTEs, an even more pressing problem is space allocation for both instructional and research use. The ME/MEAM faculty believe that the instructional laboratory allocation to ME-lead classes is insufficient for achieving success in the accreditation process with ABET.

Core Facilities - Both the MEAM research program and the ME instructional program need adequate lab space and machine shop support to exist. The current machine shop is not supported at a level that will allow Capstone Design and MEAM research programs. This limitation will severely impact the ability of the ME program to be ABET accredited in the coming years. All ME faculty members, in collaboration with the SOE staff, have been actively involved in extracting the most out of the limited instructional lab space available to deliver the ME classes. However, even considering the best use of the instructional labs (which include rotating schedules, sharing of the labs by several different disciplines, and modular educational benches that are put aside after use) it is very clear that the currently available space will not withstand ABET scrutiny. The same is true with the machine shop support.

The MEAM needs in terms of space include extra 5,000 sf laboratory space beyond what is available now for ME faculty at the SE building, of which about 2,000 sf need to be “damp” lab space. Given our emphasis on computational methods, this need is rather modest in comparison to other graduate programs, but it is critical for us in order to attract the few experimentalists needed for reaching critical mass in both energy systems and bio-inspired technologies.

Appendix 1: **Requested FTEs, Year 1 of 3-year Plan, AY 2010-2011**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Systems	Junior/Senior	CSE	ME	EECS	MEAM/ES	$200k-300k	400-800 sq ft dry	
1	Energy Storage Technologies	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Energy Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Contribute to MERI (high T materials, energy harvesting, catalysis) - existing materials characterization resources can be leveraged to bring down the cost of the start-up package
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	SoE-LPSOE-1	EECS Lecturer[1]	EECS					office	
1	SoE-LPSOE-2	Fundamentals Lecturer	ENGR					office	
1	SoE-LPSOE-3	EECS Lecturer	EECS					office	

[1]A candidate for SoE-LPSoE 1 is currently under consideration.

Appendix 1: **Requested FTEs, Year 2 of 3-year Plan, AY 2011-2012**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Science Theory	Junior/Senior	CSE	Applied Math	EECS	Applied Math	$150-250k	400 sq ft students office	
1	Air Pollution Modeling, Management, & Control	Junior/Senior	ME or ENVE	Management	ES	ME	$150-250K	400-800 sq ft	Possible use of GIS & computer cluster facility
1	Mechatronics	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Ecological Engineering	Junior/Senior	BioE	ENVE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	Possible use of GIS & computer cluster facility
1	SoE-LPSOE-4	Lab/Design Lecturer	ENGR					office	
1	SoE-LPSOE-5	Fundamentals Lecturer	ENGR					office	

Appendix 1: **Requested FTEs, Year 3 of 3-year Plan, AY 2012-2013**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Intelligent & Adaptive Control	Junior/Senior	CSE	ME	EECS	MEAM	$100-200k	400-800 sq ft dry	
1	Environmental Biotechnology	Junior/Senior	ENVE	BioE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	
1	Computational Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Computational - modeling of metastable materials processing/materials properties - ties to MERI and cognitive science (materials visualization for learning/research)
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Recombinant Sensor Development	Senior	BioE		BEST	EECS	$250-$350K	office	
1	Medical Imaging	Senior	Bio		BEST	EECS	$250-$350K	office	

Appendix 1: Requested Cross-unit FTEs, Year 1 of 3-year Plan, AY 2010-2011

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Information Management	Junior/Senior	CSE	Management	EECS		$100-200k	400 sq ft dry	fills need for databases knowledge in CSE while providing engineering expertise to management program
1	Natural Resource Management	Junior/Senior	Management, ENVE, ES	Management, ENVE, ES	ES	SCS	$200-300K	800-1,000 sq ft	Possible use of GIS & computer cluster facility
1	Sustainable Building/ Manufacturing Management	Junior/Senior	Management	MSE/ME/ ENVE/BioE	BEST	MEAM/ES	$150K	250-500 sq ft	Economic Modeling - Primarily Computational - Lifecycle and Cost Benefit Analysis of Green Manufacturing - Contribute to development of management program and possible engineering economics or management program..

Appendix 1: Requested Cross-unit FTEs, Year 2 of 3-year Plan, AY 2011-2012

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Virtual Environments	Junior/Senior	CSE	Cognitive Science	EECS	Cognitive Science & Information Systems	$200-300k	400-800 sq ft dry	could contribute to interdisciplinary program in computer game design
1	Technology Management	Junior/Senior	Management	MSE/ME BioE	BEST	MEAM BioE	$150K	250-500 sq ft	Management of Intellectual Property - Contribute to development of management program and possible engineering economics or management program.
1	Media Arts & Technology	Junior/Senior	EECS	CIS/World Cultures	EECS	World Cultures/ Art	$100K	250-500 sq ft	

Appendix 2: **Majors and Graduate Group**

Name	Established or Planned Start Date	Number of Majors (08-09)[1,2]	Student Credit Hours (08-09)[2]	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Environmental Engineering	Established	51	524	8.0 FTE Bales, Campbell, Chen (0.5),Conklin, Harmon, Guo, Rogge, Westerling(0.5), Wright		
Computer Science & Engineering	Established	152	1661	6.5 FTE Carpin, Carreira, Cerpa, Kallmann, Newsam, Noelle(0.5), Yang	1 LPSOE 1 EECS Senior/Junior	
Bioengineering	Established	104	951	3 FTE Chin, Escobar, McCloskey	1 Bioengineering	
Mechanical Engineering	Established	121	1257	5 FTE Coimbra, Diaz, Modest, Ma, Sun		
Material Science Engineering	Established	16	140	3.4 Davila, Leppert, Lu, Viney (40% Eng)		

[1]Undecided Engineering = 49
[2] Data Source: Institutional Planning & Analysis Office

Appendix 3: **Future Space Needs**

	Position	Primary Major	Office Location	Offices needed	Theoretical/ Experimental	Research Space Location	Research Space (sq ft)	
2010-11							**Dry**	**Wet**
SoE-1	Computer Systems	EECS	Campus	1	Theoretical	Campus	600	
SoE-2	Energy Storage Technology	ME	Campus	1	Theoretical/Experi	Campus	400	
SoE-3	Energy Materials	MSE	Campus	1	Theoretical/Experi	Campus	400	
SoE-4	Physiological Modeling	BioE	Campus	1	Theoretical	Campus	400	
SoE-5	Stochastic Modeling	ME	Campus	1	Theoretical	Campus	400	
SoE-LPSOE1	EECS Lecturer	EECS	Campus	1				
SoE-LPSOE2	Fundamentals Lecturer	ENGR	Campus	1				
SoE-LPSOE3	EECS Lecturer	EECS	Campus	1				
2011-12								
SoE-6	Computer Science Theory	EECS	Campus	1	Theoretical	Campus	400	
SoE-7	Air Pollution Modeling	ME/ENVE	Campus	1	Theoretical/Experi	Campus	600	
SoE-8	Mechatronics	ME	Campus	1	Theoretical	Campus	400	400
SoE-9	Ecological Engineering	BioE	Campus	1	Theoretical/Experi	Campus	400	
SoE-LPSOE4	Lab/Design Lecturer	ENGR	Campus	1				
SoE-LPSOE5	Fundamentals Lecturer	ENGR	Campus	1				
2012-13								
SoE-10	Intelligent & Adaptive Control	EECS	Campus	1	Theoretical	Campus	600	
SoE-11	Environmental Biotechnology	ENVE	Campus	1	Theoretical/Experi	Campus	300	700
SoE-12	Computational Materials	MSE	Campus	1	Theoretical	Campus	400	
SoE-13	Biosensor Development	BioE	Campus	1	Theoretical/Experi	Campus	-	-
SoE-14	Medical Imaging	BioE	Campus	1	Theoretical/Experi	Campus	-	-
Total Research Space needed							5,300	1,100
Total Office Space needed				19				
Space already allocated to ENGR				7			1,500	1,100
Space Need				12			3,800	0

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April 2, 2010

TO: Keith Alley, Executive Vice Chancellor and Provost

FROM: Maria Pallavicini, Dean, School of Natural Sciences MP

RE: School of Natural Sciences, 2011-2013 Strategic Plan

Attached please find the Strategic Plan for the School of Natural Sciences. The plan was approved by a vote by the Natural Sciences faculty on April 1, 2010. The vote tally is as follows:

29 Approved
1 Disapproved
1 Abstained (dean)

Appendix 1: **Table of Requested FTEs Year 1 of 3-year plan**
AY 2010-2011

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Applied Mathematics	Assistant	Applied Math		Applied Math		$250K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Biostatistics	Open	Biological Sciences	Applied Math	QSB	Applied Math / Env. Systems	$350-450K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Ecology	Full	Earth Systems Science	Biological Sciences	ES	QSB	$550K	Office + 900-1,000 sq ft wet/dry lab	Castle – in bldg 1201 suite 1300
1	Experimental or theoretical physicst[2]	Assistant	Physics	Biological Sciences	Chem / Physics	QSB	$500-$600K	Office + 900 sq ft if experimental	Exp. SE1–353 Theor. SE1-377
1	Molecular Biology	Full/Open[3]	Biological Sciences		QSB		$500 – 600K	Office + 600-800 sq ft lab	SE1 – 353
1	Organic Chemistry	Assistant	Chemistry		Chemistry/Physics	QSB	$600 - $700 K	Office + 600 - 800 sq ft lab	SE1 - 353

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes Social Sciences and Management Building opens by fall, 2011.

[2] Experimental or theoretical physicist, depending on AY 09-10 hire, possible emphasis Biophysics. If 09-10 hire is theoretical, then 2010 hire would be experimental or vice versa

[3] Rank dependent upon current ('09-'10) searches

Appendix 1: **Table of Requested FTEs Year 2 of 3-year plan**
AY 2011 - 2012

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Applied Mathematics	Open	Applied Math		Applied Math		$250K	Office & research group space	Academic Surge Building,COB[1] or Castle
1	Cell Biology	Assistant	Biology		QSB		$500K	Office + 800-1000 sq ft wet lab	Castle bldg 1201 suite 1300
1	LPSOE	LPSOE	Biological Sciences		QSB		$ 20K	Office	Academic Surge Building, or COB[1]
1	LPSOE	LPSOE	Physics		Chemistry / Physics		$ 20K	Office	Academic Surge Building, or COB[1]
1	Materials Chemistry	Assistant	Chemistry		Chemistry / Physics	Best? QSB? EnvSyst	$500K – 700K	Office & 600 – 800 sq ft lab	Castle – in bldg 1200 or SE1-361[2]

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes that Social Sciences and Management Building opens by fall, 2011.
[2] Placement assumes current research lab occupants are willing / able to accommodate new hire in the lab.

Appendix 1**: Table of Requested FTEs Year 3 of 3-year plan**
AY 2012-2013

EVC Targets: Number of Positions: _____Total Startup: _____ Total space: _____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Anticipated location
1	Computational/Mathematical Systems Biology	Open	Biology		QSB	Applied Math	$300- $350K	Office & research group space	Academic Surge Building, COB[1] or Castle
1	Evolutionary Biology	Full	Biological Sciences		QSB		$300 – 500K	Office + 600 sq ft wet lab	Castle facility, bldg 1201 suite 1300 or SE1-301[2]
1	Physics Experimentalist	Assistant	Physics		Chemistry / Physics		$ 600K	Office & research group space	Castle 1200, suite 151
1	Theoretical Chemistry	Full	Chemistry		Chemistry / Physics	QSB, Applied Math, EECS	$350 – 400K	Office & 200 – 400 sq ft computer/ student offices	Academic Surge Building, COB[1] or Castle
1	Faculty encouraged to request inter-disciplinary hire through Provost / campus process								

Space requirements for a theoretical fte include office and 200 sq ft for students and post-docs.

[1] Assumes that Social Sciences and Management Building opens by fall, 2011.

This table was approved by a vote of the School of Natural Sciences faculty on April 1, 2010.

Notes: This table should reflect school priorities, although it is possible that multiple positions will be assigned to the same priority level. Additional considerations such as opportunity hires, spousal hires, diversity issues, should be noted where relevant, with further description in the text of the plan.

SNS 2010 - 2013

Majors and Graduate Groups: Current and Proposed SNS Hires

Name	Established or Planned Start Date	Number of Majors (Fall 09)	Student Credit Hours (Fall 08)*	Student Credit hours by senate members (Fall 08)	Student Credit Hours (spring 09)*	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Applied Math	06-07	57	3,607	416	3,358	1,139	20	8.0	Applied Mathematics (Junior)	**2011**
								Harish Bhat		Applied Math (Assistant)
								Francois Blanchette		**2012**
								Boaz Ilan		Applied Math (Open)
								Arnold Kim		**2013**
								Yue Lei		
								Roummel Marcia		
								Michael Sprague		
								Mayya Tokman		
Biological Sciences	05-06	771	3,768	1,888	5,122	2,255	47 (QSB)	18.0	Physiology (open)	**2011**
								Andres Aguilar	*Interdisciplinary Public Health / Epi (FTE will be in SSHA)*	Biostatistics (Open)
								David Ardell		Molecular Bio (Full/Open)
								Keith Alley (0%)		**2012**
								Miriam Barlow		Cell Biology (Assistant)
								Michael Beman (50%)		LPSOE
								Jinah Choi		**2013**
								Mike Cleary		Computational / Mathematical Systems Biology (Open)
								Michael Colvin		Evolutionary Biology (Full)
								Michael Dawson		
								Benoit Dayrat		
								Caroline Frank		
								Henry Forman (50%)		
								Marcos Garcia-Ojeda		
								Steve Hart (50%)		
								Andy LiWang (50%)		
								Patti LiWang (50%)		
								Jennifer Manilay		
								Monica Medina		
								Rudy Ortiz		
								Nestor Oviedo		
								Maria Pallavicini (0%)		
								David Ojcius (50%)		
								Jason Raymond		

SNS 2010 - 2013

Majors and Graduate Groups: Current and Proposed SNS Hires

Name	Established or Planned Start Date	Number of Majors (Fall 09)	Student Credit Hours (Fall 08)*	Student Credit hours by senate members (Fall 08)	Student Credit Hours (spring 09)*	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Chemistry	06-07	104	2,496	850	2,004	1,168	13	7.5	Computational Chemistry (Junior)	**2011**
								Henry Forman (50%)		Organic Chem (Assistant)
								Anne Kelley		**2012**
								David Kelley		Materials Chemistry (Assistant)
								Andy LiWang (50%)		**2013**
								Patti LiWang (50%)		Theoretical Chemistry (Full)
								Eric Menke		
								Matt Meyer		
								Meng Lin Tsao		
								Tao Ye		
Earth Systems Science / IB	05-06	28	222	201	56	38	32 (ES)	5		**2011**
								Michael Beman (50%)		Ecology (Full)
								Asmeret Berhe		**2012**
								Teamrat Ghezzehei		
								Steve Hart (50%)		**2013**
								Lara Kueppers		*request inter-disciplinary hire*
								Peggy O'Day		
								Sam Traina (0%)		
Physics	06-07	37	1,753	801	1,615	839	17	8.0	Theoretical or Experimental Physics (senior)	**2011**
								Raymond Chiao (50%)		Experimental or theoretical physicist (Open)
								Sayantani Ghosh		**2012**
								Ajay Gopinathan		LPSOE
								Linda Hirst		**2013**
								Kevin Mitchell		Experimental or theoretical physicist (Open)
								Michael Scheibner		
								Jay Sharping		
								Lin Tian		
								Roland Winston (50%)		
SNS Und		46						46.5 total faculty		

* credit hours EXCLUDE include Math 5 and Chem 1

Appendix 3: **SNS Future Space Needs (Office & Research)**

Future SNS Faculty

	Faculty	Discipline	Office location	# Offices Needed	Theoretical / Experimental	Lab Space location		Research space (sq ft)	
2010-2011						Dry	Wet	Dry	Wet
7/2011	Applied Math	Applied Math	Campus	1	Theoretical	Campus		200	
7/2011	Biostatistics	Biology	Campus	1	Theoretical	Campus		200	
7/2011	Ecology	Earth Systems	Needed at Castle	1	Experimental		Castle Bldg 1201, Suite 1300		1000
7/2011	Molecular Biology	Biology	Campus	1	Experimental		SE1 353		800
7/2011	Organic Chemistry	Chemistry	Campus	1	Experimental		SE1 - 353		800
7/2011	Physics Exp.or theory	Physics	Campus	1	Theoretical / Exp		SE1 377 or 353[1]	500	800
2011-2012									
7/2012	Applied Math	Applied Math	Campus	1	Theoretical	Campus		200	
7/2012	Cell Biology	Biology	Needed at Castle	1	Experimental		Castle Bldg 1201, Suite 1300		1000
7/2012	LPSOE	Biology	Campus	1				0	
7/2012	LPSOE	Physics	Campus	1				0	
7/2012	Materials Chemistry	Chemistry	Needed at Castle	1	Experimental		Castle Bldg 1200, Suite 22 or SE1-361[2]		1000
2012-2013									
7/2013	Comp / Mathematical Systems Biology	Biology	Campus	1	Theoretical	Campus		200	
7/2013	Evolution Bio	Biology	May need at Castle	1	Experimental		SE1 301 or Castle 1201, Suite 1300[2]		1000
7/2013	Exper or Theor. Physics	Physics	Needed at Castle	1	Experimental		Castle Suite 1200 Suite 151		1000
7/2013	Theoretical Chemistry	Chemistry	Campus	1	Theoretical	Campus		200	
TOTAL offices needed				15					
TOTAL research space needed						5	8	1500	7400
Totals already allocated to school				0		0	3	500	2400
Unmet Need				15		5	5	1000	5000

(4-5 at Castle)

[1] Experimental or theoretical physicist, depending on AY 09-10 hire. If 09-10 hire is theoretical, then 2010 hire would be experimental or vice versa.

[2] Placement assumes current research lab occupants are willing/ able to accommodate new hire in the campus lab.

SNS 3-year FTE Plan
Position Descriptions AY 2011 - 2013

Applied Math - Year 01 (Assistant); Year 02 (Open)
Seeking mathematicians with expertise in modeling, applied analysis, scientific computing, or related areas. Some particular areas of interest include Computational Mathematics, Fluid Mechanics, Nonlinear Waves, Dynamical Systems and Inverse Problems. Special attention will be paid to applicants participating in interdisciplinary research, who could contribute to one or more of the campus research initiatives in Natural Sciences, Engineering and/or Social Sciences, including the Sierra Nevada Research Institute.

Biological Sciences - Year 02 (LPSOE)
A Lecturer with Potential Security of Employment (LPSOE) in Biological Sciences closely parallels that of an Assistant Professor on track for tenure, but with an emphasis on undergraduate education. The successful candidate will be an outstanding teacher, who wishes to have a permanent, full-time instructional position. This position will involve: Teaching Biological Science courses, with an emphasis on lower-division courses; Coordinating various aspects of the undergraduate instructional program including oversight of instructional staff; training teaching assistants; and participating in education-related committees, student recruitment and outreach, and efforts to secure extramural funding for education program development.

Biostatistics - Year 01 (Open)
Fills an urgent undergraduate and graduate teaching and research collaborative need, and Molecular Biology. It is envisioned that the Biostatistics job posting will emphasize statistical modeling and inference. Depending on the research profile, a successful biostatistician hire will contribute to research in QSB, ES, SNRI, HSRI, and/or AM.

Cell Biology - Year 02 (Assistant)
The field of Cell Biology covers both prokaryotic and eukaryotic cells from conventional (Drosophila, mouse) model and novel model organisms, and investigates cellular processes such as energy transformation, organelle synthesis, transport, division, membrane structure and function, differentiation, migration and cell death. Cell biology research that synergizes with or expands or leverages existing programs will help to build depth in targeted areas identified for excellence in the quantitative systems graduate program strategic plan. Faculty would be expected to participate in teaching in the existing Biological Sciences major and the quantitative systems graduate program.

Computational/Mathematical Systems Biology - Year 03 (Open)
Computational structural biology identifies a critical research area complementary to existing biological modeling competence here. OR **Mathematical Systems Biology** which envisions whole-cell simulation approach complementary or strengthening to that existing in QSB, along the lines of mesoscopic or spatially-explicit stochastic dynamics of parameterized biochemical systems, ideally of systems of experimental interest of other faculty.

Ecology - Year 01 (Full)
We seek an outstanding individual with research interests and expertise in any ecological field that complement those of the existing UC Merced faculty. We welcome applicants using experimental, field, computational, and/or theoretical approaches and working at population to global scales. This individual would strengthen and complement our growing interdisciplinary research cohort in the area of ecology and ecosystem science. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science (ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to teaching general education courses in ESS and BIO, the successful applicant may also contribute to the teaching of required, lower division courses in BIO (i.e., BIO 1 and 2). The successful candidate could also teach (or share teaching responsibilities with current faculty) the existing course BIO/ESS 148 (Fundamentals of Ecology), as well as the catalog-listed, but never offered courses BIO 145 (Introduction to Population and Community Ecology), ESS 128 (Theoretical Ecology), and ESS 180 (Field Methods in Earth Systems). Other upper division courses in different areas of ecology, global change, and biocomplexity in the environment could also be developed and delivered. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate group, but may also contribute to the Quantitative and Systems Biology graduate program depending on their interests. The successful candidate would contribute graduate courses in areas of ecology related to their research specialty.

Evolutionary Biology - Year 03 (Full)
We are searching for an outstanding individual with research expertise in a field of evolutionary biology that complements and coalesces the talents of the existing faculty at UC Merced. Considering the central role of evolution in the biological sciences, pure and applied, we seek an individual with broad vision who can engage evolutionary biology with related disciplines (particularly in environmental and organismal systems) thus building an innovative program. The recruit will bring distinction and help establish an internationally visible program identifiable from our highly respected sister campuses and in line with UC Merced's Strategic Vision. We particularly recognize the large contributions made in evolutionary biology through theoretical advances and their interplay with empiricism, the latter of which is already diverse and strong at UC Merced. In emphasizing theoretical contributions in the search, we prefer not to exclude completely experimentalists who are transformational leaders of the highest standing; our goal is to hire the best candidate to advance evolutionary biology and enhance its application in the sustainability of human and environmental systems. The successful candidate is anticipated to contribute to undergraduate teaching primarily in Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track (e.g. BIO141 Evolution), and may also teach in Applied Mathematics (MATH) or Earth Systems Science (ESS), teaching existing and/or developing new courses that meet the missions stated above. The successful applicant will also share teaching responsibilities for QSB 247 Advanced Ecology and Evolution with current faculty.

Experimental or Theoretical Physics - Year 01 & Year 03 (Rank depends on 2010 hire**)**
These two positions are for experimental and/or theoretical physicists, with the break down between experiment and theory dependent on the outcome of the current Physics search and the availability of space and startup funds. However, at least one of these two positions should be experimental to maintain an effective balance between theory and experiment in the Physics

program. These positions will target the three Physics emphasis areas of biological physics (including soft condensed matter), hard condensed matter, and AMO (atomic, molecular, and optical) physics. The specific area of each hire will be dependent on the outcome of this year's search, with the general strategy being to maintain a balance among these three areas.

Materials Chemist - Year 02 (Assistant)
This position was originally approved and searched last year at open rank (to start in Fall 2009). Several excellent candidates were identified, but one junior and two senior offers were made and declined and the search has not been reinstated. A materials chemist, broadly defined, is still the chemistry group's second priority. However, given the current limitations in both laboratory space and startup funds we consider it unlikely that a search at a tenured level will be successful, so we propose this position at the Assistant Professor level only. This hire could have research interests in inorganic and/or organic materials, with an emphasis on either synthesis or characterization. We would seek someone whose research interests are complementary to those of our current faculty to broaden and diversify our research programs in materials chemistry. Any materials chemist could teach general chemistry (CHEM 2 and 10, and the planned honors versions of these courses), materials chemistry lab (CHEM 147), and a variety of other core and elective undergraduate and graduate courses depending on research area. Most materials chemists will require some wet lab facilities and some instrumentation space, with the exact mix being determined by the specifics of the research. The laboratory can probably be located on campus as long as certain space-intensive or fume hood-intensive research specialties are excluded.

Molecular Biology - Year 01(Full/Open - Rank depends on current search)
Will give specific preference to those working on RNA-dependent mechanisms, epigenetic mechanisms, or both. The candidate may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced. It is envisioned that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced.

Organic Chemist - Year 01 (Assistant)
This position was originally approved and searched last year (intended to start in Fall 2009) but the search was cancelled at mid-year because of budgetary constraints and has not been reinstated. An organic chemist is still the chemistry group's top priority. We currently have only two organic chemists and we need at least two more to support the organic emphasis of the chemistry graduate program. We are requesting only one search focused in this area during the next three years; however, because of the paucity of appropriate laboratory space (organic chemists tend to require large numbers of fume hoods, for example). Organic is typically the most popular subfield of chemistry among domestic graduate applicants and strengthening our program in this area would make a major contribution toward building our graduate program in general. We also have a severe need for teaching assistants for our organic chemistry courses that are taken by large numbers of students outside the major, positions that generally cannot be filled by graduate students from other programs. The proposed hire could have research interests in either bioorganic chemistry or organic materials. Any organic chemist could teach the large undergraduate core organic courses (CHEM 8, currently being taught by biochemists, and

CHEM 100) and one or more of the core graduate organic courses (CHEM 200, 201, and 202), as well as upper-division electives and more specialized graduate courses. An organic chemist will require a wet lab, space that was presumably available when this position was originally searched last year. Additional fume hoods may have to be added to existing lab space. If the person needs to use NMR on a regular basis, as most organic chemists do, either the laboratory space would have to be located at Castle or a suitable NMR would have to be installed on campus.

Physics - Year 02 (LPSOE)
A Lecturer with Potential Security of Employment (LPSOE) in Physics closely parallels that of an Assistant Professor on track for tenure, but with an emphasis on undergraduate education. The successful candidate will be an outstanding teacher, who wishes to have a permanent, full-time instructional position. This position will involve teaching Physics courses, with an emphasis on lower-division courses; coordinating various aspects of the undergraduate instructional program including oversight of instructional staff; training teaching assistants and participating in education-related committees, student recruitment and outreach, and efforts to secure extramural funding for education program development.

Theoretical Chemist - Year 03 (Full)
Most chemistry programs have several theoretical chemists, and building strength in this area makes sense for UC Merced at this time given our severely limited laboratory facilities. We are currently attempting to hire our first theoretical chemist at the Assistant Professor rank. We would like to add a second person, ideally at a tenured rank, who could provide mentorship to the junior faculty member in this field and help attract graduate students with interests in theory and computation. Most theoretical chemists consider themselves physical chemists, but some who work on organic reactions consider themselves organic chemists. A theoretical chemist has the potential to establish strong collaborations with other UC Merced chemistry faculty, faculty in other areas (biology, physics, materials science), and faculty at other institutions. This person could teach undergraduate core courses in general chemistry (CHEM 2 and 10, and the planned honors versions), physical chemistry (CHEM 112 and 113), and possibly organic (CHEM 8 and 100), one or more of the graduate core courses (likely CHEM 212 and/or 213), and various undergraduate and graduate electives. A theoretical chemist requires minimal space—an office, a small amount of space for computational facilities, and some office space for students and post-doctoral fellows.

Applied Mathematical Sciences

Faculty providing input to the this portion of the School Strategic Plan include Harish Bhat, François Blanchette, Boaz Ilan, Arnold Kim, Roummel Marcia, Michael Sprague, Mayya Tokman, and Lei Yue.

Overview - Mathematics is a subject of great depth and beauty. Mathematics is also crucial for developing new theories in natural sciences, engineering and social sciences. The application of mathematics to other disciplines is a particularly rich area for research and education.

Applied mathematical science involves the use of analytical and computational mathematics to solve real-world problems. Its core is comprised of modeling, analysis and scientific computing. Using these tools, applied mathematical scientists study a broad spectrum of problems across a number of disciplines. In fact, applied mathematicians are connected more closely through their shared approach and attitude toward interdisciplinary research rather than a shared interest in any particular set of problems. An explicit goal of applied mathematical sciences is to contribute significantly to other disciplines and foster interdisciplinary and multidisciplinary research and education. The absence of disciplinary barriers at UC Merced is an ideal environment for multidisciplinary research and education. Hence, UC Merced has an excellent opportunity to develop top-notch academic programs in applied mathematical science. Because applied mathematical scientists contribute to other disciplines through their research, the development of applied mathematical sciences contributes to the growth of other programs.

Research - Applied mathematicians are inherently interdisciplinary. They must be well trained in fundamentals of mathematics to model, analyze and compute solutions to real-world problems. Applied mathematics research is usually assessed through two criteria: (1) sophistication of the mathematics used and (2) novelty and importance of the application. A strong group of applied mathematicians can be a great asset to any number of scientific and engineering programs within the university where they can provide the theoretical/quantitative support or foundation.

We do not seek to build a program comprised of a specific set of sub-fields. Instead, we seek to build a stellar program comprised of world-renowned researchers, who contribute to the applied mathematical sciences program and a number of other programs at UC Merced. Hence, the over-arching theme encompassing the research of the Faculty is mathematics applied to real-world phenomena. This brings applied mathematicians together with the intent to contribute to other programs of study on campus. There are many opportunities at UC Merced for interdisciplinary research under this research theme. There are several large funding sources for applied

mathematics research and education. Federal sources provide funding for both education and research programs. The current faculty members (8 + 1 in progress) are well are on their way toward developing a strong research and teaching program including undergraduates, graduate students and postdoctoral researchers.

Although the current faculty members have deep expertise in the applied mathematical sciences and breadth across several disciplines, new faculty hires are needed to deepen the base of expertise and broaden the range of application areas. For example, we are seeking new hires in stochastic modeling, mathematical biology, mathematical economics and atmospheric science, among others, to forge new links with economics and management, environmental systems, the Sierra Nevada Research Institute, the Merced Energy Research Institute (MERI), and the developing Systems Biology Institute.

Teaching – Mathematics courses are absolutely critical to nearly all of the majors at UC Merced. All applied mathematics faculty contribute to delivering undergraduate and graduate curricula. New faculty hires are needed to deliver and support the curricula as the demand due to our growing student population increases (see academic programs section). At present, 54 students have declared Applied Mathematical Sciences as their major. In addition, Applied Mathematics courses accounted for a total of approximately 5,900 hours taught in Fall 2009 alone. This large number is due to the fact that all the undergraduate students in the School of Natural Sciences and the vast majority the students in the School of Engineering are required to enroll in math courses, especially during their freshman and sophomore years. This situation is not limited to lower division courses. Upper division and graduate courses serve a number of other programs such as physics and engineering. This large number of enrollments requires a sufficient number of faculty members to maintain a low student-to-faculty ratio in these classes. Due to the fiscal crisis, in AY '09-'10 major teaching concessions were enacted, including the enlargement of class sizes by 50% and increasing the number of sections that Teaching Assistants are assigned from 2 to 3 sections at a 49% appointment. If these concessions are to stay they will have negative consequences on our ability to efficiently deliver the curriculum as well as our ability to recruit graduate students and faculty. Furthermore, the effective teaching of mathematics courses is best achieved by individuals, who have both rigorous training in the subject and use the methods being taught in their research. Being an active user is an invaluable asset in conveying the "why one should care" when discussing seemingly abstract mathematical concepts. Therefore, the delivery of the mathematics curricula requires dedicated faculty support.

Cross-disciplinary and Cross-School Linkages - The applied mathematics faculty is dedicated to interdisciplinary applied mathematical science, which seeks to build linkages across disciplines and schools. The Faculty is already involved with other programs on campus. Graduate Studies in Applied Mathematics is highly interdisciplinary; the Core faculty is comprised of 8 Natural Sciences faculty, and its

Affiliate faculty is comprised of four members from School of Engineering, two from Social Sciences Humanities and Arts faculty, and two from Natural Sciences. We seek to strengthen current linkages and to form new ties with other programs. In particular, we are interested in forming new linkages with colleagues in electrical engineering, mechanical engineering, computer science and engineering, life sciences, environmental systems, economics and management.

Historically, applied mathematicians have worked closely with researchers in physical sciences and engineering. Physical sciences and engineering have long adopted mathematical analysis and methods in their topics. At UC Merced we anticipate strong ties with physical sciences and engineering. Moreover, we anticipate more collaboration with researchers and students in the MERI as it continues to develop.

In addition to physical sciences and engineering, we anticipate that applied mathematical sciences will have an important role in the life-sciences program at UC Merced. Both the undergraduate major in Biological Sciences and the graduate program in Quantitative Systems Biology involve more quantitative reasoning and mathematical modeling than traditional biology programs. The applied mathematics faculty is working in collaboration with biology faculty to ensure the success of these objectives. In addition, we anticipate collaboration and look forward to involvement in the evolving Systems Biology Institute.

The area of collaboration between applied mathematics and environmental systems is rich with opportunities. In fact, several collaborations between applied math faculty and environmental systems have already begun. There are several top-notch applied mathematicians working in areas such as atmospheric science, geophysical fluid dynamics, porous media, geophysical remote sensing, and bio-statistics of ecological and environmental health. Hence, we will continue to foster collaborations and seek opportunities with future hires, which could participate actively in the Environmental Systems program and the Sierra Nevada Research Institute (SNRI). Particularly, we are supportive of a hire of an applied mathematician in the area of Atmospheric Science, who could interface between Applied Mathematical Sciences and SNRI.

There also exists potential to form collaborations with social science programs at UC Merced, most notably econometrics, management and public policy. These collaborations represent relatively new areas for applied mathematic science research. Nonetheless, the "open door" organizational structure at UC Merced facilitates exploring connections among colleagues that may become substantial collaborations in the future.

Resources – Faculty, lecturers/visiting assistant professors, space/facilities and computational administrative support are needed for academic success.

Faculty: At a bare minimum, 20 FTEs will be needed for the applied mathematical sciences program including the undergraduate and graduate academic programs. We propose a growth rate of hiring two applied mathematics faculty per year until that number is reached. Below is a table that shows this proposed growth beyond our current faculty and assuming that our searches are successful.

Table E1: Applied Math FTEs

	2009-2010	2010-2011	2011-2012	2012-2013
FTEs	**9***	**10****	**12**	**13**

* Included is Prof. Kevin Mitchell, who is a Core Member of Graduate Studies in Applied Mathematics

** Included is a current search for a Junior Faculty FTE.

Our top priority for AY '10-'11 is to hire world-class faculty, who can actively contribute to the development of Applied Mathematical Sciences. We are seeking mathematicians with expertise in modeling, applied analysis, scientific computing, or related areas. Some particular areas of interest include Computational Mathematics, Fluid Mechanics, Nonlinear Waves, Dynamical Systems and Inverse Problems. Special attention will be paid to applicants participating in interdisciplinary research, who could contribute to one or more of the campus research initiatives in Natural Sciences, Engineering and/or Social Sciences, including the Sierra Nevada Research Institute.

Lecturers and Visiting Assistant Professors: Currently, and in future years, the number of mathematics courses, in particular, the number of undergraduate service courses offered to students not majoring in applied mathematics, exceeds the teaching capacity of our FTEs. To fill this gap, we currently rely on 8 full-time Lecturers to teach lower-division courses. Lecturers are highly qualified teachers who take on a heavy teaching load and thus help ensure that our students are provided with the best possible education. We project that at least two or more additional Lecturers will be needed within the next three years to allow us to offer all of the required service courses.

In keeping with the research mission of the university, we propose the establishment of a Visiting Assistant Professor (VAP) position. The hired individual would help us provide high quality education, while contributing to our research program. The VAP position will also provide the means for other applied mathematics programs to recognize UC Merced as a place to nurture young applied mathematicians. Moreover, it provides UC Merced a means to attach its name onto young researchers going out to the academic job market.

Space and Facilities: Applied mathematicians do theoretical and computational research. Hence, new applied mathematics hires typically only need office space for their group. However, it should be noted that for applied mathematicians office space also doubles as "lab space": the office is where applied mathematicians spend nearly 100% of their research time. It is also where office hours are conducted. Therefore, it is essential for Applied Mathematical Sciences to have offices that are conducive for doing research, computing, and office hours. This includes office space for summer undergraduates, graduate students and postdoctoral fellows. Currently, our 19 graduate students (5 Masters and 14 Ph.D.) are occupying offices in the Academic Offices Building (the trailer). Over the next three years, we plan to have 20-30 graduate students. We expect all graduate students to serve as Teaching Assistants during the first and/or second semesters of their studies. Both Teaching Assistants and Graduate Research Students in Applied Mathematics will need access to a secure office or common space that is conducive for doing their research and holding office hours. The ability to offer adequate space is extremely important when recruiting both graduate students and faculty.

Because high-performance computing is a rich area for applied mathematical sciences research, planning is required for space, hardware-acquisition, and administration. Our faculty together with Professor Lara Kueppers has purchased a 66-node/264-processor parallel-computer cluster. This cluster will become an integral part of our graduate course MATH 233 "Scientific Computing." Sufficient space has been allocated for the cluster in the Science & Engineering building.

Undergraduate and graduate studies in applied mathematics also require open access to a computer lab for course work and research. Currently, our students have open access to the instructional computer lab in the Science and Engineering building. In the future, an open access workstation-based computer lab for graduate studies would best accommodate the computing needs of our graduate students, other students enrolled in our computational courses, and potentially other courses as well.

Computational Administrative Support: While faculty start-up funds have been used for building a modern parallel-computation cluster, long-term financial support for its administration is required. To this end, the School of Natural Sciences has hired two full-time system administrators, Philip Moose and Joseph Norris, to set up the databases and infrastructure for all academic programs. Faculty research grants and start-up funds are being used to help pay for approximately 10% of the system administrators' time. Having Information Technology people within the School of Natural Sciences dedicated to the support of the School's computing needs, including the administration of the computer cluster, has ensured an optimal use of our resources and will continue to benefit both our educational and research missions.

Strategic Plan for Biological/Biomedical Sciences at UC Merced

This portion of the School of Natural Sciences Strategic Plan covers the life sciences related to Biochemistry, Molecular and Cell Biology, and Biomedicine and was modified from last year's based on discussions at the planning group meeting on January 14, 2010. This year's plan strategically addresses the following critical goals for biology at UC Merced: adapting to space and start-up limitations affecting hiring for the foreseeable future, correcting a disproportionately large student/faculty ratio within the Biological Sciences major, filling teaching needs in both the Biology major and QSB graduate program, building the necessary expertise in the new Biological Sciences Research Institute and strengthening the short- and long-term research profiles of Biology/Biomedical Sciences at UC Merced.

Size and Growth of Biological/Biomedical Science at UC Merced

Biological Sciences is currently the largest major at UC Merced with approximately 770 undergraduate students and the Quantitative and Systems Biology graduate emphasis is the largest graduate group with 45 students (42 of whom are pursuing Ph.D. degrees). Projected undergraduate enrollment will be at least 1000 students in Fall 2010 and 1200 in Fall 2011. At that point the biology major will reach the capacity of its teaching lab facilities for the foreseeable future, which are already running at more than 100% of CPEC capacity. With currently about 17 faculty teaching in the Biomedical/Biological Sciences, we currently have about 45 undergraduates per faculty head which is much larger than biology programs on other campuses and all other science and engineering majors at UC Merced, and this ratio will exceed 50 students per faculty by fall 2011. This ratio is leading to disproportionate teaching loads for life sciences faculty and is crowding out needed graduate courses for life sciences graduate students. One partial solution to this problem, already underway by the Life Sciences Curriculum Committee, is to make Biology a more selective major with higher standards for admission to the major, progress-to-degree controls on student performance, and continued or increased emphasis on quantitative biology. However, even with such higher standards in place, additional faculty lines will be required to ensure equitable teaching loads to life sciences faculty and a good educational experience to life sciences graduate and undergraduate students. UC Merced distinguishes itself state-wide and nationally with its strong emphasis on quantitative skills in its Biology major and further development of this aspect will help address the swamping of our major while improving the competitiveness of our students after graduation.

Quantitative and Interdisciplinary Biology

Biology is on the brink of a fundamental transformation from a primarily "descriptive" study of individual components of biological systems, to a model- and high-throughput data-driven science yielding quantitative and predictive understanding. This so-called "systems" approach to biology is already dramatically changing how biological research is done, leading to new connections with the physical, mathematical, and computational sciences. This new biology offers the promise of a much more complete understanding of living systems and ultimately new treatments for complex diseases such as asthma, diabetes, and cancer.

This new biology is built on several themes: First, the acquisition of comprehensive, quantitative data sets on living systems, such as whole genome sequences, protein expression rates, on and off rates of protein modifications during signal transduction, and complete maps of metabolic and regulatory pathways. Second, the development of mathematical models for integrating and evaluating such data, with the goal of building models that can predict novel or unexpected properties of biological systems. Third, the recognition of the central role of evolution in studying and understanding organisms, pathways, genes, and disease. Finally, this "new biology" requires very close partnerships with the physical and mathematical sciences. This need for a highly multidisciplinary approach constitutes an important barrier to progress in quantitative systems biology; many universities have highly compartmentalized research programs and few undergraduate or graduate programs provide truly multidisciplinary training.

This provides UC Merced with an excellent opportunity to develop biological and biomedical sciences research and academic programs at the forefront of this field. The small size and lack of disciplinary barriers at UC Merced have already been fostering a number of multidisciplinary research programs (see below). Furthermore, this new biology will be greatly enabled by many of the other initial academic programs and research efforts at UC Merced, such as the Applied Mathematics, Earth Systems Science and Bioengineering programs, the Health Sciences Research Institute, the Sierra Nevada Research Institute, and the Center for Computational Biology.

Biological/Biomedical Sciences Research Programs

The biological and biomedical sciences at UC Merced encompass several research themes described below. Linking these themes is the strategy of using methods that integrate large data sets, such as genomic or proteomic data, or produce quantitative data at the single cell or even single molecule level. Another linking theme is the goal of quantitative characterization of biological processes with ultimate aim of predictive models.

Research Themes

Predictive Understanding of Cellular Interactions and Cell Fate Decisions

An ultimate goal of cell biology is to achieve a complete understanding of the biochemical pathways underlying cellular decisions, including developmental choices and response to outside stimuli. Research in cell biology at UC Merced spans a wide range of specific research topics, from the development of immune system cells, to the evolution of bacterial antibiotic resistance to symbiosis in marine systems. New research questions are being made accessible by technologies that allow comprehensive genomic, proteomic, and metabolomic characterization, in some cases down to the single cell level. A combination of experimental investigation using these new tools and computational modeling of the interacting pathways will provide data to determine the mechanisms of cellular responses to exogenous factors such as infection, oxidative stress, growth factors, as well as internal factors such as epigenetic state or cell age. This knowledge will allow the development of new therapies to treat diseases, including the potential of chemoprotective agents against inflammation and aging.

The understanding of cell signaling and cell fate decisions also has important biomedical applications because the ontogeny and maintenance of multicellular life depends on exquisitely complex developmental process in which undifferentiated stem cells give rise to specialized cell types. Understanding this process promises to provide new treatments for many complex disease states related to developmental failures. Moreover, because of their ability to generate new specialized cells, stem cells hold the potential to treat a vast array of health problems, including spinal cord injuries, Parkinson's disease, diabetes, and many others. Elucidating the complex mechanisms by which extrinsic and intrinsic signals determine the proliferation or differentiation of stem cells is inherently a systems-level challenge, and will require new technologies for collecting data on cell populations and individual cells, and new methods to build models of cell decision processes.

Complex Diseases

Complex diseases are defined as diseases that are influenced by the actions of multiple genes, their interactions with each other and with the environment. Examples include metabolic disease, cardiovascular disease, Alzheimer's disease, Crohn's disease, persistent infection, cancer, diabetes and asthma. These diseases can only be fully understood in multidisciplinary approaches that include: identifying communities with increased risk due to their genetic backgrounds, determining the environmental factors that increase disease risk and understanding the cellular and molecular mechanisms underlying the increased susceptibility that can offer possible treatments.

The Central Valley has a high rate of such diseases and provides a microcosm of the health challenges of the entire state and nation. A strong research program on complex disease would foster collaborations with healthcare providers in the Central Valley. Conversely, the local community would provide unique cohorts for studying strategies for treating or reducing the incidence of these diseases. This program would have strong synergies with emerging UC Merced programs in environmental science, psychology, sociology, and economics and would have many links to future health professional programs.

Quantitative, Computational and Systems Biology and Biomedicine

Across the nation, UC Merced has attracted attention with its early establishment of a Quantitative Systems Biology graduate group. It is widely recognized that the incredibly rapid and wide-spread development of high-throughput experimental technologies for sequencing, expression, genotyping, proteomics, phenotyping and more have instigated a new era that demands quantitative approaches to biology. The development of quantitative biology requires a quantitative mindset from all practitioners, from the experimentalist interested in testing and refining models through the adoption of high-dimensional techniques with ever-increasing experimental precision and accuracy, engagement with emerging public standards for data curation, and engagement with the theoreticians and computational biologists who complement the experimentalist with data analysis, simulation and data integration.

Computational biology is the scientific investigation of biological hypotheses by computer, through analysis, simulation, modeling, machine learning, and creative data integration. Its

orientation is the discovery and advancement of biological knowledge. Computational medicine is an allied field specifically applied to developments in health sciences. Although very powerful when allied with experimentalists and unpublished data, computational biology and medicine can be prosecuted independently of any experimental collaboration over the entire life cycle of scientific or medical research: from funding to discovery to high-impact publication. Although computational biology and medicine are cheaper and less resource-intensive than experimental biology and medical research, they share the most expensive cost with other modalities of research — that of human resources — while having unique needs more like those of mathematicians and theoreticians, of group and individual office space that encourage creative social discussions at some times and intense independent work at others.

Although different definitions of "systems biology" have been proposed, in modern parlance this field largely concerns whole cells and/or organisms or large systems within cells or organisms, at molecular resolution. More specifically Systems Biology measures, analyzes and integrates large, typically high throughput, biochemical, genetic and molecular biological data to model, simulate, and predict the state and dynamics of whole cells and organisms, or large parts thereof. The phenomena studied in systems biology are typically emergent characteristics of assemblies of many interacting parts. These emergent characteristics are properties of the assembly as a whole: like robustness, physiological adaptation, regeneration, and phenotypic plasticity. Systems Biology and Biomedicine encompass many modalities of science. The precepts and analysis of theoretical systems biology, the predictive simulation and modeling results of computational systems biology, high-dimensional non-parametric statistics, and the technical sophistication of whole cell measurements of gene expression, proteomics, metabolomics and molecular interactions of experimental systems biology, collaboratively combine to move whole cell- or organismal systems biology beyond descriptive science towards hypothesis-driven science. Systems biology has meaningful and productive interfaces with other subdisciplines of biology such as evolutionary biology, ecology, population biology, development, genetics and others.

FTE Requests and Justification

The attached table shows new FTE lines requested for Biology and Biomedicine over the next three years. Although some names of these proposed searches have been changed, this table of proposed FTE lines is very similar to those Biology/Biomedicine requested last year as explained below. What is different is a slight shift in prioritization towards computational and theoretical biology and biomedicine, which strategically addresses our space and start-up constraints, addresses teaching needs in the Biology major and in the QSB graduate group, and increases the quantitative and computational profile of Biology and Biomedicine at UC Merced, which in turn can help improve faculty-to-student ratios and reinforce the unique strength and reputation we are building on this campus in this area.

For AY 2010-2011, we have prioritized two areas that complement our existing research profile: Biostatistics, which fills an urgent undergraduate and graduate teaching and research collaborative need, and Molecular Biology. It is envisioned that the Biostatistics job posting will emphasize statistical modeling and inference. Depending on the research profile, a successful biostatistician hire will contribute to research in QSB, ES, SNRI, HSRI, and/or AM.

The Molecular Biology search will give specific preference to those working on RNA-dependent mechanisms, epigenetic mechanisms, or both. The candidate may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced. It is envisioned that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced.

RNA molecular biology and epigenetics are two areas that have profoundly impacted basic and applied biological and biomedical research in the last decade and will continue to do so for the next two decades at least. It is very important to UC Merced's research profile to expand and strengthen in these areas.

We have put a theoretical epidemiological modeling position as lower priority for this year, conditional on the outcome of the existing search in SSHA for the BSRI director. Our emphasis is epidemiological modeling of the spread of infectious disease and host-pathogen interactions over multiple scales of time and space. If the nature and outcome of the search in SSHA does not fulfill this very important strategic area, which would make very important contributions to QSB, BSRI and the Biology major, then we would make it a priority 1 in the subsequent year over genetic epidemiology.

In subsequent years, we identify Molecular Genetics (of gene regulation) as the highest priority experimental area to strengthen at UC Merced. Like the previous Molecular Biology position, this search should emphasize that successful candidates will take a quantitative, whole-system, high-throughput approach to their studies, ideally being able to use existing proteomics and genomics facilities already built at UC Merced. Also like the RNA molecular biologist search, the advertisement for this position will stress that candidates may work on non-model human infectious pathogen or parasitic organisms or, alternatively, on model organisms that complement the existing research profile of UC Merced (implicitly with the intention that one position could work on an infectious disease non-model organism and the other could work on a model organism). The Molecular Genetic search will give specific preference to those working on fundamental mechanisms of gene regulation, for example, in host-parasite interactions.

As a lower priority experimentalist we propose an applied systems biologist who uses proteomic techniques to address basic or applied questions in model organisms. All experimentalist FTE lines are strategically pitched to be able to use existing experimental resources at Castle like the Mass Spectrometric instrumentation and the Genomics Core Facility.

The theoretical FTE lines we have prioritized highest here include genetic epidemiology which refers to linkage and pedigree analysis, or the use of greatly expanding Human SNP data and statistical and computational models to discover and measure risk factors for complex genetic diseases. Further, we have renamed the "computational biochemist" proposed FTE lines to one in "computational structural biology" which identifies a critical research area complementary to existing biological modeling competence here. As a lower priority we list Mathematical Systems Biology which envisions whole-cell simulation approach complementary or strengthening to that existing in QSB, along the lines of mesoscopic or spatially-explicit stochastic dynamics of parameterized biochemical systems, ideally of systems of experimental interest of other faculty

here at UC Merced. All proposed theoreticians/computational biologists can make use of the core computing facilities already in place at the School of Natural Sciences, which includes two different cluster/grid computing systems and core support facilities for security and back-up, with plenty of room and capacity for expansion.

SCHOOL OF NATURAL SCIENCES—CHEMISTRY
Three-year hiring plan, 2011-2013

2011 (positions to be searched in 2010-2011)

Top priority: Organic chemist, assistant professor. This position was originally approved and searched last year (intended to start in Fall 2009) but the search was cancelled at mid-year because of budgetary constraints and has not been reinstated. An organic chemist is still the chemistry group's top priority. We currently have only two organic chemists and we need at least two more to support the organic emphasis of the chemistry graduate program. We are requesting only one search focused in this area during the next three years, however, because of the paucity of appropriate laboratory space (organic chemists tend to require large numbers of fume hoods, for example). Organic is typically the most popular subfield of chemistry among domestic graduate applicants and strengthening our program in this area would make a major contribution toward building our graduate program in general. We also have a severe need for teaching assistants for our organic chemistry courses that are taken by large numbers of students outside the major, positions that generally cannot be filled by graduate students from other programs. The proposed hire could have research interests in either bioorganic chemistry or organic materials. Any organic chemist could teach the large undergraduate core organic courses (CHEM 8, currently being taught by biochemists, and CHEM 100) and one or more of the core graduate organic courses (CHEM 200, 201, and 202), as well as upper-division electives and more specialized graduate courses. An organic chemist will require a wet lab, space that was presumably available when this position was originally searched last year. Additional fume hoods may have to be added to existing lab space. If the person needs to use NMR on a regular basis, as most organic chemists do, either the laboratory space would have to be located at Castle or a suitable NMR would have to be installed on campus.

Second priority: Materials chemist, assistant professor. This position was originally approved and searched last year at open rank (to start in Fall 2009). Several excellent candidates were identified, but one junior and two senior offers were made and declined and the search has not been reinstated. A materials chemist, broadly defined, is still the chemistry group's second priority. However, given the current limitations in both laboratory space and startup funds we consider it unlikely that a search at a tenured level will be successful, so we propose this position at the Assistant Professor level only. This hire could have research interests in inorganic and/or organic materials, with an emphasis on either synthesis or characterization. We would seek someone whose research interests are complementary to those of our current faculty to broaden and diversify our research programs in materials chemistry. Any materials chemist could teach general chemistry (CHEM 2 and 10, and the planned honors versions of these courses), materials chemistry lab (CHEM 147), and a variety of other core and elective undergraduate and graduate courses depending on research area. Most materials chemists will require some wet lab facilities and some instrumentation space, with the exact mix being determined by the specifics of the research. The laboratory can probably be located on campus as long as certain space-intensive or fume hood-intensive research specialties are excluded.

2012 (to be searched 2011-2012)

Theoretical chemist, open rank. Most chemistry programs have several theoretical chemists, and building strength in this area makes sense for UC Merced at this time given our severely limited laboratory facilities. We are currently attempting to hire our first theoretical chemist at the Assistant Professor rank. We would like to add a second person, ideally at a tenured rank, who could provide mentorship to the junior faculty member in this field and help attract graduate students with interests in theory and computation. Most theoretical chemists consider themselves physical chemists, but some who work on organic reactions consider themselves organic chemists. A theoretical chemist has the potential to establish strong collaborations with other UC Merced chemistry faculty, faculty in other areas (biology, physics, materials science), and faculty at other institutions. This person could teach undergraduate core courses in general chemistry (CHEM 2 and 10, and the planned honors versions), physical chemistry (CHEM 112 and 113), and possibly organic (CHEM 8 and 100), one or more of the graduate core courses (likely CHEM 212 and/or 213), and various undergraduate and graduate electives. A theoretical chemist requires minimal space—an office, a small amount of space for computational facilities, and some office space for students and postdoctorals.

2013 (to be searched 2012-2013)

Analytical chemist, open rank. This person could have research interests on either the biological side (*e.g*. ultrasensitive single molecule/assembly/cell measurements, biosensors, novel techniques for proteomics and genomics, high throughput screening techniques) or the materials side (*e.g*. electrochemistry, including photovoltaic, battery, and fuel cell research, or surface analysis). An analytical chemistry hire would provide a new, distinct research direction within the chemistry group that would complement current faculty who have some analytical flavor to their work (Tao Ye, Anne Kelley, and Erik Menke) and generally strengthen our research programs. As analytical chemists are in demand in many industrial sectors, analytical chemistry is a very popular area among both undergraduates and graduate students. The vast majority of people who get a B.S. in chemistry but don't go to graduate school end up doing analytical chemistry in industry, and it is a disservice to our undergraduates that we don't have a specialist in this area of chemistry. This hire would help us attract students while maintaining our overall focus on biological and materials applications. This person could teach a number of the core courses in the chemistry curriculum: our upper-division analytical course (CHEM 115), the physical/analytical lab (CHEM 114L), general chemistry (CHEM 2 and CHEM 10), and perhaps physical chemistry (CHEM 112 and 113), as well as upper-division electives and graduate courses beyond the bare minimum we currently have. Any analytical chemist will need laboratory facilities and the specific needs will vary widely with the person's research field, but analytical chemists tend to be somewhat less space- and resource-intensive than other experimental chemists. An analytical chemist has the potential to collaborate broadly with faculty in other disciplines including physics, biology, and engineering.

PROGRAMMATIC RESEARCH AREAS AND TEACHING

CHEMISTRY

Natural Science faculty providing input to this portion of the School's Strategic plan included Anne Kelley, David Kelley, Matt Meyer, Meng-Lin Tsao, Tao Ye, and Erik Menke.

Overview - Chemistry is often known as "the central science" because of the key position it occupies in modern science and engineering. Most phenomena in the biological and earth sciences can be described in terms of the chemical and physical behavior of atoms and molecules, and chemical principles also underlie much progress in medicine and engineering. In addition, chemical systems are fascinating and often beautiful in their own right. George Whitesides, in his 2007 Priestley Medal address, states that "Chemistry is now the natural home of many of the most engaging problems in fundamental science and of the problems in applied science about which society cares the most." Herein we give a few examples of how chemistry has had a profound impact on other fields of science and technology. Just a few years after the inception of UC Irvine, Sherwood Rowland and Mario Molina (Nobel Prize, 1995) used physical chemistry approaches to unravel the chemical mechanisms of ozone depletion. This discovery, which helped to pull us back from the brink of an environmental catastrophe, played no small part in catapulting Irvine to research powerhouse status. Chemistry plays an essential role in the development of nanoscience and technology due to chemists' expertise in understanding and controlling matter at the atomic and molecular scale. It is no coincidence that almost all the exciting nanomaterials, from quantum dots to carbon nanotubes to semiconductor nanowires, have been pioneered by chemists. The intimate connections between life sciences and chemistry result from the prowess of chemists at manipulating and measuring molecules, the building blocks of life. Recent examples include Bertozzi's chemical manipulation of oligosaccharides in biological systems, which opens up new avenues to understanding and regulating complex cell surfaces. Analytical chemists such as John Fenn (Nobel Prize, 2002), were responsible for developing mass spectrometric analyses of biological macromolecules, a cornerstone in proteomics. The advancement of single molecule spectroscopy by Sunney Xie, a molecular spectroscopist by training, has stirred much excitement in biophysics as it affords access to unprecedented details of life processes at the single molecule level.

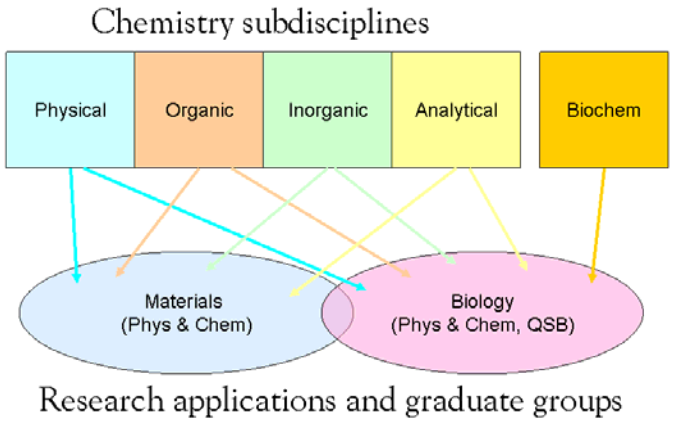
Because of the indispensible role of chemistry as a core discipline in science, one would be hard-pressed to think of any highly respected comprehensive research university that does not have a strong chemistry program that grants both bachelor's and Ph.D. degrees. Chemists may be classified according to their subdiscipline and/or by the nature of the problems on which they work. The four traditional subdisciplines of chemistry are organic, inorganic, physical, and analytical:

- Organic chemistry is the chemistry of carbon-based compounds. Organic chemists are concerned with synthesizing useful chemical compounds, developing new reactions to better achieve challenging syntheses, and determining the physical principles that are

responsible for chemical behavior. Organic chemists are actively engaged in the synthesis of new materials for energy harvesting and storage, the manipulation and understanding of biological processes, and the development of efficient and ecologically benign catalysts and reactions.

- Inorganic chemistry is the chemistry of chemical compounds that are not primarily carbon-based. Inorganic chemists determine the structures of inorganic molecules, study their reactions, and develop procedures for their synthesis. The fundamental principles are applied to problems in environmental chemistry, bioinorganic chemistry, and solid-state materials chemistry.
- Physical chemistry applies the fundamental laws of physics to understand the properties of chemical compounds and the basis of chemical reactivity. Physical chemists study the energetics of molecular and macroscopic processes, the dynamics of chemical reactions, quantum chemistry, and interactions of molecules with light (spectroscopy, photochemistry, and photophysics) using techniques that are experimental, theoretical, and/or computational.
- Analytical chemistry concerns the chemical analysis of substances. Analytical chemists develop instrumentation and methodologies to determine what chemical compounds are present in a sample and/or how much is present. Modern analytical chemistry is particularly concerned with very small systems, down to the single-molecule level, as well as applications to biology (proteomics, genomics) and environmental monitoring.

At UC Merced, we have the unique opportunity to build a modern chemistry program that combines disciplinary rigor and interdisciplinary reach. Ph.D.-level research in chemistry requires systematic training, and all four subdisciplines should be represented to some extent. Reflecting the expansive nature of chemical research and the interdisciplinary emphasis at UC Merced, the faculty have decided to focus our efforts on recruiting chemists working on problems in two broadly defined areas, biology and materials. The representation of traditional disciplines should not be viewed as an impediment to interdisciplinary research as we intend to recruit chemists who can bring novel chemical solutions and perspectives to materials and biology, just as the aforementioned prominent chemists have done. The figure below summarizes this scheme.



Biochemistry is a discipline closely allied with both chemistry and biology but distinct from both. Some universities have a combined department of chemistry and biochemistry while in others biochemistry is a separate department or is associated with another department. Currently biochemistry is associated with the biological sciences rather than the chemical sciences, but this arrangement may be revisited.

One faculty search is currently underway in theoretical/computational chemistry at the Assistant Professor level.

Materials Chemistry research

Materials Chemistry encompasses solid-state and polymer chemistry, both inorganic and organic, especially as directed to the development of materials with novel and/or useful optical, electrical, magnetic, catalytic, and mechanical properties. Materials chemists may be focused predominantly on synthesis (organic or inorganic chemistry) or characterization (analytical or physical chemistry). These areas offer the possibility of many different types of collaborations, both within UC Merced between Natural Sciences and Engineering and at other nearby institutions including Hewlett-Packard, LLNL, and possibly NASA/Ames in the near future. This type of research is very well funded and we expect it will continue to be well funded in the foreseeable future. In particular, materials chemistry will be key to advances in new energy sources. Potential research areas for future Materials Chemistry hires include:

- *organic electronics*: design, synthesis, and physical properties of materials for organic light-emitting diodes (OLEDs), thin film transistors, and liquid crystal displays
- *solar photovoltaics*: design, synthesis, and physical properties of materials for organic, inorganic, or hybrid solid-state devices and/or electrochemical cells
- *photonic materials*: design, fabrication, and properties of materials for frequency conversion of lasers, optical limiting materials, contrast agents in nonlinear optical imaging technologies, electro-optic modulation, and photonic bandgap crystals
- *batteries:* new materials to enable lightweight, high capacity, multiply rechargeable battery technology
- *heterogeneous catalysts*: solid-state materials that catalyze a variety of desired chemical reactions
- *structural materials:* design, synthesis, and characterization of new materials having desirable properties (light weight, high strength, environmentally benign, biocompatible, *etc*.)
- *"smart" materials*: synthesis, characterization, and engineering of materials that can respond adaptively and autonomously to changes in their condition or the environment
- *plasmonics*: materials for, and study of, phenomena based on the coupling of light to the plasma oscillations of conduction electrons in small metallic nanostructures, and their coupling to other materials

Biological Chemistry research

Much of the recent dramatic progress in the life sciences has been driven by quantitative approaches and a molecular-level understanding of complex biological systems. Experimental, computational and theoretical methods and techniques from chemistry have played a significant role in these advances. In addition, the flow of knowledge and inspiration runs both ways: challenges posed by specific biological problems are driving the development of new analytical tools, prompting advances in the physical and chemical sciences. Biological chemistry has undergone explosive growth in recent years as experimental and computational tools from the physical sciences have become widely applied to biological problems. Biological chemistry is explicitly interdisciplinary between the physical and life sciences, and there should be extensive opportunities for collaboration across these groups. In addition, at least some biological chemistry faculty are expected to have research interests that overlap engineering, particularly Bioengineering. The development of a strong presence in biological chemistry would position our school for center grants and other translational research initiatives. Biologically related chemistry is a large area of chemistry research that is well funded, largely by NIH but also through other agencies. Potential areas for future Biological Chemistry hires include:

- *Nucleic acid replication, damage and repair*
- *Novel modes for drug delivery*
- *Development of ultrasensitive bioanalytical techniques, particularly for single molecule/single assembly measurements and/or high throughput screening*
- *Single molecule studies of molecular motors, DNA/RNA dynamics, transcription factor binding/functioning, viral genome packaging, ion channel transport etc.*
- *Organized chemical systems that imitate the functioning of biological cells*
- *DNA and/or other biological macromolecules as scaffolds for fabrication of organized structures*
- *Protein folding*
- *Molecular recognition*
- *Novel uses of combinatorial techniques at the interface of chemistry and biology: aptamers, phage display, novel approaches to screening and combinatorial synthesis*
- *Atomistic modeling of biological systems (channels, membranes, receptors)*
- *Membranes and associated phenomena including fusion, exo/endocytosis, pore formation and functioning, lipid rafts*

Teaching – The Chemistry faculty have broad teaching responsibilities, including graduate students in the Physics and Chemistry Graduate Program and undergraduates majoring in chemical sciences. In addition, the chemistry faculty teaches preparatory lower division courses in chemistry for science and engineering majors, constituting a large service load for the campus.

Undergraduate - Chemical Sciences Major: In AY 2006, UC Merced began accepting majors into the B.S. degree program in the Chemical Sciences. Our first four graduates earned their degrees in Spring 2009. Chemical Sciences is now the second most popular major in Natural Sciences, with 103 students in the major. Our program is designed to meet the requirements for approval by the American Chemical Society, although such approval cannot be granted until we have graduated majors for four years and the campus itself has been accredited by WASC. Students who complete an approved curriculum may obtain a certified degree, a valuable credential which serves as national-level recognition. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. The UC Merced chemistry B.S. graduate will be well prepared to pursue a career in chemistry or an allied field.

Students pursuing a B.S. degree in Chemical Sciences have the opportunity to explore interdisciplinary areas within a degree program that is still focused on chemistry. Our B.S. degree in Chemical Sciences offers four emphasis tracks: Biological Chemistry, Environmental Chemistry, Materials Chemistry, and "pure" Chemistry. All four tracks share the same lower-division courses and some of the core upper-division courses. While some of the required and elective courses for the Biological, Environmental, and Materials tracks are offered by faculty in other disciplines in the Natural Sciences and Engineering, there are four lower-division and eight upper-division courses that must be taught by the chemistry group (not counting two cross-listed biochemistry courses which are taught by the biochemistry faculty). The lower-division courses, as well as second-semester organic chemistry (CHEM 100) and its lab, are each offered every semester in order to meet the needs of not only the chemistry majors but also the other Natural Sciences and Engineering students for whom these courses are required. The upper-division courses each need to be offered once each year. Therefore, a total of 16 undergraduate chemistry courses must be taught each year, requiring eight faculty FTE. While instructors can cover a few of the lower-division courses, the chemistry faculty feel strongly that non tenure-track faculty should only teach in Chem 1 and Chem 2, leaving a bare minimum of seven tenure-track faculty FTE to cover undergraduate teaching needs alone. In addition, all of our emphasis tracks require at least two units of research, and undergraduate research supervision is highly intensive of faculty time.

Graduate Programs: At present, Ph.D. programs in chemistry are administered under the umbrella "Interim Individual Graduate Program" that was put in place at UCM's inception. A combined Physics and Chemistry emphasis area currently involves 19 faculty (six chemistry, one biochemistry, seven physics, three engineering, and two with split appointments in physics and engineering). Separate courses of study are offered in Physics, Physical Chemistry, and Organic Chemistry; our 31 current graduate students include nine in physical chemistry, four in organic chemistry, and 18 in physics. Physics programs normally require more extensive graduate course work than chemistry programs, and we are currently taking advantage of this by having our physical chemistry students take some

of the physics graduate courses, particularly statistical mechanics. However, this combined graduate group is certainly not an ideal situation from the standpoint of either graduate student recruiting or graduate education, and we expect that when we apply for stand-alone graduate program status it will be as separate physics and chemistry Ph.D. programs. Even if we limit our course offerings to a bare minimum of two to four advanced courses in each of physical, organic, and analytical chemistry (recognizing that some students may take courses in more than one subdiscipline), eight to ten graduate chemistry courses would have to be offered each year, requiring four to five faculty FTE. This, combined with the undergraduate teaching requirements outlined above, leads to the conclusion that a faculty size of eleven to twelve is the absolute minimum required to offer undergraduate and graduate programs in chemistry. This conclusion is in keeping with data from the American Chemical Society showing that the smallest Ph.D.-granting chemistry departments in the U.S. have more than ten full-time faculty. Thus, much of this strategic plan is based on the facts that Merced's current IIGP is an interim program that will soon expire, and we need to be able to propose a graduate program in Chemistry at that time. This will involve broader coverage of the discipline and require at least five or six more faculty than we currently have.

Resources - Development of a stellar academic and research program in chemistry requires faculty, laboratory space for faculty, and shared core facilities.

Faculty: The chemistry group needs to grow to a minimum of eleven to twelve faculty in order to offer both the undergraduate major and a viable graduate program. The current faculty plus the one position being searched this year give us a total of seven; the four new positions requested over the next three years would bring us to eleven. At the undergraduate level, we would like to introduce some more specialized upper-division elective courses (several of which are currently approved but have never been offered because of lack of faculty), honors versions of general and organic chemistry, separate instrumental analysis and physical chemistry labs, and perhaps a physical chemistry course geared toward students with biological interests. At the graduate level, we also need to offer a broader range of courses and be able to offer all core graduate courses on an annual basis.

Summary of Proposed Chemistry Hires for the Next Three Years

Faculty	Research areas	Subdiscipline
Current	Kelley, A: materials	Physical/analytical
	Kelley, D: materials	Physical
	Ye, T: materials/bio	Physical/analytical
	Meyer, M: bio	Organic
	Tsao, ML: bio	Organic
	Menke, E; materials	Physical/analytical
2010-2011 (search underway)	Bio or materials	Theoretical (physical or organic)
2011-2012	Bio or materials	Organic
	Materials	Any subdiscipline
2012-2013	Bio or materials	Theoretical (physical or organic)
2013-2014	Bio or materials	Analytical

Whenever possible, all positions should be searched at open rank. We have no tenured faculty in any of the sub-disciplines except physical, and senior leadership in these areas is much needed. However, recruiting top-notch tenured faculty will be very challenging in view of the limited space and startup funds available. For that reason two of the four hires (those in areas that are likely to be most laboratory space intensive) are requested only at the Assistant Professor level.

Facilities and space: Laboratory research space poses a huge challenge. Competitive offers will require allocation of significant amounts of laboratory space. This is particularly true for senior-level candidates. There is a small amount of laboratory space left in SE 1 which we hope can be allocated to the organic and materials chemistry hires that were originally approved for searches last year, before the budget collapsed. Office space for students and postdocs for a theoretical chemistry hire could be accommodated in temporary buildings if necessary. The analytical chemistry hire may be able to be located in SE2 if that building is available on time; otherwise, additional space at Castle will likely be required.

Core Facilities: Many new chemistry hires will require the services of core facilities. Any organic chemist will require NMR, which we already have, but currently only at Castle. Many materials chemists will make use of our existing excellent electron microscopy facilities and the recently acquired powder x-ray diffractometer. Major core facilities that potential hires are likely to need, and that we do not currently have or do not have in working order, include clean room facilities, high quality mass spectrometry, single crystal and thin-film x-ray diffraction, and circular dichroism. Other instruments that are currently

in the laboratories of individual faculty members, but would be widely used and should be reproduced as core facilities develop, include a high quality UV-VIS-NIR and a fluorimeter.

ACADEMIC PROGRAMS

Undergraduate programs

Chemical Sciences - The Chemical Sciences major is designed to meet the requirements for approval by the American Chemical Society, although we cannot apply for approval until we have graduated majors for four years. Students who complete an approved curriculum may obtain a certified degree, a valuable credential which serves as national-level recognition for successfully completing a rigorous academic chemistry curriculum in an ACS-approved department. The curriculum is designed to meet the needs of students who plan to end their formal education with a bachelor's degree as well as those who wish to go on for an advanced degree. The UC Merced chemistry B.S. graduate will be well prepared to pursue a career in chemistry or an allied field. A basic chemistry program and three emphasis tracks in biological chemistry, environmental chemistry, and materials chemistry allow students to pursue interdisciplinary areas within a degree program that is still focused on chemistry.

A degree in the chemical sciences opens the door to a wide variety of careers in industry or government service, forensic chemistry in crime laboratories, commercial fields such as patent law and scientific writing, and high school science teaching. Many chemistry majors go on to graduate study to prepare for careers in teaching and/or research at the college or university level, or research positions in the chemical, pharmaceutical, electronics or other high-tech industries. A major in chemistry is also an excellent foundation for medical school or other careers in the health sciences.

Graduate Programs

Chemistry and Physics - At present, Ph.D. programs in physics and chemistry are administered under the umbrella "Interim Individual Graduate Program" that was put in place at UCM's inception. Graduate education within the group is currently divided into three tracks--Physics, Physical Chemistry, and Organic Chemistry--which have different preliminary exams and course work. Thus, students are educated and must demonstrate proficiency in a particular discipline, but have the opportunity to pursue research that spans disciplines if they so desire. This emphasis area currently involves 19 faculty and 31 graduate students, of whom seven have successfully advanced to candidacy for the Ph.D.

While interdisciplinary collaboration between physics and chemistry is in many cases natural and desirable, the primary mission of a graduate emphasis area or graduate group (unlike a research institute) is the education of graduate students. The disciplines of physics and chemistry have considerably different cultures and coursework needs in this regard, and we feel that our students would be best served by having separate programs in physics and chemistry. In addition, we have observed that most prospective students are looking for programs in physics or chemistry, not a joint program. Our ability to recruit excellent graduate

students would be enhanced by having two separate but closely interacting programs. Accordingly, we have been moving toward separating many of the functions of the group. When we finally have adequate faculty strength to do so, we will seek systemwide recognition as two separate stand-alone graduate groups, one in physics and one in chemistry. It is anticipated that at that time the chemistry graduate group will offer emphasis tracks in at least three of the four major subdisciplines of chemistry: physical, organic, and analytical.

SCHOOL OF NATURAL SCIENCES — Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences
Strategic Plan 2010-2013

4. Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences (ES/EEB/EHS)

Overview - Environmental Sciences and Integrative and Evolutionary Biology were established as initial areas of research and education excellence at UC Merced. Earth Systems Science (ESS) was designated as one of the first undergraduate majors in Natural Sciences (SNS), Environmental Engineering (ENVE) as a first major in the School of Engineering (SE), and the Environmental Systems (ES) graduate group as a joint SNS and SE graduate program awarding M.S. and Ph.D. degrees. In 2006, the Integrative Biology (IB) track (now Ecology and Evolutionary Biology) within the Biological Sciences (BIO) was approved for study of ecology and comparative and evolutionary biology. A revision of the ESS undergraduate major is underway, with the goal of strengthening the interdisciplinary nature of the major through cross-school faculty support to reflect the broad and diverse nature of environmental sciences. The Sierra Nevada Research Institute (SNRI) is a cross-school institute through which faculty, researchers, and students conduct basic and applied research on environmental issues, using the San Joaquin Valley and the Sierra Nevada as their outdoor laboratory. Existing research collaborations and coordinated teaching efforts between SNS and SE in this area, as well as recent successes in faculty recruitment in the School of Social Sciences, Humanities and Arts (SSHA) in the areas of environmental policy and economics emphasize our cross-school, interdisciplinary nature. Environmental Health Sciences, focusing on research at the intersection of environment and health, is an emerging area at UC Merced. Given the breadth of research and education encompassed in this area, a major challenge for program development is to identify and build strategic areas in which UC Merced can excel while providing sufficient program breath and depth to support undergraduate majors and graduate education. The following plan was developed based on previous years' plans and consideration of strategic plans from graduate groups, SNRI, and faculty from other schools with interests in environmental research.

Strategic Hires

The following two position descriptions are our planning group's top two priorities (in order) for the 2010-2013 period (see Table 1 for the complete list of desired hires over the next three years). These two positions arose from this plan after several discussions among planning group leads in the SNS made it clear that 2 of the 15 positions to be allocated to the SNS over the next three years would likely be within the ES/EEB/EHS planning area.

1) Ecology (open)

We seek an outstanding individual with research interests and expertise in any ecological field that complement those of the existing UC Merced faculty. We welcome applicants using experimental, field, computational, and/or theoretical approaches and working at population to global scales. This individual would strengthen and complement our growing interdisciplinary research cohort in the area of ecology and ecosystem science. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science

(ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to teaching general education courses in ESS and BIO, the successful applicant may also contribute to the teaching of required, lower division courses in BIO (i.e., BIO 1 and 2). The successful candidate could also teach (or share teaching responsibilities with current faculty) the existing course BIO/ESS 148 (Fundamentals of Ecology), as well as the catalog-listed, but never offered courses BIO 145 (Introduction to Population and Community Ecology), ESS 128 (Theoretical Ecology), and ESS 180 (Field Methods in Earth Systems). Other upper division courses in different areas of ecology, global change, and biocomplexity in the environment could also be developed and delivered. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate group, but may also contribute to the Quantitative and Systems Biology graduate program depending on their interests. The successful candidate would contribute graduate courses in areas of ecology related to their research specialty.

2) Ecosystem/Environmental Modeling (open)

We seek an outstanding individual with research interests and expertise in modeling of ecological or environmental systems. This strategic hire is intended to add research expertise in modeling that will serve as an integrator of current multi- and inter-disciplinary interests across environmental and ecological research areas. The successful candidate is anticipated to contribute to undergraduate teaching primarily in either Earth Systems Science (ESS) and/or Biological Sciences (BIO), in particular the Ecology and Evolutionary Biology track. In addition to lower division courses in ESS, the successful candidate would be expected to develop new, upper division courses with a strong quantitative focus in topical areas such as “Quantitative Analysis of Global Environmental Problems,” or “Computer Simulation of Ecological and Environmental Systems,” or potentially courses related to quantitative spatial/temporal analysis and remote sensing. The successful candidate is anticipated to contribute to graduate teaching and mentoring primarily in the Environmental Systems graduate program, but may also contribute to the Quantitative and Systems Biology graduate group depending on their interests. The successful candidate may teach the existing (but never offered) Ecological Modeling (ES 228) course, as well as develop new graduate courses in their research specialty.

Research - A central philosophy of the environmental program area is an integrated approach to the study of physical, chemical, and biological processes in natural and engineered environments. Research and education components focus on the quantitative understanding of the Earth as coupled systems of atmosphere, hydrosphere, lithosphere, and biosphere, and of biological systems as shaped by evolution and the environment. These themes intersect with human and ecosystem health. Such integrated studies require a balance of disciplinary expertise and interdisciplinary connections. This requirement translates to a need for a large and diverse faculty assemblage - one that can support the multifaceted components of priority research themes and whose members will contribute to multiple majors and programs. Current SNS research areas include *Global Change Science*, *Climate and Watershed Resources*, *Biocomplexity and Evolution*, *Atmospheric Pollution and Health*, and the *Ecology of Infectious Disease*. Continued expansion of complementary faculty in SSHA and the future School of Management is viewed as an integral component of program development to address the human dimension of environmental systems, along with continued synergy with SE. The research themes are described in more detail below:

a. Environmental Sciences

***Climate and Watershed Resources* -** Water is a critical resource on our planet and an essential component of planetary function where it serves as a solvent, a transporter, and a reactant, as well as a basic requirement for life. From an anthropogenic perspective, water is a critical resource, for drinking water, agricultural and industrial use, energy production, and recreation, thus making it an important commodity. There is growing awareness that the combination of impending climate changes and increased human demand for water will soon collide, particularly in California and the western U.S. where high quality water is already a limited resource in many areas. UC Merced is well poised to have a signature impact on integrated science, engineering, and management issues related to water as a critical resource including relationships between climate change and the regional hydrologic and carbon cycles, fundamental understanding of molecular, chemical, and biochemical processes the impact water quality, and integration of basic research into water resource management, sustainable agricultural activities, and economic development in the Central Valley. This thematic area already has a strong component in SE and formed the initial core of the ES graduate group programs. We envision that a faculty group in SSHA with interests in economics, policy, law and social science related to the environment would strengthen cross-discipline research and education. Faculty in the School of Management would also play an important role in the development of interdisciplinary links in areas of environmental management, particularly related to water and biological resources. We support a proposed cross-school position in environmental management (Table 1 and 3). Growth in this thematic area requires additional faculty strength in SNS in Earth surface processes / ecohydrology, and in other areas noted in Table 3.

***Global Change Science* -** Ecosystems encompass living organisms and the abiotic environment they inhabit. The science of global change employs a genome- to ecosystem-level perspective to understand interactions among organisms and the environment with an emphasis on discovering the effects of climate change, land use, pollution, biodiversity loss and other environmental pressures on ecosystems. Research in this area examines both past environmental changes and their impact on evolution as well as modeling future global change scenarios. Global change science examines how these alterations influence the interactions among organisms, ecosystem processes, and other Earth System components such as oceans, the atmosphere, and soils. Both significant needs for new knowledge in stressed regional and global ecosystems and new research initiatives in this region make this a compelling opportunity for UC Merced. For example, the California Ecological Observing Network (CALEON) planning group has proposed the San Joaquin Valley and Southern Sierra as a focus for new research infrastructure. Extramural funding in global change research initiatives and environmental biology from NSF, EPA, DOE, NASA, USDA, and other agencies are currently on the order of $3 billion. We have begun to develop expertise in the area of global change science, with faculty in evolutionary and conservation genetics, ecosystem and fire ecology, and macroecology. In AY 2007-2008, we successfully recruited two new faculty in the ecology area, Stephen Hart (senior, started July 1, 2008) and J. Michael Beman (junior, started January 1, 2009), which has significantly strengthened research expertise in microbial ecology, ecosystem ecology, and biogeochemistry. Two additional faculty will joined NS in January 1, 2009: Asmeret Berhe (junior), working in

soil biogeochemistry and carbon cycling related to climates, and Teamrat Ghezzehei (junior), in the area of soil physics, hydrology, and multiphase flow (Table 2). These new faculty strengthen considerably our strategic efforts to establish internationally recognized research related to global change science, particularly at the interface between biological systems and physical sciences. In AY 2008-2009, we attempted to search for a senior faculty to fill the remaining position in Ecology carried over from AY 2007-2008. We advertised broadly in the area of ecology with the hope to fill strategic programmatic gaps. We had an excellent applicant pool, but the position was held at abeyance in the fall 2008 and the search ended. In our current plan this position remains the top priority of the group (see Table 1 and 3), but we would like to have an open search to increase our chances of a successful recruitment. Senior faculty applicants will still be preferred. The addition of new faculty in the area of ecology will strengthen expertise in environmental life sciences. In order to continue to develop a nationally and internationally competitive program grounded in both life and physical sciences, we need to continue to build complementary expertise in the area of Earth surface processes / ecohydrology (prioritized in the ES strategic plan as ecological engineering or ecohydrology; Table 3). Future positions in environmental management, conservation biology/evolutionary biology, theoretical biology, and others listed in Tables 1 and 3 would further strengthen the global change science research area.

Table 2: Current Environmental Science and Ecology and Evolutionary Biology Faculty FTEs across Graduate Groups and Schools

Current Faculty	School			Research Themes: SNS Faculty		
	SNS	SE	SSHA	Global Change	Bio-complexity Evolution	Climate, Water-sheds
ES	7	9	1	AA, AB, JB, LK, MD, SH, TG	AA, CF, MD, BD, JR MM	AB, JB, LK, PO, SH, ST, TG
QSB	17	5		AA, JB, MD, SH	AA, CF, DA, MB, MD, BD, MM, JR	JB, SH

* SNS Faculty: AA: Andres Aguilar; Asmeret Berhe: AB; BD: Benoît Dayrat; Carolin Frank: CF; David Ardell: DA; LK: Lara Kueppers; MB: Miriam Barlow; MD: Michael Dawson; MM: Monica Medina†; PO: Peggy O'Day†; JR: Jason Raymond; J. Michael Beman: JB; SH: Steve Hart†, ST: Sam Traina† (0% FTE); Teamrat Ghezzehei: TG. †denotes tenured faculty. Faculty contributing from SE and SSHA not listed.

b. Ecology and Evolutionary Biology

***Biocomplexity and Evolution* -** Biocomplexity research explores the emergence of self-organized, complex behaviors or structures from the interaction of many simple agents in the environment. Such emergent complexity is a hallmark of life, from the organization of molecules into cellular machinery, through the organization of cells into tissues, to the organization of individuals into communities. The study of biocomplexity in the environment requires novel approaches to understanding pattern and process across multiple temporal and spatial scales, and draws upon interdisciplinary efforts at the interface of biology, physics, chemistry, and mathematics. Biocomplexity in the Environment research is a Priority Area at the National Science Foundation, with over $35,000,000 currently allocated in grant funds for 2007. Additional potential funding sources in biocomplexity research include the National Institute of

Health, the Department of Energy, NASA, the James S. McDonnell Foundation, and the Moore Foundation. Biocomplexity research at UC Merced addresses a diverse range of questions relevant to integrative biology such as: What are the forces that shape the magnitude and diversity of life across multiple temporal and spatial scales? How do systems with living components respond and adapt to stress? Are adaptation and change predictable? How do organisms within and between populations interact and evolve? A core group of faculty in this research theme is developing at UC Merced (see Table 2) that is represented strongly in the QSB graduate group, and priorities in this area overlap with the other research themes in BIO, ES, and QSB. Further expertise in evolutionary biology, paleoecology, and theoretical biology will be required to adequately develop strength in this theme and to fulfill undergraduate and graduate teaching (Table 3). In addition, the requested positions in ecology and ecological modeling would also help solidify research in this area.

Table 3: Proposed SNS and Cross-Unit Faculty in Environmental Sciences and Ecology and Evolutionary Biology. See Table 1 for prioritized list over the next 3 years.

Faculty	Research Themes			
	Climate, Water-sheds	**Global Change**	**Bio-complexity Evolution**	**Fills coursework gaps***
AY 2011-2012				
Ecology†	x	x	x	BIO, ESS, ES, QSB
Atmospheric dynamics	x	x		BIO, ESS, ES
Environmental management++	x	x		ESS, MGMT, ES
AY 2012-2013				
Ecological or ecosystem modeling	x	x	x	BIO, ESS, ENVE, MGMT, ES, QSB
Environmental / Ecological biostatistics	x	x	x	BIO, ESS, ENVE, ES, QSB
Earth surface processes/ Ecohydrology	x	x		BIO, ESS, ENVE, ES, QSB
AY 2013-2014 and beyond				
Environmental health or epidemiology	x	x	x	BIO, ESS, ES, QSB
Conservation biology/evolutionary biology	x	x	x	BIO, ESS, MGMT, ES, QSB
Global change ecology / Paleoecology	x	x	x	BIO, ESS, ES, QSB
Theoretical biologist		x	x	BIO, ESS, ES, QSB
Physical/chemical oceanographer; ocean sediments	x	x		ESS, ES

† Carried over from unsuccessful search in AY07-08, AY08-09 (due to search cancellation).
¶May be cross-unit position with Engineering; may also contribute to Environmental Health Sciences.
++Cross-unit position in Management in this area is supported by EES faculty.
*BIO: Biological sciences; ESS: Earth systems science; ENVE: Environmental engineering; ES: Environmental systems; MGMT: Management; QSB: Quantitative systems biology.

c. Environmental Health Sciences

Earth is an ecosystem that houses more than one million different species whose complex interactions with each other and the environment shape the life and fate of its individual constituents and their progeny. These interactions are frequently manifested in symbiotic,

parasitic and, pathogenic relationships between species. Humans frequently degrade the environment, and this in turn affects their health and safety. The cost burden for health care associated with environmental toxins and infectious agents, the emergence of drug resistant pathogens, the economic impacts of pathogens on agriculture, the threat of bioterrorism, and the increasing need to ensure clean and safe air and water are some of the compelling examples of how fundamental research in *Environmental Health Sciences* directly connects to social, economic, and political impacts both locally and globally. UC Merced is uniquely positioned to develop a strong and interdisciplinary research program in *Environmental Health Sciences*, initially focused in two highly complementary areas: *Atmospheric Pollution and Health*, and the *Ecology of Infectious Disease*. UCM Faculty who are interested in this research focus or already engaged in this research, are listed in Table 4. Potential partners outside of UCM include biologists, geochemists, and biodefense researchers at LLNL, LBNL, and Los Alamos National Laboratory and UC-wide programs in toxicology.

Table 4: Current faculty FTEs who would contribute to the development of research in Environmental Health Sciences.

Current Faculty	School			Research Themes	
	SNS	SE	SSHA	Atmospheric Aerosols & Health	Ecology of Infectious Disease
ES	4	3	1	TW, YC, LK, VL, PO, WR	YC, AA, MD
QSB	7			HF, RO	AA, MB, MD, JC, DO

Faculty: AA: Andres Aguilar; MB: Miriam Barlow; YC: Yihsu Chen; JC: Jinah Choi; MD: Michael Dawson; HF: Henry Forman†; QG: Qinghua Guo; LK: Lara Kueppers; VL: Valerie Leppert†; PO: Peggy O'Day†; DO: David Ojcius†; RO: Rudy Ortiz; WR: Wolfgang Rogge†; TW: Tony Westerling. †denotes tenured faculty.

The Environmental Health Sciences program is unique in that it steps beyond a traditional biomedical and public health focus to examine fundamental, mechanistic questions from multiple angles, fully integrating genomic, biological, geochemical, physical, computational, and ecological tools into studies of toxins and pathogens that involve humans as well as other organisms. This initiative encompasses both research and education that intersects all three schools in a compelling interdisciplinary area and is expected to support new and existing undergraduate and graduate programs. It also complements existing and future SNS research areas in addition to the environmental research described above, including areas of Applied Math, Complex Disease States, and Microbiology and Immunology. The addition of faculty in relevant aspects of health management and policy through SSHA and/or the School of Management will contribute to the future development of a community-health-focused medical school and public health. Recommendations for FTEs are given in our overall planning area request for the next three years is shown in Table 1 and over a longer planning horizon in Table 5.

Atmospheric Pollution and Health - Air pollution in the Central Valley is a daily burden on human and ecosystem health and well-being. Organic and inorganic particulates, persistent

organic pollutants, and precursor gases for ozone formation are produced during routine agricultural practices and weekday commutes. These pollutants are lofted into the atmosphere to interact with other chemicals or microbes and are eventually deposited in the respiratory systems of humans and animals, as well as on plant leaves. The resulting effects on human and ecosystem health are devastating. A significant air pollution-related research effort aimed at the understanding and mitigating the escalating air quality problems in the Central Valley, Sierra Nevada, and elsewhere has already been initiated in the Environmental Systems graduate group. Two new air pollution hires (Wolfgang Rogge and a future junior position hire, both in SE) have added strength in measurement and analysis of atmospheric pollutants, and will contribute to research on human and ecological exposure. Strength in this research area can be built through the addition of FTEs in atmospheric dynamics, environmental toxicology, environmental epidemiology, and environmental microbiology, which will add to current expertise in pathophysiology (HF, RO), particle and surface chemistry (VL, PO), and land use-atmosphere interactions (LK; Table 4). UC Merced is well poised to conduct critically needed basic research in this area, as well as to developing solutions to these complex environmental and public health problems. This area would also benefit from the addition of faculty in atmospheric chemistry and environmental/ecological biostatistics.

Ecology of Infectious Disease **-** Infectious disease agents affect all living organisms, can have complex life histories involving multiple species, and can be specialists or generalists in terms of host preference. A better understanding of the ecological and socio-ecological determinants of transmission by vectors (e.g., insects, rodents, birds) or abiotic agents (e.g., dust, water, weather systems), the population dynamics of reservoir species, the transmission to humans or other hosts, or the cultural, social, behavioral, and economic dimensions of disease communication is needed. The interface between humans and both domestic and wild animals is a region rife with opportunity for emerging diseases – those that were not pathogenic in the original host, but are in the new host (e.g., Hantavirus, SARS). Evolution of infectious agents and their plant and animal hosts is also a critical component of research for understanding the ecology of infectious disease. UC Merced is uniquely positioned for research in this area, literally located in the transition zone between suburban, agricultural and natural ecosystems. Migratory birds use Central Valley agricultural fields as stopover points, and human migration supports the agricultural industry. Air pollution can make stressed organisms more susceptible to infection. Building strength in this research area requires the addition of FTEs in environmental/ecological biostatistics or epidemiology, environmental toxicology, environmental microbiology, and emerging zoonoses/immunology (Table 5) to complement initial expertise in evolution (MB, MD), cell level host-pathogen interactions (JC, DO), environmental epidemiology (YC), and population genetics (AA; Table 4).

Table 5: Proposed SNS and cross-unit faculty in Environmental Health Sciences

Faculty	Research Themes		
	Atmospheric Aerosols & Health	**Ecology of Infectious Disease**	**Fills coursework gaps***
AY 2011-2012			
Air pollution (SE)[††]	x		ESS, ENVE, ES
Atmospheric dynamics	x		BIO, ESS, ES
AY 2012-2013			
Environmental/Ecological biostatistics	x	x	BIO, ESS, ENVE, MGMT, ES, QSB
Ecological/Ecosystem modeling		x	BIO, ESS, MATH, ES, QSB
AY 2013-2014 and beyond			
Environmental Health or Epidemiology	x	x	BIO, ESS, ES, QSB
Atmospheric Chemistry	x		CHEM, ESS, ENVE, ES
Environmental toxicology	x	x	BIO, BIOCHEM, ESS, ES, QSB
Environmental Health Policy[++]	x		BIO, ESS, MGMT, ES
Emerging Zoonoses/Immunology		x	BIO, QSB
Eukaryotic Microbiology		x	BIO, ESS, ES, QSB
Mechanisms of Complex Disease[†]	x	x	BIO, QSB
Infectious Disease		x	BIO, QSB

[†] carried over from AY 2007-2008
[††] carried over from AY 2007-2008
[++]Cross-unit position in SSHA and/or Management in this area is supported by EES faculty.
* BIO: Biological sciences; BIOCHEM: Biochemistry; CHEM: Chemistry; ESS: Earth systems science; ENVE: Environmental engineering; ES: Environmental systems; MATH: Mathematics; MGMT: Management; QSB: Quantitative systems biology.

Teaching - Faculty in Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Science contribute to both Undergraduate and Graduate Programs.

Undergraduate Programs: SNS faculty members with interests in environmentally related research contribute primarily to undergraduate Biological Sciences (BIO) and Earth Systems

Science (ESS) majors. A number of SNS faculty with interests in *Biocomplexity and Evolution* form the core of the Ecology and Evolutionary Biology emphasis in BIO (Table 2), whereas SNS faculty shown in Table 2 in the *Climate/Watersheds* and *Global Change* areas and many faculty noted in Table 4, together with faculty from other schools, contribute to the ESS major. SNS Faculty indicated above contribute to other tracks in the current BIO major and to the Chemical Sciences major, particularly Biochemistry and Environmental Chemistry. Faculty contributions to multiple undergraduate majors is a strength for the school and valued by the faculty involved. However, faculty should be vested in the undergraduate majors to which they contribute.

Discussions are in progress regarding the feasibility of changing the ESS major to a cross-school major to enable faculty who teach the courses to have full participation in programmatic direction and student mentoring. This change would also enable the formulation of undergraduate tracks, minors, or new majors that intersect with Social Sciences and Management, with potential increases in student participation. Plans are in development for a separate Ecology and Evolutionary biology major, to be implemented when sufficient faculty are on-board to support the major. We foresee the diverse faculty who contribute to environmental research as those who will continue to contribute to a number of undergraduate majors in the future, rather than aligning strictly with a single major. From a student viewpoint, however, it is advantageous to clearly define the differences between majors such as ESS and EEB when the programs share courses and faculty. Evolution of these majors will include discussion and revisions to distinguish program content and educational objectives for the student. The faculty lines proposed above will contribute to existing undergraduate programs by filling programmatic course needs and assembling a critical mass of faculty to deliver the curriculum. Furthermore, additional of faculty in the *Environmental Health Sciences* will contribute to proposed development of undergraduate programs in Biochemistry and Microbiology and Immunology, as well as supporting current majors.

Graduate Programs: At the graduate level, the environmental faculty contribute primarily to the Environmental Systems (ES) and Quantitative and Systems Biology (QSB) graduate programs, currently the two largest and most successful graduate groups. For example, current extramural grants by members of the ES graduate group/SNRI faculty have brought more than $15M in research funds and equipment to UCM between 2003 and 2010. The proposed FTEs will contribute to strategic areas within the current graduate groups, as well as contribute to development of programmatic areas that may eventually spin-off to form new graduate groups.

Resources - Development of a stellar program in Environmental Sciences, Ecology and Evolutionary Biology, and Environmental Health Sciences requires resources in faculty, space and centralized core research facilities.

Faculty: A description of the types and proposed sequencing of faculty hires for each emphasis area is described above**.** The faculty hiring plan is derived from the need for balanced growth among the thematic areas described above, graduate and undergraduate teaching demands, identification of cross-school and cross-discipline hires that support multiple degree programs and research areas, and laboratory space limitations. As noted above, the interdisciplinary nature of environmental programmatic areas requires support from a breadth of faculty within SNS and among all of UCM's schools. The research initiatives we are pursuing and the graduate and

undergraduate degree programs associated with them span from "Natural Sciences-centric" to truly cross-school. Thus, long-range planning requires a university-wide view of programmatic development and needs. An immediate goal is to insure balance between SNS, SE, and SSHA/Management in thematic areas where complementary or cross-school hires can be made. We note, however, the difficulties associated with formal joint appointments for Assistant-level faculty. Given the likelihood of future junior faculty with cross-school research and teaching affinities, an explicit policy for evaluating and promoting interdisciplinary scholars should be established at UCM. Additional research support comes from the affiliation of adjunct researchers. There are presently two adjunct faculty (Duffy, Quinn) affiliated with the ES graduate group. Four additional government scientists have expressed interest in being involved with supervising graduate students, teaching, or being Co-PIs on grants. We expect to affiliate at least two more government scientists with the ES graduate group in the near future.

***Space and centralized facilities*:** The research encompassed within three broad environmental areas described above has prime opportunities for funding from a variety of government and foundation sources that span across physical, chemical, and biological sciences and engineering. Our strategic development is targeted to interdisciplinary areas where funding opportunities exist or are anticipated to increase. Programmatic growth relies on the availability of adequate space for research, graduate students, post-doctoral associates, and technical support staff for new and existing faculty as their individual research portfolios grow.

- Centralized instrumentation and computing facilities are critical to the success of the interdisciplinary research carried out in the area. Space and technical personnel support must be provided for these facilities to enable cutting edge research in a cost-effective way. Continued support for courses with field labs (which incur comparable or lower per student costs than courses with indoor labs) is critical for providing students with quality hands on research and educational opportunities.

  Several established centralized facilities figure prominently in the environmental program areas. The SNRI Wawona Field Station provides support for field-based research and learning across all research themes by housing field researchers, and by hosting field classes and workshops. SNRI is helping spearhead UCM's flagship Yosemite Leadership Program --- a partnership between the University of California, the National Park, and the largest privately owned business to develop tomorrow's thoughtful, ethical, and innovative leaders. The Environmental Analytical Laboratory (EAL, administered under SNRI) provides core analytical support for all research themes, including instrumentation for lab courses required in several majors (ESS, ENVE, CHEM). Likewise, the Imaging and Microscopy Facility (IMF) is a key support laboratory for multiple research themes and is used in several lab-based courses. The Genomic Core Facility (GCF) is the first centralized facility with genomics instrumentation to fulfill multiple needs of faculty in SNS and SE, with a foundation based on sequencing and microarray analysis equipment already available through faculty start-up funds. The GCF is essential for the success of research themes in Global Change, Biocomplexity and Evolution, and Ecology of Infectious Diseases. A collaborative scientific supercomputing cluster is under development using start-up funds, to be co-administered by Applied Mathematical Sciences and Environmental Systems faculty with support from the School of Natural Sciences. This computing facility will support research in the Climate and Watershed Resources and Global Change research themes. Core facilities in other program areas such as those supporting

chemical sciences would also be used by environmental faculty. ***A critical need for strengthening the Global Change and Biocomplexity and Evolution themes is a modern greenhouse facility and freshwater and seawater aquaria.*** University technical staff support for existing (i.e., EAL and the IMF) and new facilities is an essential feature of centralized facility success.

- Space and Facilities - Environmentally related faculty require a range of resources to support research that may encompass laboratory, field, and/or computational methods. Both junior and senior faculty will need adequate start-up packages, laboratory and office space, and institutional investment for equipment, both shared as noted above and individual. Anticipated space requirements for the priority hires over the next three years in the ES/EEB/EHS planning area are shown in Table 1.

  Over the longer term, each of the new faculty will require at least the CPEC average of ~700 square ft (assuming about 50% senior faculty), in addition to adequate space for centralized facilities that these faculty might use. With the possible exception of an epidemiologist or ecological biostatistician, new Environmental Health Sciences faculty require standard wet lab space with fume hoods, analytical instrumentation, and/or field equipment. New faculty in atmospheric chemistry and toxicology would likely take advantage of the Environmental Analytical Facility, and also the Imaging and Microscopy Facility or the Genomics Core lab, depending on their particular research. Depending on their research emphases, the Environmental Toxicologist, Emerging Zoonoses, and/or Animal Responses to Air Pollution researchers may need access to the vivarium or a biosafety level three (BSL3) facility (unless certain agents are avoided). Environmental Health Sciences faculty could also make use of core facilities under development by current QSB, ES, Applied Math, and Chemistry faculty. Anticipated use of existing UCM facilities by the ES/EEB/EHS priority hires over the next three years are shown in Table 1.

***Table 1. Environmental Sciences, Integrative and Evolutionary Biology, and Environmental Health Sciences* CAPRA table of requested FTEs**

Priority	Name of Position	Level†	Primary Major	Secondary Major	Primary Grad Group	Secondary Grad Group	Estimated startup	Estimated space	Special needs and strategic considerations
Year 1 (starting Fall 2011)									
1	Ecology	Open	BIO	ESS	QSB	ES	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL
2	Atmospheric dynamics	Open	ESS	Management	ES		$200 – 300K	Office + graduate student and computational workspace (400 sf)	Possible use of GIS facility, parallel computer cluster
2	Environmental management	Open	ESS	Management	ES	SCS	$200 – 300K	Office + graduate student space	Possible use of GIS or field facilities
Year 2 (starting Fall 2012)									
1	Ecological or ecosystem modeling	Open	ESS	BIO	ES	QSB	$200 – 300K	Office + graduate student and computational workspace (400 sf)	Possible use of GIS facility, parallel computer cluster
2	Environmental / Ecological biostatistics	Open	BIO	ESS	ES	QSB	$200 – 300K	Office + graduate student space	Possible use of GIS facility
2	Earth Surface processes/ Ecohydrology	Open	ESS	BIO	ES		$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL
Year 3 (starting Fall 2013)									
1	Environmental health or epidemiology	Open	BIO	ESS	QSB	ES	$300 – 500K	Office + 1,200 sf wet or 800 sf dry lab	Possible use of GIS facility, EAL
2	Conservation biology / Evolutionary biology	Open	BIO	ESS	ES	QSB	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS facility, EAL
2	Global change ecology / Paleoecology	Open	BIO	ESS	ES	QSB	$300 – 800K	Office + 1,200 sf wet/dry lab	Possible use of GIS, field facilities, EAL

† All searches are designated as open because of the strong need of more senior faculty in all of these programmatic areas, and the low probability of successfully recruiting senior candidates in any of these positions.

Physics Strategic Plan

Physics is the study of the properties of nature at their most fundamental. It ranges from the study of the very tiniest pieces of matter and energy, including molecules, atoms, photons, and subatomic particles, to the study of the entire universe. Insights in physics have revolutionized our society. It is hard to imagine an area of science or engineering that has not been profoundly affected by fundamental developments in physics. One need only think of the harnessing of electricity, the invention of the transistor, and the discovery of the laser. The present strength in physics at Merced is centered on three broad areas of research, detailed below.

1. Atomic, Molecular, and Optical Physics

UC Merced is building a strong research emphasis in atomic, molecular, and optical (AMO) physics. Interest and developments in this field have surged in the last ten to fifteen years, primarily due to advanced experimental techniques. These developments have been recognized by several recent Nobel prizes: for ion trapping and atomic clocks (1989; Ramsey, Dehmelt, Paul), for atomic cooling and trapping techniques (1997; Chu, Cohen-Tannoudji, Phillips), for the creation of Bose-Einstein condensates (2001; Cornell, Ketterle, Wieman), and most recently for advances in quantum optics (2005; Glauber, Hall, Haensch).

The modern trend in AMO science is toward greater control over quantum systems such that quantum coherence is maintained and quantum processes can be resolved. This includes working at very low temperatures, at ultrashort time scales, and with very high spectroscopic precision. Modern techniques can now routinely address single atoms, single photons, and single qubits (the quantum analog of a bit).The technological implications for such precise control over the fundamental building blocks of ordinary matter are as yet unimagined, but the promise is great. By analogy, the laser, which in some sense is a “Bose-Einstein” condensate of photons, has impacted almost every area of technology and medicine. The program in AMO physics complements the research programs in condensed matter physics and chemistry.

Atomic, Molecular and Optical Physics Research

At present UC Merced has hired seven faculty whose research supports the general AMO theme: Roland Winston and Ray Chiao (both split between Natural Science and Engineering), Kevin Mitchell, Jay Sharping, Lin Tian, Michael Scheibner and

Sayantani Ghosh. Potential areas for future AMO hires, include, but are not limited to:

- *ultrafast optics*: pico-, femto-, and attosecond pulses, time-domain studies, wavepacket dynamics, high harmonic generation, photonic crystals and nanostructures for plasmonics and terahertz dynamics
- *attosecond physics*: fourth generation synchrotron sources, attosecond pulse generation, characterization, and applications
- *fundamental quantum processes and engineering*: quantum control, quantum computing and information theory
- *atomic cooling and trapping*: ultracold gases and plasmas, Bose-Einstein condensates, degenerate Fermi gases, superfluidity
- *precision measurement*: atomic clocks, ultrasensitive detectors, high precision spectroscopy, multi-photon microscopy
- *novel imaging techniques*: sub-diffraction fluorescence imaging, near-field imaging, etc.

Funding potential: Various government funding agencies support physics research, and AMO research in particular, with NSF being the largest sponsor of table-top AMO research. Furthermore, DOE funds several large national user facilities, including three that are strategically located with respect to UC Merced: Lawrence Livermore National Lab, Lawrence Berkeley National Lab, and the Stanford Linear Accelerator Center. Research is supported to a significant extent by the DOE and defense organizations (DARPA, ONR, AFOSR, ARO). In addition, optics research has historically benefited financially from its close connection to industry and industrial applications.

Cross-disciplinary and cross-school linkages

Expertise in AMO science has a natural connection to other present and potential University research programs. This is reflected in the fact that two of the AMO faculty have joint appointments between natural science and engineering. Specific connections include, but are not limited to:

a) The energy sciences program: Optics is of fundamental importance to solar energy collection.
b) Chemical physics/ physical chemistry: Current faculty rely heavily on lasers and other optical techniques. They could be well supported by additional expertise in optics and atomic physics.
c) The materials or nanoscience programs would benefit from advanced optical techniques. Also, many of the issues of quantum control, manipulation, computing, etc. are relevant to nanoscience just as they are to AMO science.
d) Computer science: Quantum computation and information processing synergizes naturally with computer science.
e) Biology and Earth systems science: Synergy could potentially arise in the areas of microscopy, advanced detector design, and optics.

2. Condensed Matter Physics

The Condensed Matter Physics program in Natural Science is a broad, interdisciplinary program focusing on "condensed" phases of matter. These phases range from simple solids and liquids to metallic and semiconductor nanomaterials to exotic condensed phases such as the superconducting phase exhibited by conduction electrons in certain materials, and the ferromagnetic and antiferromagnetic phases of spins on atomic lattices. The intellectual scope of this program is vast, and includes an understanding of the optical, electrical, mechanical, and transport properties of materials, encompassing the nano- to the macro-scale. Research in condensed matter can be harnessed to design new materials such as magnets, semiconductors, ferroelectrics, superconductors, polymers, and liquid crystals, used for applications in a wide variety of disciplines including efficient energy conversion, ultra-fast optics, quantum information processing, and structural materials, to name a few.

Condensed Matter Physics Research

The faculty participating in this program span the disciplines of solid state physics, nanoscale physics, soft matter physics, physical chemistry, surface science and materials characterization. Several specific areas that are at the forefront of modern condensed matter science are targeted. These include photonic materials, nano-scale electronics, quantum information and "smart" materials.

Photonic materials. "Photonics" may be broadly defined as the technology of generating and harnessing light and other forms of radiant energy. All photonic technologies rely on appropriate materials, which may be organic, inorganic, or composites. Materials that respond nonlinearly to light are used in frequency conversion of lasers, as optical limiting materials to protect eyes or optical sensors from laser pulses, and as contrast agents in nonlinear optical imaging technologies. Materials that change their optical properties in response to applied electric fields can be used to fabricate electro-optic modulators for electrical to optical conversion in fiber-optic communications. Photonic band-gap crystals, periodic dielectric structures that forbid propagation of a certain frequency range of light, have potential applications in ultra-low-threshold lasers, optical filters, polarizers, and waveguides. Metamaterials are those that exhibit novel optical properties leading to compact imaging systems and even "cloaking" devices. Research in this area is highly interdisciplinary and spans solid-state physics, surface science, optical physics, physical chemistry and applied mathematics.

Nanoscale electronics. " Nano-electronics" is poised to provide the next technological revolution in computer design. Moore's prediction of rapid miniaturization has already pushed commercial transistors well below 100 nm in size. Developing an in-depth understanding of the fundamental properties of nanoelectronic devices is of crucial importance because Nature behaves quite differently at the nanoscale, and

an extrapolation of our knowledge at larger dimensions is not possible. It is not prudent to invest a vast amount of time and effort to try to compete with the immense silicon industry. Instead, it is more attractive to look into nanoelectronic devices that could play a role complementary to the silicon technology, with a strong focus on exploring the possibilities of organic materials, for example in the form of single molecules or self-assembled molecular monolayers. Investigating the use of complex transition-metal oxides in nanoelectronic devices is another field worth exploring since these materials show a wide range of interesting characteristics, including strongly insulating behavior, high-temperature magnetism and superconductivity. Nanoelectronics is the field where physics, material science, chemistry and electrical engineering inevitably meet.

Quantum information science. The tremendous miniaturization of electronic devices has led to the point where the spatial scale has hit the atomic limit. In this regime, the quantum properties of matter dominate, which, at first glance, seems to compromise information processing and storage, since quantum states are unstable and are destroyed by the very act of making a measurement. However, this very fragility of quantum phenomena has the capability of revolutionizing the fields communication and computation. A quantum channel of information transfer is very secure, since any effort to eavesdrop leaves an imprint on the quantum state. Computation power is exponentially enhanced when using quantum bits instead of classical ones due to the property of entanglement, which adds immense parallel processing capabilities. Recently, quantum information processing has started influencing the agenda of condensed matter, and some of the implementable quantum bits which this field has contributed include superconducting structures (Josephson junctions), single-electron quantum dots and semiconductor photonic devices.

Photovoltaics. As the worldwide demand for energy increases, the need for renewable energy sources will become more and more urgent. Solar energy is the obvious answer, providing an unlimited, pollution-free energy source. Through the use of efficient photovoltaics, a relatively small amount of land area can in principle be used to meet the energy needs of the entire United States. For these reasons, research into more efficient and lower cost ways of turning the energy of sunlight directly into electrical energy is now, and will continue to be, an important field in the physical sciences. Photovoltaic devices can be grouped into two broad categories, each type having its advantages and disadvantages: solid state (semiconductor) devices, which may be organic, inorganic, or hybrid, and electrochemical cells.

The California Advanced Solar Technologies Institute (CAST). This year the California Advanced Solar Technologies Institute (CAST) was established at UC Merced, lead by physics faculty member Roland Winston and funded by a five year $2.25 million dollar grant from the UC Office of the President. CAST will serve as a platform for a variety of solar energy projects including development of novel photovoltaic devices, which convert sunlight into electricity, and thermal energy for cooling of

buildings, industry and other applications. In addition to speeding the commercialization of solar technologies, another of CAST's primary goals is to help train the next generation of solar energy researchers.

The areas described above are particularly attractive because they offer the possibility of many different types of collaborations, both within UC Merced and at other nearby institutions. Potential industrial collaborations could be found in nearby Palo Alto and the Bay Area. There are also collaborative opportunities with Lawrence Livermore National Laboratory (LLNL) through LLNL/UCM adjunct faculty. We also anticipate that collaborations and funding through NASA/Ames will be available in the near future.

Current faculty in this research area are:

- Roland Winston (solar energy, optics)
- Sayantani Ghosh (experimental condensed matter physics)
- Raymond Chiao (experimental condensed matter physics)
- Lin Tian (theoretical condensed matter physics and quantum information)
- Ajay Gopinathan (theoretical soft condensed matter physics and biophysics)
- Linda Hirst (Experimental soft condensed matter physics and biophysics)
- Michael Scheibner (Experimental condensed matter physics)

Other faculty across disciplines who could contribute include

- David Kelley (experimental chemical physics)
- Anne Kelley (experimental physical/analytical chemistry)
- Tao Ye (nanotechnology)
- Jennifer Lu (materials engineering)
- Valerie Leppert (materials engineering)

Given the necessarily diverse and fundamentally interdisciplinary nature of this group, and the desirability of building on and extending current strengths, we would like to see recruitment of new faculty in fields that encompass and bridge condensed matter physics, physical chemistry, and materials engineering. We need to recruit faculty with related but complementary research interests in order to build a program that can attract graduate students, offer modern and compelling programs for both undergraduate and graduate students, successfully compete for funding, and achieve national and international prominence in research. The condensed matter physics and senior nanoscale physics searches underway during the current academic year will result in new faculty who would contribute to this research area. It is assumed that these positions will be carried forward if we are unsuccessful at filling them this year.

Funding potential: The level of support available is a primary concern when considering programmatic initiatives. This type of research is very well funded and

we suspect will continue to be well funded in the foreseeable future. The Bush administration's American Competitiveness Initiative (ACI) commits to doubling, over 10 years, funding for research at key federal agencies that support physical science and engineering: NSF, DOE's Office of Science, and NIST. Part of the ACI is the Advanced Energy Initiative, which provides for a 22% increase in funding for clean-energy research at the DOE. The fields of solid-state physics, and materials science will be key to advances in new energy sources, and UCM could become a major player in a field in which few established universities yet have large, well developed programs.

Single-investigator or small collaborative group funding in this field is available from a number of different agencies and programs within these agencies. Examples include:

- NSF: programs in Physics and Materials Research divisions.
- AFOSR Broad Area Announcement (BAA): programs in Metallic Materials, Ceramic and Nonmetallic Materials, Quantum Electronic Solids, Semiconductor Materials, Surface and Interfacial Science.
- ARO BAA: programs in Condensed Matter Physics, Quantum Information Science, Surfaces and Catalysis, Electrochemistry and Advanced Energy Conversion, Materials Synthesis and Processing.
- ONR BAA: programs in Electronic Materials, Semiconductor Materials.
- DARPA: solicitation in Nano-Composite Optical Ceramics.
- DOE: Several programs in Basic Energy Sciences: Condensed Matter Physics, Materials and Engineering Physics.

3. Biological Physics

Experimental, computational and theoretical methods and techniques from Physics have played a major part in recent advances in our understanding of biological systems. Examples include cutting-edge imaging techniques that have provided snapshots of biological molecules and their complex assemblies in action and have also led to dramatic improvements in medical imaging. The ability to control matter at the smallest scales, using for example optical and magnetic tweezers, has allowed us to study and manipulate biological processes at the single molecule level. Theoretical and computational modeling are leading the way in our efforts to understand protein folding/misfolding, the functioning of molecular motors and enzymes, ion channels, membrane structure and dynamics as well as the dynamics of complex biochemical and neural networks. The result of advances in biological physics will be a better understanding of normal and pathological processes at both the molecular and systems level. Equally important, from a physics perspective, is that studies of biological systems that serve as paradigms of complex, self-assembling, non-equilibrium systems has led to new and interesting physics including emergent properties in dynamical networks, self-assembled, self-replicating systems, the thermodynamics of "active" systems and an atomistic

understanding of complex macromolecules. Biophysics is the most rapidly growing area in physics research attracting both seasoned physicists from several different subfields and large numbers of entering students.
To develop a state of the art research program in biophysics requires individuals who have had extensive training in doing biophysical research, hailing from either traditional physics subfields such as condensed matter, polymer or statistical physics or from more interdisciplinary backgrounds including specifically biophysics, materials or bioengineering.

Biological Physics Research

Current faculty in this research area are:

- Ajay Gopinathan (theoretical soft condensed matter physics and biophysics)
- Linda Hirst (Experimental soft condensed matter physics and biophysics)
- Jay Sharping (experimental biophotonics)

Other faculty across disciplines who could contribute include

- Mike Colvin (computational biology)
- Tao Ye (nanotechnology)
- Wei-Chun Chin (bioengineering)
- Ariel Escobar (bioengineering)
- Andy LiWang (biochemistry)
- Patti LiWang (biochemistry)

A core group of at least 6 biophysicists is needed to establish a strong competitive program. Broad areas of interest include biomaterials and biopolymers, membranes and associated phenomena, single cell studies of biomechanics including motility and mitosis, microfluidics with biological applications and protein folding. Several specific research fields are listed below that would allow us to attract the best available candidates with interests in these broad areas.

- Biocompatible organic materials as organ replacements and/or as scaffolds for cell growth (links to Materials program and to Bioengineering)
- Development of ultrasensitive bioanalytical techniques, particularly for single molecule/single assembly measurements and/or high throughput screening
- Single molecule studies of molecular motors, DNA/RNA dynamics, transcription factor binding/functioning, viral genome packaging, ion channel transport etc.
- DNA and/or other biological macromolecules as scaffolds for fabrication of organized structures (links to Materials program)
- Protein folding, experimental and computational methods that quantitatively determine protein structure and folding pathways

- Atomistic modeling of biological systems: channels, membranes, receptors, proteins, enzymes (links to CCB)
- System level studies of mitosis, morphogenesis, cellular motility, cytoskeletal dynamics, viral self-assembly, cellular hydrodynamics, chemotaxis and pattern formation. (links to Systems Biology)
- Membranes and associated phenomena including fusion, exo/endocytosis, pore formation and functioning, lipid rafts. Also biomedical applications of engineered membranes. (links to Materials and Bioengineeing).

It is to be noted that many of these areas will have a considerable overlap with research interests in Biochemistry and Molecular Biology. There is also a considerable overlap with the field of soft condensed matter physics in both expertise and methodology. We will seek to hire individuals to enhance this natural synergy and anticipate hiring both theorists and experimentalists in these fields.

Funding potential. Funding for biophysics is growing at an extremely rapid pace. The NSF provides substantial funding for fundamental research in physics including its interfacial areas with biology. Research more directed toward specific problems in the life sciences is supported by the NIH, and also to a significant extent by the DOE and defense organizations (ONR, AFOSR, ARO). Funding for research in biological physics is also available from private foundations (*e.g*. Packard, Hughes, Burroughs-Wellcome) and for-profit companies. Faculty with research interests in this area should have a variety of funding opportunities available to them, although all of these sources are highly competitive.

Cross-disciplinary and cross-school linkages

The fundamental principles of Physics form the foundation for all of modern science and engineering. While there remain exciting unsolved problems in pure physics there is increasing interest in the frontiers that lie at the intersection with other disciplines including the life sciences, earth and environmental sciences, and engineering. The Biological Physics program is explicitly interdisciplinary between the physical and life sciences, and there should be extensive opportunities for collaboration across these groups. In particular, Biological Physics faculty are expected to have research interests that overlap Biochemistry, Molecular Biology and engineering, particularly Bioengineering. Finally, this research area offers a natural interface with the proposed medical school. Interdisciplinary collaborative science is one of the few strengths that UC Merced can leverage as a research institution, and this strength should be fostered as a means of bolstering the resources and potential of both biological and physical science at UC Merced.

4. Astrophysics

Introduction

The University of California is a world leader in (observational) astronomy and (theoretical) astrophysics. The world's largest, W.M. Keck twin 10-m telescopes have been designed and built by UC in collaboration with Caltech, and a joint future 30-m telescope is well on its way. This unprecedented access of UC astronomers to the world's premier optical telescopes has also stimulated a vigorous development in several areas of theoretical and computational astrophysics. Thus there is a vibrant community of astronomers and astrophysicists in California, which also includes many researchers at federally funded laboratories as well as private organizations.

All of the well established UC campuses have used this unique access to facilities and expertise to develop first class astronomy and astrophysics research groups. We propose to begin such a research direction also on our campus. Our goals will be carefully chosen to leverage and augment physics research already conducted at UC Merced, while being realistic in scope. Our first consideration is what kind of 'flavor' of astronomy and astrophysics we believe would be optimal for UC Merced. Astrophysics can be broadly classified as: theoretical, observational instrumental, and experimental.

Experimental or laboratory astrophysics, typically aims to study the physics and chemistry of interstellar or interplanetary molecules and dust grain particles under extreme conditions (high vacuum, cold temp., UV/X-ray irradiation or high energy particles [Cosmic Rays]). Laboratory astrophysics groups require significant laboratory facilities. In California there are current successful groups at LLNL (Livermore) and NASA Ames (Mountain View) working in these areas. Instrumentation development for telescopes (imaging cameras, spectrographs, adaptive optics technology) is similarly a laboratory and engineering intensive endeavor This work is very well done at UC Santa Cruz and UCLA. Researchers in both these two fields, laboratory astrophysics and instrumentation, would require laboratory space comparable with other experimental physicists currently in the physics group.

Observational astrophysics (astronomy) has grown enormously in California, as well as nation wide and globally, thanks to the many new observatories on the ground and in space, and covering the entire spectrum from radio – infra-red –optical – X-ray – Gamma-ray wavelengths. Competition for observing time is fierce (oversubscription rates range from 4 – 10), and with it funding is equally limited. Successful observing proposals increasingly rely on demonstrable theoretical and analytical team work at the home institutions.

Theoretical astrophysicists study a broad range of phenomena, several of which have been well developed in California at UC, Caltech and Stanford, For example, cosmology, galaxy evolution, stellar evolution, extraterrestrial planet searches and Galactic Center (black hole) studies are well established research directions at several of the UC campuses. Below we describe an area of research that is presently less emphasized within UC, but which exploits several areas that uniquely suited to UC Merced

Proposed research direction

The above considerations suggest a specific direction for UC Merced for starting a modest astronomy and astrophysics (sub-)group that would be a natural fit: astrophysical research which is directed at studying the physics and chemistry of materials exposed to

the extreme conditions of space. The intellectual foundation of this program is to understand how the optical, electrical, mechanical, physical and chemical properties of large molecules and nanoparticles are modified by exposure to the harsh environment of space and how these changes, in turn, influence the origin and evolution of planets, stars, and galaxies in the Universe. In addition, the impact of these large molecules and nanoparticles on the emergence of life and space is a question which is now emerging as new field of research that can be successfully probed. Besides these fundamental science aspects, this program will also lead to a deeper understanding of materials and their properties on the nanoscale.

It is well established that large molecules and dust are ubiquitous and abundant components in the interstellar medium of galaxies and conversely play a major role in the evolution of the Universe. Mid infrared spectra of almost all objects show the tell tale signatures of large Polycyclic Aromatic Hydrocarbon molecules and nanograins. This is particularly true for regions of star and planet formation. These components dominate the opacity of these regions and hence control their observable spectral characteristics and thus whatever we can learn through remote observations. These species dominate the energy balance of the gas through the photo-electric effect – and hence its thermal properties such as pressure and temperature – as well as the ionization balance – and hence the coupling to prevalent magnetic fields. In addition, these species provide surfaces for active chemistry and influence in many ways the organic inventory of space, in particular in regions of star and planet formation.

This program will leverage the following strengths of UC Merced:

1) Close proximity to major, unique national laboratories – Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, and NASA Ames Research Center – that provide facilities and research environments for experiments on large molecules and nanograins under astrophysically relevant conditions. These include the analytical tools to study the properties of molecules and nanograins relevant to astronomers as well as providing energetic UV/X-ray and energetic particle environments which are so relevant to space. In addition, the Bay Area is home to several groups that study materials from sample return missions.

2) Direct access to the Keck observatory and its infrared instrumentation which provide prime observational opportunities to study the characteristics of large molecules and nanograins in space. In addition, access can be obtained to NASA's new orbital and space based initiatives in the infrared (The Stratospheric Observatory for Infrared Astronomy – SOFIA; and the 6.5-m James Webb Space Telescope) which makes this program very timely. Specifically, These observatories are geared towards probing the characteristics of large molecules and nanograins in regions of active star and planet formation in the here and now and all the way out through the era when most stars and galaxies were assembled.

3) The unique UC Merced research environment which is conducive to interdisciplinary studies where astronomers in the area of astrochemistry, astrophysics, and astrobiology

can work closely together with experts in physical chemistry, solid state physics and surface science, and materials sciences.

Scope of the program

To start a viable astronomy and astrophysics (sub-)group within physics at UC Merced would require the commitment, over the next few years, to hire a total of at least 3 faculty members in these fields. Fewer faculty would not be able to start a minor in astronomy and astrophysics and would only wet the appetite of prospective graduate students. These faculty would also benefit from close interactions with physics and engineering colleagues who have an open eye towards astronomy and astrophysics but who are firmly embedded within other disciplines, specifically in the areas of molecular physics, material sciences, Earth and planetary sciences, biochemistry and astrobiology, thus exploiting a truly interdisciplinary environment.

A physics minor in astronomy and astrophysics of the kind described above would provide graduate students at UC Merced with a unique research environment and learning experience that will poise them well for future careers of research in astronomy and astrophysics, (space-) materials sciences, NASA, national research laboratories, or aerospace industry.

If such a program would begin with the very near future, then current 'Recall Adjunct Professor of Research' Wil van Breugel could help jump start such a group by teaching an upper level observational astronomy class.

Space and Facilities Needs

In a well balanced department a three to one ratio between experimental physicists and theoretical physicists is typical. Thus, most physics hires should be experimentalists. Although the nature and configuration of the space required by different types of physicists is quite different, all of the experimentalists are likely to require an average of at least 1000 sq. ft. of lab space each, plus office space for the PI, postdocs, and graduate students. A junior experimental astrophysicist may not require as much space however as many of their experiments will take place remotely. We anticipate that theoretical/numerical astrophysicist will need just office space for themselves and group members. Established senior faculty will require more space than this. Start-up costs for experimentalists depend on specific research needs but typically fall in the $500k-$750k range for a junior hire and 700k-1.5M for a senior established hire.

Experimental condensed matter and AMO physicists sometimes need bench and fume hood space but typically have large pieces of specialized equipment such as cryostats, vacuum chambers, and laser-based setups on large optical tables. They often also have specialized requirements for the space in which these instruments are housed, such as high temperature stability, low vibration, isolation from sources of electrical noise, and light-tightness. Because of the specialized nature of the instrumentation it is often not possible for a single room to be shared by multiple investigators Experimental biophysicists tend to have research groups that require

a mixture of wet lab space, with fume hoods, and dry space for specialized instruments and depending on the specific field they may require access to core facilities for confocal microscopy, in-house x-ray diffraction, or lithography facilities. Theoretical and computational hires will require office space and computational facilities for the PI, postdocs, and graduate students.

Faculty Needs

At a bare minimum twelve FTEs will be needed to teach the core of the undergraduate and graduate physics curriculum, with more faculty needed to provide depth in our course offerings and to provide a critical mass for an effective research environment. To achieve this goal we require a hiring rate of at least two faculty per year. We currently have eight FTEs dedicated to teaching physics (Profs. Chiao and Winston at 0.5 FTE each and Profs. Mitchell, Ghosh, Gopinathan, Sharping, Hirst, Scheibner and Tian at 1 FTE each.)

Proposed Hiring priorities for 2011-2014

Here we propose a hiring plan for the next three years. The proposed positions are flexible depending on hiring outcomes for the preceeding years and represents a general guide on how the dept will grow over the next three years. The primary goals of this hiring plan are to cover teaching requirements for our major and graduate programs, to build current research strengths and to establish an astrophysics program with the goal of teaching a minor in astrophysics.

2011-2012

1. Biophysics and soft condensed matter experimental physicist.

This position seeks applicants who are trained in physics with research interests in either biophysics or soft condensed matter physics. Fields of interest include bio-molecular self-assembly, biological membranes, biopolymers, molecular motors, biological networks or the development of novel biophysical techniques. In soft matter physics areas of interest will be polymer physics, colloidal science, macromolecular assembly and liquid crystal science. We seek candidates whose research is complementary to the work of existing faculty in the School of Natural Sciences.

2. Atomic, Molecular and Optical (AMO) experimental Physicist.

This position seeks an experimental physicist trained in atomic and molecular or optical physics. The areas of research of interest include ultrafast optical

phenomena, attosecond studies, fundamental quantum processes and engineering, atomic cooling and trapping, precision measurement, and novel imaging techniques, quantum information in quantum many body systems and semiconductor photonics. New programs as well as research in areas complimentary to existing UC Merced faculty are welcome.

2012-2013

1) Astrophysics theoretical/numerical junior
2) AMO exp Junior

2013-2014

1) Condensed Matter Theory
2) Astrophysics (observational) junior

Summary of proposed physics faculty hires for the next five years

	2010-2011	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**
FTEs already hired	8	9	11	13	15
Active searches	1	2	2	2	2
Cumulative	9	11	13	15	17

School of Social Sciences, Humanities, and Arts Strategic Plan, AY 2010-11, 2011-12, and 2012-13.

Mark Aldenderfer, Dean
April 19, 2010

Summary of the plan

Positions requested:

AY 2010-11	11
AY 2011-12	9
AY 2012-13	9
Total	29 (EVC target 21)

Eleven Priority 1 positions rank-ordered for AY 2010-11

Nine Priority 1 positions recommended for AY 2011-12 and 2012-13 but **NOT** ranked ordered by priority

SSHA will engage in a revision of the strategic planning process for FTE in Fall 2010; therefore, we request that we be given permission to rank-order our choices for AY 2011-12 and 2012-13 based upon two criteria: what positions are actually allotted for AY 2010-11 and the results of the changes in our planning process.

Although no positions for the management major are included in the priority rankings, three positions are identified as priorities as a plan for the management major begins to emerge

Space is not a concern for any SSHA hiring scenario

No new majors are proposed in this plan

This plan was approved by a vote of the faculty that was completed on 19 April 2010:

Yes: 39
No: 0
Abstain: 3
Did not vote: 5

Document summary

This document consists of the following:

A description of the process by which the plan was created and the distinct logics by which it was developed;

The FTE requested for the three years of the planning period

An analysis of current and planned space requirements for SSHA

Strategic plans of each of the programs and graduate groups of SSHA

The appendices and tables requested by CAPRA (separate documents)

Appendices 1a, 1b, 1c: positions requested by AY

Appendix 2: Majors and grad groups{ proposed SSHA hires

Appendix 3: SSHA space requirements over the planning period

How the plan was developed

I learned about the deadline for the strategic plan documents shortly after arriving to Merced in early January. I requested from EVC and Provost Alley an extension of the deadline to submit the plan, and scheduled a faculty meeting for 26 January 2010 to discuss, among other things, my suggestions for the process through which SSHA would develop a strategic plan.

At that meeting, I recommended that the plan be developed jointly with the SSHA Executive Committee and myself. Although this recommendation was not voted upon, the faculty supported the process.

Consequently, I asked each of the groups within SSHA to submit to me their strategic plans and FTE requests by 15 February 2010. I asked them to develop their plans with strict attention to the guidelines outlined in the memo from EVC and Provost Alley and sent to the deans on 9 December 2009. This memo also contained the detailed requests by CAPRA as to formatting and content for the plans.

Based upon these program plans, including input from the graduate groups (ech plan is included in this document for your reference), I prepared a draft FTE request and presented it to the executive committee on 5 April 2010. It became clear during that meeting that there were very different opinions on how to best allocate FTE among the members of the Executive Committee. The debate and

discussion was spirited, difficult, but respectful. At the end of the meeting, an unhappy consensus was reached on the allocation of FTE requests for AY 2010-11. Although CAPRA has asked that we create a plan for three years, the Executive Committee determined that since we may not be granted the full number of FTE requested in AY 2010-11 (these now total 11), we would instead ask CAPRA to allow SSHA to revisit the next two academic years and re-evaluate our requests for AY 2011-12 and 2012-13 based on the positions awarded to us for AY 2010-11. Therefore, it was recommended by the committee that we list the positions for AY 2011-12 (9) and 2012-13 (9) in alphabetical order and indicate to CAPRA that these are all priority 1 positions. I should stress that this decision was reached by consensus by the committee members. SSHA is now asking for a total of 29 positions for the planning period, or eight more than the target requested by the provost. It was also agreed that we indicate to CAPRA and the administration that it is time to begin to engage in serious discussions about the Management program. As you may know, the Provost maintains a pool of at least three (unfunded) FTE designated for Management. Although these positions were not placed in the priority tables, we are asking CAPRA to consider releasing them as a SSHA-centric plan for Management begins to take emerge. Position descriptions for these are included in this document.

The amended plan was emailed to SSHA faculty on 9 April 2010, and was discussed extensively at a meeting of SSHA faculty (a voting meeting) on 12 April 2010. An email ballot was sent to all SSHA faculty on Tuesday,13 April 2010, and votes were to be in by 5PM on Monday, 19 April 2010. The results of the vote are: 39 yes, 0 no, 3 abstain, and 5 did not vote.

To improve the planning process, SSHA will engage in a review of its strate4gic plan and will discuss in depth a direction for SSHA during Fall 2010. This will provide needed context for the reassessment of SSHA priorities in the light of CAPRA recommendations and EVC FTE assignments and is consistent with the desire, as outlined above, to re-examine the priority ranking of positions in the light of these decisions.

Plan logics and plan evolution

It goes without saying that each and every SSHA major and program needs to grow. Unfortunately, fiscal realties make that impossible and thus, strategic thinking is required. In the development of the draft plan, I relied upon a number of assumptions and principles in making my selections.

NB: the term “program” here is meant to describe disciplinary offerings in general and is not meant to describe programs that listed within SSHA.

Draft plan logic as developed by the Dean

1) In the plan, I offered only those positions I deem Priority 1 using the CAPRA definition. There seemed little point in defining lower priorities in this exercise.

2) Within the Priority 1 category, my selection of requested FTE was based upon the following criteria: a) current and projected enrollment growth at the undergraduate level; b) my evaluation of program strength and coherence based upon the narratives sent to me as a part of this process. This also includes consideration of graduate education as offered to me by our two graduate groups; c) other factors, most notably whether a program has an opportunity to bring distinction to SSHA and UCM, how a program fits into interdisciplinary thinking at UCM, and finally, whether a program offers a potential for making a significant contribution to the Research Themes articulated in the 2009 Strategic Academic Vision of UCM. As dean, I am responsible for the growth and development of the school as an entirety.

NB: Thus, the draft plan was not strictly enrollment driven.

3) The draft plan did not include the Writing Program, which obtains its FTE through SSHA by an alternative process.

4) This plan made no specific request for hires in the Management major. I believe that Management should be housed within SSHA until it is ready to move forward as its own School, some time in the future. I cannot predict when and how these FTE will be released to SSHA.

5) The draft plan asked for 12 FTE in 2010-11, 10 in 2011-12, and nine in 2012-13, for a total of 31. Should we be reduced to the original 7-7-7 model proposed by the Provost in December 2009, I recommend that we revisit these lists on an annual basis, and I look forward to discussing just how this can be done. Again, given the uncertainty of the state budget, just how many of these positions we will get is unknown, but we should ask for what we need.

6) The draft plan did not come close to what SSHA faculty requested—that was a total of 52 FTE. I considered my draft to be a good faith compromise.

Compromise plan logic

The meeting of the Executive Committee was difficult primarily due to very different models of how FTE should be allocated. At t one extreme was a model that posits that all FTE should be allocated strictly by current and projected enrollment growth and the number of majors. This plan leaves nothing for those programs with lower enrollments, and rewards those programs that, at least in the minds of the advocates, have been doing the job requested of them: growing

their programs. Although the logic of the model is clear, it is of course the most selfish.

An intermediate model was proposed that argued strongly for enrollment growth as the primary criterion upon which FTE decisions should be made but offered the dean a proportion of the total number of FTE to be used for strategic hires. This approach recognizes a common good, but penalizes those programs that, in the eyes of the proposers, have not thought strategically about maximizing enrollment growth.

It should be obvious to CAPRA and the EVC that the strategic planning process as currently implemented at UCM (and as implemented historically by SSHA) is flawed and frankly, untenable. That this is the case is reflected by the outcome of the discussions of the Executive Committee: it took more than three hours to rank eleven positions for AY 2010-11 simply because of the incommensurate approaches to FTE allocation. No one was willing to rank the positions for the other two years although there is broad consensus that the positions listed are of strategic importance for SSHA. It is for these reasons that SSHA is asking that we be permitted to revise and review the priority rankings for AY 2011-12 and 2012-13 in the light of an attempt to create consensus on a SSHA-wide process for FTE allocation to be undertaken in Fall 2010.

The plan submitted is thus an unhappy compromise agreed upon by consensus by the Executive Committee and voted upon by the faculty. We need to do better.

Narrative of positions requested for the three years of the planning process

As noted above, the FTE request for AY 2010-11 is rank-ordered, while the other two years are not.

Positions requested, AY 2010-11
(These positions are ranked in order following the meeting of the SSHA Executive Committee)

Developmental Psychologist ; Psychology (Associate/Full) We intend to hire a senior (tenured) developmental psychologist with a focus in cognitive and/or social development in childhood (pre-adolescence). Within this broad focus, we will seek to recruit the best available candidate, but will give preference to researchers who complement and extend the existing areas of research expertise. High-priority additions would be someone with expertise in infancy or developmental neuroscience. More broadly, this position is intended to provide much-needed senior leadership and mentorship in the developmental area, which is currently without a tenured faculty member. This hire will require both laboratory space equivalent to the largest labs in the new Social Sciences and Management Building (e.g., 900 sf), and startup funds of about $150,000.

Regarding space, the anticipated developmental psychology hires would work with infants and children in laboratory settings. They need space for (a) interacting with the infant/child in a controlled environment, (b) observing those interactions through one way mirrors from a separate room, and (c) parents to wait for their infant/child in close proximity to the experimental room. Possible research strengths**:** cognitive development in infancy; developmental neuroscience; cognitive and/or social development in childhood. Possible teaching contributions: New undergraduate and graduate courses in area of specialization (e.g. infancy; neuroscience); PSY 130, Developmental Psychology; PSY 136, Cognitive Development. Possible research synergies**:** Strong synergies are expected with both current developmental faculty (Chouinard and Dunham). In particular, an emphasis in social and cognitive development will overlap with both, and a focus in infancy or developmental neuroscience will open new avenues for existing faculty and graduate students to extend their research interests to younger children or to neuroscientific methods, respectively.

Quantitative Psychologist; Psychology (Assistant) We intend to hire a quantitative psychologist with a solid background in statistical modeling. This hire will require both laboratory space equivalent to one of the smaller labs in the new Social Sciences and Management Building, and startup funds of about $80,000. This position will *expand our existing strengths* in Quantitative Psychology, and strengthen our ability to contribute to research in both Developmental and Quantitative Psychology. This hire will also teach one of our two required graduate statistics courses. Possible research strengths: longitudinal data analysis, multilevel modeling, categorical data analysis, structural equation modeling, item response theory, meta-analytic models. Possible teaching contributions: PSY 10, *Analysis of Psychological Data*; PSY 15, *Research Methods in Psychology*; PSY 105, *Advanced Research Methods in Psychology*; PSY 171, *Psychological Tests and Measurement*; PSY 190, *Topics in Psychology*; PSY 202A *Advanced Psychological Statistics I*; PSY 202B, *Advanced Psychological Statistics II*; PSY 202C, *Multivariate Methods*; PSY 205, *Measurement Theory and Psychometrics*; PSY 206, *Quantitative Methods for Reviewing Research*; PSY 207, *Linear Structural Modeling*; PSY 211, *Computer Programming for Social Sciences*; and PSY 212, *Special Problems in Psychological Statistics.* This hire may also develop new undergraduate and graduate courses, for example, *Multilevel Modeling* or *Longitudinal Data Analysis*. Possible research synergies: Direct synergies are with Shadish's research on meta-analysis and Vevea's research on meta-analysis and item response theory. However, this hire will benefit most of our faculty in Developmental and Health psychology where nested design requiring multilevel models, and longitudinal designs following children or patients over time, are common.

Cognitive Science and Technology; Cog Sci (Assistant/Associate) We intend to hire an applied cognitive scientist to *expand our existing strength* in technological and computational aspects of CIS, facilitate industry cooperation,

strengthen ties with Virtual Heritage/SSHA and CSE/SoE. Our last faculty recruitment effort (search began 2007-8) focused on a Cognitive Engineering hire. The search was nearly successful. A hiring case for a candidate with expertise in both human-computer interaction (HCI) and visual perception achieved majority faculty support when the position was "deferred" by administration in response to the economic crisis. Freezing this position has crippled our plans to steadily advance our curricula into cognitive science applications to technology, and adversely affected our undergraduates. Many students pursue the cognitive science major because they are interested in the development and use of technological applications, and more generally, applied cognitive science. For some, expertise in this area is key to employment opportunities. (Comparison point: UC Berkeley Cognitive Science majors often obtain jobs in industry, for instance, Google and Yahoo!) Our students continue to ask when COGS 128 (*Cognitive Engineering*) will finally be offered, and we hope to be able to meet their needs soon. Possible research strengths: Human-computer interaction, cognitive robotics, visualization, motor control, attentive user interfaces, virtual environments. Possible teaching contributions: *Cognitive Engineering* (UG), *Perception and Action* (UG), *Computational Modeling Foundations* (Grad), *Cognitive Robotics* (Grad). Possible research synergies: Matlocks' human-computer interaction, Maglio's work on service science and virtual environments, Kallmann's (CIS Affiliate) work on artificial intelligence, Newsam's (CIS Affiliate) work on pattern recognition, Noelle's work on computational neuroscience, Carpin's (CIS Affiliate) work on robotics and motion path planning, and Kello's work on computational neuroscience and virtual environments.

Public economics, Economics (Assistant): Public economics is the study of economic issues related to the public sector (i.e., government) and its relationship to the private sector. The scholar recruited for this position would likely study some aspect of the government's interaction with the private sector and his/her research would inform public policies relating to many potential aspects of the public economy. Given that government consumes about 25 percent of gross domestic product presently, the research theme in which the successful recruit would specialize is difficult to predict a priori. Depending on the pool put before the search committee, we might recruit a specialist in taxes and subsidies, saving behavior and Social Security, medical services related to Medicare and Medicaid, the structure and performance of government, inter-governmental relationships, debt policy, etc. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on the public sector. Possible teaching contributions: Introduction to Economics, Economic Statistics,

Econometrics, Public Economics, Public Finance, Political Economics, and Applied Research Methods – all at the undergraduate or graduate levels. Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant portions of the real economy that are not well covered by the current faculty, including the public sector. A public economist, depending on his/her research specialty, would complement our political economy strengths (Innes, Kantor, and Whalley) and our labor strengths (Neumann, Whalley, and Winder). Further, the successful recruit, again depending on his/her research, would bolster our expertise in management as this economist might be able to work with colleagues and students interested in government performance and decision-making. Finally, a public economist would be in a position to work with other social scientists interested in the political process, especially political scientists and sociologists interested in institutions and organizational behavior.

International Heritage. Policy and Management; World Heritage (Associate/full): World Heritage involves a multidisciplinary approach to the theory and practice of conservation, protection, management and communication of heritage. The complexity of this work requires a theoretical background in heritage (natural and cultural, tangible and intangible), interpretation, management and presentation, but also practical skills in the implementation of sustainable policies. In short WH studies reflect not just the sites involved, but also the tension between the programs of official organizations (such as UNESCO, ICOM, ICOMOS, etc.), their formal processes, and their final adaptation/implementation in different cultural contexts across the globe and diverse communities. This approach embraces ethical, social, anthropological, political, historical, environmental, economic and cultural issues. To build a program that integrates the theoretical/philosophical and the practical (reflected in the work of Professor Forte) we need to hire a scholar engaged with issues of heritage politics, policy or management with a strong international focus. This may include research on international policies and management, including legal and ethical issues, or study and analysis of preservation and conservation policy and an attitude to evaluate world heritage not just as a landscape, a monument or a site, but as a network of processes.

Quantitative methods; Sociology (Assistant) We intend to hire a sociologist with a strong background in quantitative techniques to add breadth and depth to our methodological skills and course offerings. This hire is likely to be relatively inexpensive, and require little or no lab space. While current sociological faculty have good quantitative skills, we would like to expand our skill set while also acquiring a faculty member who can teach graduate and undergraduate level statistics courses. Possible research strengths: advanced quantitative analytical techniques, possibly including time series analysis, multi-level modeling, or

network analysis. We anticipate that the hire's substantive area of research will fit well with one of our existing areas of strength in political sociology, inequality, or organizations and institutions. Possible teaching contributions: Soc 10 (undergraduate statistics); and may develop courses on graduate statistics, graduate regression analysis, advanced graduate research methods, and advanced undergraduate research methods. Possible research synergies: all of the sociology faculty use quantitative research methods, so having a faculty member with additional quantitative skills could potentially fit well with any and all of us. They also would be a good colleague and resource for the other quantitative social science faculty in SSHA, as well as potentially in the sciences. We plan on hiring someone who possesses these quantitative skills but also who fits will with our substantive areas of strength, including political sociology, inequality, or organizations and institutions.

Literature and Cultures/English and Creative Writing (Assistant): Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Moreover, such a scholar would support both the graduate group and would provide synergies with Professor Amussen in History, thus increasing the attractiveness of the graduate program; it could also lead to collaboration with the performing arts.

Political behavior; Political Science (Assistant) To hire a political scientist who conducts research on mass or elite political behavior, with a substantive focus on either U.S. or comparative politics. There is currently only one dedicated political behavior scholar on the UC Merced faculty, and thus this hire is necessary to bolster this key component of the Political Science Program. There are also significant potential synergies with Cognitive Science and Psychology. Possible research strengths: public opinion; elections; campaigns; voting behavior; political psychology/cognition; race, ethnicity, and politics; experimental methods; statistical modeling.. Possible teaching contributions: POLI 120 (Voting Behavior, Campaigns, and Elections), POLI 125 (Public Opinion), POLI 135 (Comparative Political Behavior), and relevant graduate courses. Possible research synergies: Nicholson (Political Science - public opinion and political psychology), Heit (Decision Sciences - reasoning and decision making), various psychology and cognitive science faculty.

Colonial American History (Full): Colonial America and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in

the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world; a senior hire will provide visibility for our program. This position would also be key in recruiting graduate students and building the graduate program.

Biological Anthropologist, Anthropology (Assistant Professor): Seeking a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology major.. Given the many needs of UCM to which a position in biological anthropology might contribute, the search is broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race.

Positions requested: AY 2011-12
(At the recommendation of the Executive Committee of SSHA, these positions are listed in alphabetical order by major discipline or program only, and are thus not ranked in order of preference).

Music studies; Arts, (GASP) (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[1] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

[1] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

Cognitive Neuroscience, Cog Sci (Assistant) We intend to hire a cognitive neuroscientist to *fill a gap in our coverage*, most likely using electrophysiological methods (EEG) to study the neural bases of cognition, broadly speaking. EEG methods are inexpensive and feasible relative to brain imaging, and hiring a cognitive neuroscientist trained in a cognitive science or psychology department would be far cheaper (particularly regarding start-up package) than hiring a similar individual trained in biology or related departments. Last year, a neuroscience candidate was recruited as a target of opportunity (UC Presidential Postdoc) through SoNS. The candidate was transferred to SSHA to be hired as part of the CIS faculty, but our offer was declined because the start-up package was much smaller than the candidate expected. A candidate with a cognitive science background would of course need sufficient lab space, but would have start-up expectations more in line with SSHA budget constraints. Possible research strengths: Learning, memory, motor system, attention. Possible teaching contributions: Potentially easing the teaching burden in the campus's most impacted major, Biology, this FTE could teach *Neuroscience* (UG), *Cognitive Neuroscience* (UG), and *Proseminar in Cognitive Neuroscience* (Grad). Possible research synergies: For this position, there is great potential for fruitful collaboration with the computational cognitive neuroscience work of Noelle (SoE/SSHA), as well as with the neural network and dynamic systems modeling work of Kello, Yoshimi, and Spivey (all SSHA).

Health economics; Economics (Open): We intend to hire an economist who studies the market for health care and/or the public policies surrounding the allocation of health care services. Health care in the U.S. presently accounts for about 15 percent of gross domestic product and, as we well know, is a source of significant political attention. Research in health economics is very broad, so it is difficult to predict a priori what type of specialist we might be able to attract. Depending on the pool put before the search committee, we might recruit a specialist in Medicare and Medicaid financing and usage, the short-term and long-term economic implications of health care access and usage, the market for medical services, etc. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on health care. Clearly, this area is an important one to add strength given the importance of health care to the economy and citizens' productivity. Possible teaching contributions: Introduction to Economics, Economic Statistics, Econometrics, Health Economics, and Applied Research Methods – all at the undergraduate or graduate levels. Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic

history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant portions of the real economy that are not well covered by the current faculty, including health. A health economist, depending on his/her research specialty, would complement our political economy strengths (Innes, Kantor, and Whalley) and our labor strengths (Neumann, Whalley, and Winder). Further, the successful recruit, again depending on his/her research, would bolster our expertise in management as this economist might be able to work with colleagues and students interested in health care financing or delivery. A health economist would be ideally suited to complement the growing strength at UC Merced in public health. The successful recruit could participate in Center for the Study of Health Disparities and the undergraduate Public Health minor. Such an affiliation would bring an economics perspective to a broadly interdisciplinary effort to understand the causes and consequences of health disparities

Mexican/Latin American History (18th-20th century); (Assistant): This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the Hispanic Studies cluster as well as the World Cultures graduate group as a whole.

Romantic/Victorian British Literature (Full/Associate): In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.

Comparative politics, Political Science (Assistant): To hire a political scientist whose research examines cross-national or cross-governmental variation in political institutions, behavior, or policy outcomes. Currently, there is only one member of the UC Merced Political Science faculty who has a dedicated focus in

the field of comparative politics (Haifeng Huang). This hire is necessary to bolster this important component of the program. Possible research strengths: Comparative political institutions (e.g., electoral systems, legislatures), comparative political behavior (e.g., comparative voting behavior, protest behavior), comparative public policy. Possible teaching contributions: POLI 3 (Intro. to Comparative Politics), POLI 130 (Comparative Political Institutions), POLI 135 (Comparative Political Behavior), POLI 140 (Democratization), and comparative graduate courses. Possible research synergies: Conrad (Political Science – interaction between domestic and international political institutions), Huang (Political Science – comparative political institutions), Trounstine (Political Science – comparative local political behavior and institutions), Almeida (Sociology – comparative social movements).

Developmental Psychologist: Psychology (Associate/Full): We intend to hire a senior (tenured) developmental psychologist with a focus in child and/or adolescent development. Within this broad focus, we will seek to recruit the best available candidate, but will give preference to researchers who complement and extend the areas of research expertise represented by the faculty at the time of this search (which cannot be exactly predicted because we anticipate having two new developmental faculty present at the point of this search, one at the assistant and one at the associate/full level). High-priority additions would be someone with expertise in infancy or developmental neuroscience. This hire will require both laboratory space equivalent to the largest labs in the new Social Sciences and Management Building (e.g., 900 sf), and startup funds of about $150,000. Regarding space, the anticipated developmental psychology hires would work with infants and children in laboratory settings. They need space for (a) interacting with the infant/child in a controlled environment, (b) observing those interactions through one way mirrors from a separate room, and (c) parents to wait for their infant/child in close proximity to the experimental room. Possible research strengths**:** cognitive development in infancy; developmental neuroscience; cognitive and/or social development in childhood; cognitive or social development in adolescence. Possible teaching contributions: New undergraduate and graduate courses in area of specialization (e.g. infancy; neuroscience; adolescent development); PSY 130, Developmental Psychology; PSY 136, Cognitive Development. Possible research synergies**:** Strong synergies are expected with both current developmental faculty (Chouinard and Dunham) and additional faculty hired before this search commences. In particular, an emphasis in social and cognitive development will overlap with both, and a focus in infancy or developmental neuroscience will open new avenues for existing faculty and graduate students to extend their research interests to younger children or to neuroscientific methods, respectively.

Health Psychologist; Psychology (Associate/Full) *Health psychology* deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health

psychology includes research into how behavior affects physical health as well as how physical health affects behavior.

Our priorities are to provide teaching and research expertise in salient areas of health psychology such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), (e) meta-analysis of effects in health psychology, (f) interactions between behavior and health over development in childhood (ages 0-20), and (g) etiology and prevention of behaviors associated with increased health risks (e.g., tobacco use, sexual risk behaviors, unhealthy diet). Interest in health issues prevalent in the Central Valley is of high priority within the aforementioned research areas.

A search at the senior level, based on our experience, usually generates a relatively small pool of outstanding candidates. This makes it unwise to highly focus the search on only one or a couple of these areas. Rather the best candidates overall matching our opportunities and needs need to be identified in this search. If otherwise equal candidates are available, the preference is to add strength in areas not yet covered by current faculty; yet this should be balanced with the benefits from adding faculty in already covered areas to build high recognition in a few focal areas. Opportunities for synergies with the COE Health Disparities and the Health Sciences Research Institute will of course be valued

The hire at the senior level is likely to be moderately expensive in terms of salary and start-up funds. Most all health psychologists need lab space, varying from damp lab space for use in collecting biological specimens from humans to desk space for data management and analysis by a cadre of assistants. Space needs would start at the size of a large lab (e.g., 650 sf) in the new Social Sciences and Management Building, and would expand proportional to any grant funding obtained; startup costs might be in the $150,000 range. <u>Possible research strength</u>: It is impossible to predict the research strengths this hire will bring, because, as explained above, searches at the senior level will necessarily be open across the broad range of aforementioned listed topics. Examples of strengths possibly represented with this hire can range from controlled experimental research with biological measurements to longitudinal survey research on national representative samples to randomized controlled trials of intervention strategies with patient populations to meta-analysis of existing research findings. Analytic strategies may also be as varied, including for example analysis of complex sampling design, longitudinal growth curve modeling, hierarchical linear modeling, structural equation modeling, neural network analysis, and traditional general linear model analysis <u>Possible teaching contribution</u>: Because actual expertise cannot be predicted the possible teaching contributions may be varied and include, for example, some set of the following *undergraduate courses*: Psy 1 Introduction to Psychology, Psy 10 Analysis of

Psychological Data, Psy 15 Research Methods in Psychology, Psy 105 Research Methods in Psychology, Psy 120 Physiological Psychology, Psy 131 Social Psychology, Psy 132 Personality, Psy 133 Abnormal Psychology, Psy 140 Clinical Psychology, Psy 145 Human Sexuality, Psy 146 Alcohol, Drugs and Behavior, Psy 147 Health Psychology, Psy 150 Psychological Perspectives on Cultural, Racial and Ethnic Diversity, Psy 190 Topics in Psychology, and new course(s) in some focused area of health psychology. It is also possible this hire can contribute to the newly approved Minor in Interdisciplinary Public Health. At the *graduate level*, we plan to expand the basic curriculum in health psychology to provide a solid foundation for those graduate students with this focus. We are especially interested if this hire can cover additional foundational courses such as Psy XXX Biological Basis for Health Psychology and Psy XXX Health Psychology Methods and Measures, in addition to seminars in the an area of expertise. Possible research synergies**:** Possibilities include: Hoyt's research into biobehavioral mechanisms related to chronic disease, Song's research into decision making regarding health risk behaviors, Wallander's research into quality of life and development during childhood, and Shadish's meta-analysis research in health psychology, plus whatever an expected new hire at the senior level for the fall 2010 will add. Moreover, we expect synergies with the activities in the COE on Health Disparities and Health Sciences Research Instititute.

Race/ethnicity or Immigration; Sociology (Open): We intend to hire a sociologist who studies race and ethnicity and/or immigration. This hire is likely to be relatively inexpensive, and require little or no lab space. Social inequality is one of the three substantive foci of our growing program, and we would like to expand our breadth with a race and ethnicity scholar, possibly one who studies immigration. Possible research strengths: Minority experiences in the labor market or other social institutions such as education; ethnic and racial identity formation; urban inequality; race and ethnicity and the life course; immigrant experiences; impact of immigration on individual health and well-being; immigration and family dynamics; immigration and economic outcomes. Possible teaching contributions: Soc 30 (Social Inequality), Soc 130 (Stratification), Soc 180 (Race and Ethnicity); and may develop additional upper division race and ethnicity courses, a course on the sociology of immigration, and graduate courses on race and ethnicity and/or immigration. Possible research synergies: Would fit well with Weffer's focus on race and urban inequality; Beattie and Hamilton's work on education and inequality; possible connections with Van Dyke and Almeida's work on political mobilization. This hire would also contribute to inter-disciplinary programs for which race and ethnicity are relevant, and could potentially contribute to the Chicano Studies Minor.

Positions requested: AY 2011-13
(At the recommendation of the Executive Committee of SSHA, these positions are listed in alphabetical order by major discipline or program only, and are thus not ranked in order of preference).

Pre-20th C Arts GASP (Open) Art history (due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

Sustainable Architecture , Arts, MAP (Assistant): Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

Industrial organization, Economics (Open: We intend to hire an economist who studies market structures and how firms interact with each other strategically in a competitive setting. Research in industrial organization (IO) is exceptionally broad, so it is difficult to predict a priori what type of specialist we might be able to attract. Depending on the pool put before the search committee, we might recruit a specialist in firm strategy and performance, pricing strategy, monopoly/oligopoly or other market imperfections, antitrust policy, and any of the numerous sector specialties. The goal of the Economics program, in general, is to create a group of experts who help to inform better public policy-making and managerial decision-making. This scholar would contribute importantly to this overarching goal. Possible research strengths: We anticipate that the recruit will add to the present Economics faculty's strengths in applied econometrics and microeconomic theory. We anticipate that the hire's substantive area of research will complement our existing strengths in other aspects of applied microeconomics that do not directly focus on IO. Clearly, this area is an important one to add strength given the importance of markets and competition in developed economies. Possible teaching contributions: Introduction to Economics, Economic Statistics, Econometrics, Industrial Organization, Strategy, and Applied Research Methods – all at the undergraduate or graduate levels.

Possible research synergies: The economics faculty currently has strengths in political economy, labor economics, environmental economics, and economic history. The economics faculty brings a common set of quantitative and analytical tools to bear on pressing questions related to public policy interventions and managerial decision-making. There are significant areas of the discipline that are not well covered by the current faculty, including IO. An IO economist could complement our political economy strengths (Innes, Kantor, and Whalley) if s/he studied anti-trust policy or our labor strengths (Neumann, Whalley, and Winder) if s/he focused on how firms behave in input markets or the organization of the firm. Both Innes and Neumann have done research on the retail sector, which would form the basis for a strength in IO if they were able to add an IO specialist to the economics group. A recruit in IO would decidedly contribute to the management research and teaching programs, as this scholar would focus on the strategic aspects of firms' decision-making and relationships to competitors. Finally, again depending on the expertise of the recruit and of the aforementioned hires in public and health, all three might complement one another's expertise given that all would be concerned with the performance of important sectors of the real economy.

Colonial and Post-Colonial Literature in English (Open). This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.

Philosophy of Mind; Philosophy/Cog Sci (Assistant) We intend to hire a philosopher who will *fill a gap in our coverage* of the cognitive and information sciences, where we currently have only two faculty with relevant expertise. Recently, a great many philosophers of mind have begun synthesizing experimental findings from cognitive science and neuroscience, and applied results from robotics and artificial intelligence, to formulate and support their logical arguments for various theories of how the mind works. By hiring in the area of Philosophy of Mind, we simultaneously smooth out potholes in CIS's ability to teach enough courses in this important area and lay the groundwork for what will eventually become a full-fledged Philosophy program of its own at UC Merced in the future. This hire would be comparatively inexpensive, and would require little or no lab space. Possible research strengths: agency, moral psychology, mental causation, metaphysics of mind, bioethics, perception, personal identity, animal cognition, concepts, embodied cognition. Possible teaching contributions: Introduction to Philosophy (UG), Introduction to Logic (UG), Philosophy of Mind (UG), and perhaps develop new courses such moral psychology, bioethics, free will and agency, metaphysics of mind, or animal cognition (UG or Grad). Possible research synergies: Yoshimi's research on

consciousness and dynamical systems, Vanderschraaf's research on moral and political philosophy, Noelle's research on cognitive control, and Spivey's research on unconscious perception.

Political institutions; Political Science (Assistant): To hire a political scientist who focuses on either political behavior or political institutions within the context of U.S. politics. One of the primary strengths of the current Political Science group is in the area of American politics. This hire would build on that strength and help reinforce graduate training in this area. Possible research strengths: American mass public opinion; campaigns, voting, and elections; Congress; presidency; judiciary; state and local politics; interest groups; political parties; race, ethnicity, and politics. Possible teaching contributions: POLI 1 (Intro. to American Politics), POLI 2 (Controversies in American Politics), various upper division American politics classes (and future corresponding graduate classes). Possible research synergies: Hansford, Monroe, Nicholson, and Trounstine (Political Science – American politics); Van Dyke and Weffer (Sociology – American political protest and social movements); Economics faculty.

Health Psychologist; Psychology (Associate/Full) Health psychology deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health psychology includes research into how behavior affects physical health as well as how physical health affects behavior. The same strategy as depicted for searching to fill the previous position in health psychology in 2011-12 will be employed for this search. It will be important to consider what expertise was added to the health psychology faculty from senior hires in 2010 and 2011-12, which are unknown at present. Nonetheless, our priorities are to provide teaching and research expertise in salient areas of health psychology such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), (e) meta-analysis of effects in health psychology, (f) interactions between behavior and health over development in childhood (ages 0-20), and (g) etiology and prevention of behaviors associated with increased health risks (e.g., tobacco use, sexual risk behaviors, unhealthy diet). Interest in health issues prevalent in the Central Valley is of high priority within the aforementioned research areas.

A search at the senior level, based on our experience, usually generates a relatively small pool of outstanding candidates. This makes it unwise to highly focus the search on only one or a couple of these areas. Rather the best candidates overall matching our opportunities and needs need to be identified in this search. If otherwise equal candidates are available, the preference is to add strength in areas not yet covered by current faculty,; yet this should be balanced with the benefits from adding faculty in already covered areas to build high

recognition in a few focal areas. Opportunities for synergies with the COE Health Disparities and the Health Sciences Research Institute will of course be valued

The hire at the senior level is likely to be moderately expensive in terms of salary and start-up funds. Most all health psychologists need lab space, varying from damp lab space for use in collecting biological specimens from humans to desk space for data management and analysis by a cadre of assistants. Space needs would start at the size of a large lab (e.g., 650 sf) in the new Social Sciences and Management Building, and would expand proportional to any grant funding obtained; startup costs might be in the $150,000 range. Possible research strength: It is impossible to predict the research strengths this hire will bring, because, as explained above, searches at the senior level will necessarily be open across the broad range of aforementioned listed topics. Examples of strengths possibly represented with this hire can range from controlled experimental research with biological measurements to longitudinal survey research on national representative samples to randomized controlled trials of intervention strategies with patient populations to meta-analysis of existing research findings. Analytic strategies may also be as varied, including for example analysis of complex sampling design, longitudinal growth curve modeling, hierarchical linear modeling, structural equation modeling, neural network analysis, and traditional general linear model analysis Possible teaching contribution: Because actual expertise cannot be predicted the possible teaching contributions may be varied and include, for example, some set of the following *undergraduate courses*: Psy 1 Introduction to Psychology, Psy 10 Analysis of Psychological Data, Psy 15 Research Methods in Psychology, Psy 105 Research Methods in Psychology, Psy 120 Physiological Psychology, Psy 131 Social Psychology, Psy 132 Personality, Psy 133 Abnormal Psychology, Psy 140 Clinical Psychology, Psy 145 Human Sexuality, Psy 146 Alcohol, Drugs and Behavior, Psy 147 Health Psychology, Psy 150 Psychological Perspectives on Cultural, Racial and Ethnic Diversity, Psy 190 Topics in Psychology, and new course(s) in some focused area of health psychology. It is also possible this hire can contribute to the newly approved Minor in Interdisciplinary Public Health. At the *graduate level*, we plan to expand the basic curriculum in health psychology to provide a solid foundation for those graduate students with this focus. We are especially interested if this hire can cover additional foundational courses such as Psy XXX Biological Basis for Health Psychology and Psy XXX Health Psychology Methods and Measures, in addition to seminars in the an area of expertise. Possible research synergies**:** Possibilities include: Hoyt's research into biobehavioral mechanisms related to chronic disease, Song's research into decision making regarding health risk behaviors, Wallander's research into quality of life and development during childhood, and Shadish's meta-analysis research in health psychology, plus whatever an expected new hire at the senior level for the fall 2010 will add. Moreover, we expect synergies with the activities in the COE on Health Disparities and Health Sciences Research Instititute.

Quantitative Psychologist; Psychology (Assistant) We intend to hire a quantitative psychologist with a solid background in statistical modeling, but who does not overlap unduly with the previous hire. This hire will require both laboratory space equivalent to one of the smaller labs in the new Social Sciences and Management Building, and startup funds of about $80,000 (in 2010 dollars). This position will *expand our existing strengths* in Quantitative Psychology, and strengthen our ability to contribute to research in both Developmental and Quantitative Psychology. This hire will also teach one of our two required graduate statistics courses. Possible research strengths: longitudinal data analysis, multilevel modeling, categorical data analysis, structural equation modeling, item response theory, meta-analytic model Possible teaching contributions: PSY 10, *Analysis of Psychological Data*; PSY 15, *Research Methods in Psychology*; PSY 105, *Advanced Research Methods in Psychology*; PSY 171, *Psychological Tests and Measurement*; PSY 190, *Topics in Psychology*; PSY 202A *Advanced Psychological Statistics I*; PSY 202B, *Advanced Psychological Statistics II*; PSY 202C, *Multivariate Methods*; PSY 205, *Measurement Theory and Psychometrics*; PSY 206, *Quantitative Methods for Reviewing Research*; PSY 207, *Linear Structural Modeling*; PSY 211, *Computer Programming for Social Sciences*; and PSY 212, *Special Problems in Psychological Statistics.* This hire may also develop new undergraduate and graduate courses, for example, *Multilevel Modeling* or *Longitudinal Data Analysis* Possible research synergies: Direct synergies are with Shadish's research on meta-analysis and Vevea's research on meta-analysis and item response theory. However, this hire will benefit most of our faculty in Developmental and Health psychology where nested design requiring multilevel models, and longitudinal designs following children or patients over time, are common.

Health Sociology; Sociology (Open): We intend to hire a sociologist who studies the sociology of health and medicine. This hire is likely to be relatively inexpensive, and require little or no lab space. They would expand our breadth by focusing either on health institutions, or inequality and health. Possible research strengths: social aspects of individual health and well being; inequality in health outcomes; inequality in medical institutions; the social organization of health care. Possible teaching contributions: Soc 30 (Social Inequality), may develop an upper division health sociology course, graduate courses on sociology of health, and could potentially teach courses on inequality or organizations, depending on their interests. Possible research synergies: Would fit well with the University's Center for the Study of Health Disparities and the undergraduate Public Health minor; Beattie, Weffer and Hamilton's focus on social inequality; and, Song, Wallender and Hoyt's research on health psychology, as well as health research in the natural sciences.

Management positions recommended but not ranked or prioritized

Finance (2010-11);* Associate or Full*: To hire a researcher who studies the ways in which individuals, business entities and other organizations allocate financial resources over time, with particular attention given to decision-making under conditions of uncertainty. Finance courses are core to any Management program, but Merced currently has no ladder rank faculty in this area, limiting our course offerings. Potential hires could have a PhD in Finance or Management, Economics, Mathematics, Decision Sciences, or other fields. There are also significant potential synergies with Economics, Applied Mathematics, Cognitive Science, and Engineering, depending on the expertise of the specific scholar recruited.

Possible research strengths:)1)-the generation and analysis of financial information; 2) methods to raise and allocate investment funds, including asset pricing, capital budgeting, investment strategy, and international asset management; 3) the structure and regulation of financial institutions; and 4) behavioral finance. Possible teaching contributions: MGMT 25 (Introduction to Finance), MGMT 121 (The Economics of Money, Banking, and Financial Institutions), MGMT 165 (Intermediate Finance), and new courses developed by the successful recruit. Possible research synergies: Economics faculty, Yihsu Chen (Engineering/SSHA; energy/asset modeling); Harish Bhat (Applied Mathematics); Evan Heit (decision sciences); Cognitive Science faculty

Marketing (2010-11);* Associate or Full*: To hire a researcher who studies the process whereby demands for products, services and ideas are anticipated, managed and satisfied. Marketing courses are core to any Management program, but Merced currently has no ladder rank faculty in this area, limiting our course offerings. Potentially hires could have a PhD in Management, Economics, Psychology, Decision Sciences, Cognitive Science. There are significant potential synergies with faculty in a number of areas, such as Economics, Sociology, Political Science, Psychology, and Cognitive Science. A specific area of potential specialization for UC Merced is a specialization in the retail sector, so attracting a marketing scholar to the campus could bolster this burgeoning strength. Possible research strengths: Understanding, explaining and predicting consumer behavior and the effectiveness of various marketing strategies, and developing theoretical frameworks with which consumer choice can be better understood and more efficient and effective strategies can be designed. Potential applications include media communications in such areas as health, environment, or politics, which would complement other faculty's interests. Possible teaching contributions: MGMT 120 (Marketing), other marketing courses not currently offered, such as Consumer Choice, Media and Advertising, Market Segmentation, Behavioral Economics; cross-listed courses with Political Science, Sociology, Psychology, etc. Possible research synergies: Economics faculty (especially Todd Neumann, who studies history of retail, and Rob Innes who studies market structures); Sociology faculty (social movements

and effects of mass media); Psychology faculty (any faculty with interests in social psychology or public health communications); Anthropology faculty (sociocultural); Cognitive Science faculty (judgment and decision making). HSRI.

Management Strategy (2010-11) **Any:** To hire a researcher who studies how firms strategize with respect to the various uncertainties and constraints that they face. Possible areas include the interactions of economic incentives, firm strategy, public policy and political economy, institutional design, and technology management, with applications to antitrust, telecommunications, energy and the environment, airlines, health, banking, human resources, game theory, international trade, and strategy, both private and public. Such a faculty could add applied "content" courses to the Management program. Merced currently has no ladder rank faculty, limiting our course offerings. Potential hires could have a PhD in Management, Economics, Decision Sciences, Political Science, Sociology, Public Health, Engineering, or other fields. There are also significant potential synergies with Economics, Political Science, Sociology, Engineering, and Psychology.

Possible research strengths (examples, not exclusive list): 1) International Economics: The effects of international trade and trade restrictions on prices and welfare; the determination of exchange rates and relative prices across countries; the economics of pollution havens, eco-dumping, international labor and environmental agreements, and international economic development; 2) Industrial Organization: Strategy, pricing, and performance in imperfectly competitive markets, including the nature and effects of contracts, vertical and horizontal organization of production and retailing, and antitrust; 3) Risk and Insurance: The intersection of Finance and Economics, including decision making under uncertainty, market failures in insurance, pricing risk, public decision making under risk, diversifiable vs. undiversifiable risk, and ethical issues in cross-generational choices under risk.; 4) Health Economics and Management: Economics of health care management and delivery from consumer decision making to doctor incentives, hospital management, innovation and marketing of pharmaceuticals and vaccines, and alternative health delivery systems. Possible teaching contributions: MGMT 116 (Organizational Strategy), MGMT 141 (Industrial Relations and Human Resource Economics), Organizational Behavior, applied courses in public policy, energy management, health management, insurance, international trade, plus many other potential courses not currently offered in applied areas of Management, depending on expertise. Possible research synergies: Economics faculty, Yihsu Chen (Engineering/SSHA; energy/asset modeling), Tony Westerling (Engineering/SSHA; resource management), Psychology faculty (with public health interests), Public Health faculty, Peter Vanderschraaf (Philosophy; game theory), Political Science and Sociology faculty, SNRI and HSRI more generally.

Projected space requirements of SSHA

In July 2011 SSM is scheduled to open. This will be of enormous importance to SSHA and the campus in general. As a part of the plan (and which was a serious reason for the delay in finishing the plan) I undertook a careful analysis of existing and projected SSHA space requirements under the most optimistic of our FTE requests.

At the start of AY 2010-11 (or 7/1/10), SSHA ladder faculty will require 50 offices assuming all hires (including a projected Public Health position) are successful. Three of our cross-hires (Chen, Noelle, and Westerling) have offices in Engineering. One office is currently occupied by Greg Herken, who will be retiring on 6/30/10; this space will be open at the start of the new academic year.

Office needs are thus:

7/1/2011	50
7/1/2012	61 (11 new)
7/1/2013	69 (9 new)
7/1/2014	78 (9 new)

SSM currently has 72 spaces designated as faculty offices. Taken together, SSHA has allocated to it a total of 123 offices (this includes the 72 SSM offices and the existing 51 COB offices; this includes Herken's to-be-vacated office). If SSHA is allotted the number of faculty requested in this proposal (27), by the start of AY 2013-14 we will have a total of 78 faculty. In principle, this creates a surplus of 45 offices that can be devoted to continued growth, assignment to adjuncts, or other academic purposes. This number may be smaller if FTE are released to the Management major from the Provost's pool.

At the start of AY 2010-11 (7/1/10), assuming a full slate of successful hires, we will require 19 lab spaces. Thus, assuming that the FTE proposal is fully funded, lab needs are:

7/1/2010	19
7/1/2011	26 (seven new)
7/1/2012	29 (3 new)
7/1/2014	31 (2 new)

There are a total of 16 "spaces" designated as labs in COB, AOB or Castle. Note that the definition of lab is broad: some are sets of offices, others are true lab spaces, and still others are conference rooms that have been re-tasked to research purposes. SSM has a total of 41 spaces designated as research labs or studios devoted to the arts (in MAP). This is a fairly conservative estimate of the number of lab spaces in SSM. In principle, this leaves a surplus of 10 lab spaces for continued growth. In general, planned lab space meets or exceeds the amount of square footage currently devoted to lab use in COB/AOB.

In summary, space is not a significant concern for the development of the SSHA FTE plan.

Strategic plans as submitted by the four programs of SSHA

The following plans are offered as part of the overall SSHA strategic plan. It is here that each program makes its best case for the allocation of FTE, and these plans are the basis upon which I as dean created the draft FTE allocation plan. I have not modified these documents in any way aside from placing them all into the same font. They are listed in alphabetical order. Plans submitted by the graduate groups follow them.

Cognitive and Information Sciences Strategic Plan

0. Executive Summary
Within three years, Cognitive and Information Sciences at UC Merced can become one of the top ten cognitive science programs in the world.

The Cognitive and Information Sciences (CIS) bylaw 55 unit proposal, and the CIS graduate group proposal, are currently in their respective review processes. This strategic plan document supplements those proposals with a description of our vision for the future growth of Cognitive and Information Sciences at UC Merced. The CIS faculty unit brings together faculty in the School of Social Sciences Humanities and Arts who utilize computational models and/or technological innovations in their research. CIS faculty members are dedicated to synergizing research and teaching in interdisciplinary endeavors that form a natural class around the emergence of organized system behavior at all scales, including for example biological intelligence, artificial intelligence, perception-action systems, game theory, systems science, communications, and both human-computer and human-environment interaction. These research areas, and their ties to computational modeling and technological innovation, complement UC Merced's closely-related strengths in robotics, computer graphics, machine learning, and visual/spatial analysis (in the School of Engineering, SoE), computational biology (in the School of Natural Sciences, SoNS), and environmental sciences (spread across all three schools at UC Merced).

At the academic core of the CIS faculty unit is the field of Cognitive Science, made unique in our case with an emphasis on computation and simulation techniques. At UC Merced, Cognitive Science combines theories and methods from computer science, complex systems, neurobiology, linguistics, philosophy, service science, psychology, and neurobiology. Our overarching research program aims to understand how cognition and other self-organized behavior emerge within and between biological organisms and natural and

artificial systems. The cognitive scientists produced by our graduate and undergraduate curricula go on to conduct research in universities, and pursue careers in areas as diverse as cognitive engineering (which includes areas such as human factors engineering, computer supported collaborative work, and user interface design), information sciences, management, law, service science, graphic design, communications, and medicine.

Cognitive and Information Sciences has become a signature academic program at UC Merced. Our cognitive science major is popular among undergraduates (fourth largest major in SSHA). Our faculty and graduate students are receiving prestigious awards and publishing high-profile articles. We are actively pursuing and obtaining substantial extramural funding. We have captured the attention of cognitive scientists worldwide. This success is the result of careful planning, outstanding hires, forward-looking vision, and expansive interdisciplinary research. It is also the result of resourcefulness. We make the most of our limited FTE, space, and graduate support resources.

To continue our success, the CIS faculty unit must grow and maintain balanced ties to all its related disciplines. Only then can it benefit from the cross-fostering of ideas in various research and teaching agendas while contributing value in return to each of the other disciplines. CIS will, therefore, contribute in a balanced way to different strategic areas at UC Merced, for example, through links to Engineering, Biological Sciences, and Management. CIS will continue to serve as a hub of scientific and academic integration amidst the exceptional intellectual synthesis that promises to make UC Merced unique within the University of California system, and among universities around the world.

1. The Challenges

The Cognitive and Information Sciences faculty unit has gotten off to a strong start, yet challenges lie ahead. We need to:

- obtain faculty positions to fill gaps and expand areas of strength
- obtain faculty positions devoted to teaching in the Cognitive Science major
- hire faculty who will actively seek and obtain extramural funding
- acquire adequate research space for faculty and graduate students
- fortify our stand-alone PhD program (proposal currently under review)
- strengthen ties to the School of Engineering
- build bridges to the School of Natural Science
- ensure that our program has strengths in multiple sub-areas of Cognitive Science
- improve recruiting efforts for undergraduate and graduate students
- expand research opportunities for students from underrepresented groups

2. The Strategy

By raising the Cognitive and Information Sciences faculty unit as a beacon of excellence within UC Merced, a large and diverse array of related disciplines

will be similarly raised with it. Due to its integration of varied researchers across the campus in their joint endeavor to study the function of natural systems, brains, and artificial minds, programs such as computer science, psychology, economics, management, and the biological sciences will all benefit from an institutional commitment to CIS.

2.1 Cognitive and Information Sciences Faculty

The CIS faculty unit consists of 10 core faculty members, as well as 24 affiliate faculty members (listed elsewhere). The 10 core members come from a variety of disciplines that intersect computation and cognition:

Yihsu Chen (Assistant Professor of Environmental Economics and Engineering, and Geography, SSHA and SoE)
Chris Kello (Associate Professor of Cognitive Science, SSHA)
Paul Maglio (Associate Adjunct Professor of Cognitive Science, SSHA)

Teenie Matlock (Associate Professor of Cognitive Science, SSHA)
David Noelle (Assistant Professor of Cognitive Science and of Computer Science and Engineering, SSHA and SoE)
Michael Spivey (Professor of Cognitive Science, SSHA)
Peter Vanderschraaf (Associate Professor of Philosophy, SSHA)
Anthony Westerling (Assistant Professor of Environmental Policy and Engineering, and Geography, SSHA and SoE)
Art Woodward (Professor Emeritus of Psychology, SSHA)
Jeff Yoshimi (Assistant Professor of Philosophy, SSHA)

2.2 National Recognition of the CIS Faculty Unit

In the following section, we present metrics to begin documenting the overall national (and international) recognition among our 9 core active (non-emeritus) CIS faculty, comprising 1 full professor, 3 associate professors, 1 adjunct associate professor, and 4 assistant professors. To make these performance metrics quantifiable (and eventually generalizeable), some details are unavoidably lost. Note: The choice of some metrics may be revised in the future, perhaps as a shared template of performance metrics is adopted across multiple faculty units.

These metrics clearly demonstrate that the CIS faculty have research programs that exert great influence in their various fields. These metrics also indicate that CIS faculty are successful at bringing in extramural funding, and that they receive awards for recognition in research and teaching. The first metric we report for our CIS faculty unit is the h index.[2] For calculating h index among our CIS faculty, citation counts were obtained from scholar.google.com on 1/14/2010.

[2] In 2005, J. E. Hirsch introduced an elegant (though imperfect for some disciplines) quantitative metric of a scientist's impact on his/her field, the h index. (In the scientometric literature, there are critiques, extensions and modifications of this metric, but debate over alternate versions has not been settled.) The h index is calculated as the highest number N of published papers that have each been cited at least N times. For example, if a scientist has 14 papers that have each been cited 14 or more times, and his/her 15th most cited paper has not been cited 15 or more times, then that scientist's h index is 14.

<u>h index:</u>
• Overall mean h index for the 9 non-emeritus CIS faculty: 11.8
• Full, mean h index: 26
• Associate, mean h index: 14
• Assistant, mean h index: 6

Number of articles (co-)authored by non-emeritus CIS Faculty w/ >100 citations: 22

Number of CIS Faculty who have served as a member on a research grant review panel: 5

Number of funded extramural research grants on which CIS Faculty are PI: 7

Number of funded extramural research grants on which CIS Faculty are co-PI: 9

Sum total costs of current extramural research grants to CIS Faculty: ~$3.28M

Number of Journal Editor or Associate Editor positions among CIS Faculty: 4

Number of Journal Editorial Board positions among CIS Faculty: 7

Number of official positions held by CIS Faculty in Scientific Societies: 6

Total number of invited presentations by CIS Faculty in 2009: 49

Number of academic awards/honors for CIS Faculty in 2009: 7

Number of academic awards/honors for grad students of CIS Faculty in 2009: 8

2.3 Vision for the Future

When college seniors the world over ask where they should do graduate work in cognitive science, their faculty advisors will rattle off the top PhD programs in Cognitive Science, and it will sound like this: UCSD, Johns Hopkins, Edinburgh, Indiana, MIT, Brown, Rochester, Washington University, Carnegie Mellon, and UC Merced. Our goal of being a top ten program is coming to fruition as a result of rapidly increasing visibility, award-winning faculty, robust research strengths, and success in extramural funding. Our quick rise to this status is aided by the fact that the number of Cognitive Science PhD programs is still considerably smaller than the number of PhD programs in more traditional fields (e.g., Computer Science, Psychology, etc.),

and by the fact that our PhD program is one of only two such doctoral programs on the west coast (along with UCSD).

Being a top ten program in Cognitive Science will yield many positive outcomes, especially for our students. Our undergraduates will be admitted to well-known Cognitive Science PhD programs, such as MIT or UCSD, or obtain profitable industry jobs, especially in companies in nearby Silicon Valley. The latter is a likely outcome for many of our students given current hiring trends. Many high tech companies are beginning to employ large numbers of service scientists (applied cognitive scientists with expertise in programming and management) in the coming decade. For instance, IBM is hiring thousands of individuals in this area to secure its position as a world leader in service science, management and engineering. To ensure they will have service scientists to hire, IBM has been providing seed money and establishing partnerships with universities worldwide, such as UC Berkeley, UCSC, and throughout Europe and China. (See past issues of *Business Week* and *Computer World*.) (For other benefits, see section 3.)

UC Merced's Cognitive and Information Sciences group is becoming one of the signature badges of honor for the campus and the UC system, with considerably less investment than would be needed for building such prestige in other disciplines already represented at most universities. Essentially, institutional investment in CIS is a "low-hanging fruit" with enormous pay-off that will spread beyond its core faculty members to its affiliate members and to connected disciplines, including Computer Science, Biology, Philosophy, Psychology, Economics, and Management. As CIS is an interdisciplinary hub that connects SSHA with the Schools of Engineering and Biological Sciences, it both benefits from and adds to the synergistic activities across fields, thus feeding back to the various supporting disciplines, improving their own visibility and prestige in return. Thus, institutional support that goes to CIS is naturally multiplied and amplified into support for several neighboring disciplines, maximizing the scientific reputation of UC Merced in multiple fields. As an example of UC Merced's growing scientific reputation, while Professor of Cognitive Science, Teenie Matlock, was President of the UC Merced chapter of Sigma Xi (The Scientific Research Society) in 2009, UC Merced was one of only six universities nationwide awarded a *Sigma Xi Certificate of Excellence* for exceptional chapter activity, innovative programming, and community leadership. In addition, Michael Spivey was awarded Sigma Xi's highly prestigious William Procter award for distinction in research (previous recipients include Stephen Jay Gould, Herbert Simon, and Margaret Mead). From efforts like this, there will soon come a day when any UC professors who suggests that UC Merced ought to be "a small undergraduate liberal arts college" won't simply be seen as rude or insensitive, but patently and obviously wrong.

2.3 Mission

Through its scientifically rigorous integration of a variety of theoretical frameworks and methodological approaches in the study of intelligent behavior,

the Cognitive and Information Sciences Faculty Unit is an interdisciplinary hub that both draws from and gives back to the research and education strengths that are growing at UC Merced throughout the Social Sciences, Humanities and Arts, Engineering, and Biological Sciences. This symbiotic relationship will quickly and inexpensively place Cognitive and Information Sciences among the top ten Cognitive Science programs in the world.

3. Goals and Strategies

Strengths. There are four emerging areas of research strength in the Cognitive and Information Sciences faculty unit at UC Merced. Each provides multiple routes for multidisciplinary interaction, and together they form the foundation on which expansion will be based. Our productivity in these research areas has already generated considerable national and international interest in our Cognitive and Information Sciences group. Over the next few years, we aim specifically to *build on these strengths* with three of our six requested hires (Cognitive Science & Technology, Computational Linguistics, and Visual Perception).

1. *Computation*, e.g., neural networks and dynamical systems (Kello, Noelle, Spivey, Yoshimi), simulation and forecast techniques (Chen, Vanderschraaf, Westerling), distributed cognition (Maglio), statistical methods (Woodward, Westerling)
   CIS Affiliates: machine learning (M. Carreira-Perpiñán, S. Newsam), Bayesian reasoning (E. Heit)

2. *Cognitive Technology*, e.g., artificial intelligence (Kello, Maglio, Noelle), service science (Maglio), human-computer interaction (Matlock, Maglio)
   CIS Affiliates: robotics (S. Carpin, M. Kallman)

3. *Perception and Action*, e.g., spatial cognition (Matlock), visuomotor processing (Spivey), dynamical analysis of cognitive performance (Kello), cognitive neuroscience (Noelle), phenomenology (Yoshimi)
   CIS Affliates: computer vision (S. Newsam, M-H.Yang)

4. *Language*, e.g., linguistics (Matlock), speech production (Kello), sentence comprehension (Spivey), philosophy of mind (Yoshimi)
   CIS Affiliates: child language use (Y. Dunham)

Weaknesses. The weaknesses that our faculty unit experiences result from slowed growth and financial support during the present budget crisis. Our primary weakness is that there are gaps in our coverage of important fields under the umbrella of CIS. A related weakness is that, due to enormously heavy service loads and highly active participation and leadership in School, UCM, and Senate committees, CIS faculty have precious little time to service the undergraduate and graduate programs. Despite these drains on faculty

time, and due to heroic efforts on the part of CIS faculty, our current coverage of CIS fields is sufficient for our faculty unit and our graduate group to display the necessary cohesion to garner praise from colleagues all over the globe. While we have also been successful at recruiting highly competitive graduate students, the need still looms large for making hires that can fill the gaps in our coverage. In previous strategic plans for the Cognitive Science group, great emphasis was placed on hiring in Cognitive Neuroscience, Philosophy of Mind, and Spatial Analysis. Accordingly, over the next few years, we aim specifically to *fill in our gaps* with the other three of our six requested hires in these areas. These three areas are critical to our research and teaching, yet CIS currently has only 1 or 2 faculty experts in each.

Opportunities. Many unique opportunities result from sustaining a 21st Century Cognitive and Information Sciences Program at UC Merced. Unique interdisciplinary research collaborations, which would be difficult or impossible at many other universities are naturally emerging among our core and affiliate faculty, who come from diverse backgrounds. Similarly, our program produces rare interdisciplinary educational opportunities for undergraduates, such as project-based training that combines computer programming, statistical methods, data visualization techniques, systems design, experimental protocols, and experience with technologically advanced laboratory equipment. Undergraduate cognitive science courses and lab opportunities also allow other majors in SSHA to combine science with the arts or humanities in any number of interesting projects (e.g., interactive media and virtual reality; music perception; visual processing of art; discourse analysis of literary works; comparative linguistics). They also provide students from Natural Sciences (NS) and the School of Engineering (SoE), such as those majoring in biology and computer science, the opportunity to take social science classes related to their interests (e.g., *Introduction to Cognitive Science, Artificial Intelligence, Neural Networks, Cognitive Neuroscience*).

Graduate training in Cognitive and Information Sciences can prepare PhD's for academic posts not only in cognitive science departments but also in computer science departments, information science departments, psychology departments, philosophy departments, linguistics departments, and, as well as for industry positions in areas related to cognitive engineering, data mining, and machine learning. Cognitive Science training on our campus can also benefit students from underrepresented groups. Many of our Cognitive Science undergraduate majors are from ethnically diverse backgrounds or are women. The low representation of women and other minorities (below 10 percent) is viewed as a problem in cognitive science departments and programs across the country, and among members of the Cognitive Science Society.

Threats. The key threat that we see lurking in the future is one that would severely affect many faculty groups on campus, not just CIS. The threat of UC Merced being demoted to the status of an undergraduate liberal arts college, if its research reputation were to dwindle and/or it had not graduated enough

PhDs by 2013, would be simply devastating. The campus would experience a mass exodus of its most world-renowned faculty. The primary (and most affordable) solution to this threat is a substantial increase in graduate student support campus-wide. Without high-quality graduate students in our faculty laboratories, the scientific research that maintains our national and international reputation will inevitably fade. Our best graduate applicants understandably express concern when they learn that UC Merced offers little in the way of university fellowships, imposes exorbitant non-resident graduate tuition fees, and provides no office space for graduate students (often forcing them work at a desk in a public space, rather than risk interfering with laboratory data collection by sharing a desk in the lab during a human cognition experiment.) In order to avoid being relegated to an undergraduate liberal arts college in the future (and thereby losing all of its highest-quality faculty), it is critical that UC Merced invest heavily in its graduate student community.

3.1 Research Opportunities and Funding

Although most academic programs generally seek research funding from one or two basic sources, research projects in the Cognitive and Information Sciences faculty unit routinely draw from a wide variety of external research funding sources, including grants from:

- government institutions
  NSF, NIH, NOAA, NASA, DARPA, USDA, California Energy Comission
- private institutions
  McDonnell, Sloan, Glushko-Samuelson Foundation
- University of California partnerships
  UCOP Digital Media Discovery Grants, CITRIS
- local industry groups and high-tech companies
  HP, IBM Research, Google

Our Cognitive and Information Sciences graduate group (proposal under review) is a natural candidate for a training grant (such as an NIH T32, an NSF IGERT, or an NSF GK12) that would include fellowships for graduate students and postdocs, conference travel funds, and funds for a colloquium budget. We are in an excellent position to pursue such funding because our faculty have an impressive track record of external support.

In 2008, the Glushko-Samuelson Foundation provided a generous gift of 50,000 dollars to cognitive science faculty to boost the visibility and support activities centered around cognitive science at UC Merced. The gift, which was intended to last for three years, has supported the following activities for the past two years:

1) Distinguished Cognitive Scientist award and visit. This high-profile event attracts faculty, students, as well as members of the Merced community,

to a lecture and reception to showcase important advances in cognitive science that have an impact on everyday life. The 2008 recipient of the Distinguished Cognitive Scientist award was Professor George Lakoff of UC Berkeley Linguistics Department. The 2009 recipient was Linda B. Smith of University of Indiana Cognitive Science Program. The 2010 recipient is Michael Mozer of University of Colorado, Boulder Cognitive Science Institute and Computer Science Department. With each visit, faculty and graduate students have the opportunity to meet and discuss their research with a well-established leading cognitive scientist.

2) *Mind, Technology, and Society* (MTS). This weekly talk series brings in experts from cognitive science and related areas, including neuroscience, linguistics, philosophy, computer science, and information sciences, to present their work to a combined graduate seminar (COGS 250) and faculty audience. These well-attended lectures also bring in undergraduates and researchers from the School of Natural Sciences and the School of Engineering. MTS keeps UCM cognitive scientists and colleagues apprised of recent developments in the cognitive science and related fields and provides graduate students the opportunity to network.

3) Conference travel funds for students. These funds enable UC Merced graduate students to attend and present their research at the annual Cognitive Science Society meeting. This enables our students to acquire peer-review of their work in a richly interactive conference atmosphere. It also provides the opportunity to network with leading figures in the field, and to interact with other cognitive science students.

4) Best Cognitive Science Project. Funds are also available (but have not yet been used) to award an undergraduate and a graduate student an award for an outstanding research project in UCM Research Week. Such awards ensure that the campus maintains a strong emphasis on research at all levels of education, and to increase visibility of the campus in the community.

This honor bestowed upon the cognitive science group by the Glushko-Samuelson Foundation demonstrates confidence in our efforts to rapidly build a world-class program in cognitive science. The donor provided comparable gifts only to cognitive science programs at UC Merced, UCSD, Johns Hopkins, and UC Berkeley. We look forward to future interactions with this foundation and other private philanthropic organizations.

3.2 Teaching Opportunities and Enrollment

UC Merced Cognitive Science has gained the attention of cognitive scientists worldwide since its inception in 2004-5. When the campus opened a

year later, cognitive science courses instantly attracted students who were intrigued by interdisciplinary training in human behavior, biology, and technology. In early 2005, a make-shift cognitive science emphasis track under SCS was created. In 2007, the bonafide Cognitive Science majors, BA and BS, were created to meet student demand. A minor in Cognitive Science was also crafted and approved.

Though the number of cognitive science majors may never be as large as the more traditional majors, such as psychology or political science, the number of cognitive science majors at UC Merced is already impressive. There are already 77 COGS majors and 22 COGS minors (January, 2010), making Cognitive Science the fourth largest major in SSHA and one of the top 10 majors on the campus). Moreover, as is the case at UCSD and UC Berkeley, which offer cognitive science undergraduate programs, our courses function as service courses for students in other areas, including biology, computer science, and psychology. Our courses contribute to a variety of programs. In fact, some COGS classes are cross-listed with other areas, in particular, COGS 123/CSE 173, COGS 125/CSE 175, COGS 153/MGMT 153, COGS 152/MGMT 150, and COGS 141/PSY 162.

Student interest in cognitive science is evident in robust course enrollments in COGS courses. Note that our courses are often capped because we do not have a sufficient number of TAs or because of limited room size (e.g., COGS 1, Fall 2009, COGS 5, Spring 2010). We routinely find ourselves forced by the administration to turn students away who want to add our courses. This actually produces a form of catch-22, whereby we have insufficient TAs to expand the undergraduate enrollment in a course, and then with those courses not expanded in size, there is no clear evidence for the need to increase the number of TAships next time (thus hindering growth of the graduate program as well).

Undergraduate Training. Over the next three years, we would like to continue to offer our more popular undergraduate COGS courses for majors and non-majors, for instance, COGS 1 (*Introduction to Cognitive Science*), COGS 5 (*Introduction to Linguistics*), COGS 105 (*Cognitive Science Research Methods*), COGS 152 (*Service Science),* COGS 159 *(Metaphor and Thought),* COGS 153 *(Judgment and Decision Making*), COGS 123 (*Computational Cognitive Neuroscience*). Several of these courses are requirements for the major or minor.

However, despite the growing interest in cognitive science, we are understaffed and cannot possibly meet student demand. Not being allowed to make a new hire for two years has kept us from offering several courses we need to offer. **Note that only three Cognitive Science related faculty teach exclusively Cognitive Science courses and manage the day-to-day business of its major** (Kello, Matlock, and Spivey). All other faculty who teach Cognitive Science courses have substantial teaching and program-development commitments in other disciplines as well. For example, Yoshimi also teaches in Philosophy and manages its minor, and Noelle also teaches in

Computer Science & Engineering and contributes to its strategic planning. These circumstances place restrictive limitations on COGS offerings. A larger teaching staff is critically needed so we can cover courses that we have been unable offer, for instance, COGS 128 (*Cognitive Engineering*), COGS 154 *(Cognitive Science Applications for Management)*, COGS 175 (*Spatial Cognition*), COGS 130 (*Cognitive Neuroscience*), in addition to courses that need to be developed, for instance, *Introduction to Computational Linguistics*, *Perception and Action*, and *Seminar in Visual Processing*. Note that these courses would serve other majors beside CIS, i.e. Computer Science, Management, and Biology.

To meet our students' diverse needs and ensure their success in graduate school and the job market, we will propose new emphasis areas for the Cognitive Science BA and BS in 2011. For the BS, plans include emphases in *Cognitive Engineering* and in *Neurobiology*. For the BA, current plans include emphases in *Philosophy of Mind* and in *Linguistics*. The Linguistics emphasis will meet the needs of UC Merced students with an interest in language. As linguistics is a pillar of cognitive science, our faculty plan to develop additional courses in this area. We currently offer *Introduction to Language and Linguistics* (COGS 5) and *Metaphor and Thought* (COGS 159). Other emphases to be discussed include *Service Science.*

Graduate Training. Last year we generated a proposal for a new standalone PhD in Cognitive and Information Sciences. The proposal is now under review, and once CCGA and WASC approval is achieved, cognitive science faculty will no longer be members of the Cognitive Science emphasis track within the Social and Cognitive Sciences (SCS) graduate group (current status).

Faculty are currently teaching a minimal slate of CIS graduate courses, in particular, COGS 201-202 (*Cognitive Science Foundations I & II*), COGS 203 (*Introduction to Neural Networks in Cognitive Science*), COGS 223 (*Computational Cognitive Neuroscience*), COGS 250 (*Mind, Technology, and Society* colloquium series), and COGS 285 (*Topics in Philosophy of Cognitive Science*). There are currently 12 students in the Cognitive Science portion of the special emphasis graduate group in Social and Cognitive Sciences. It is expected that these students will choose to transition into the stand-alone CIS graduate program.

As CIS becomes a standalone graduate program and enrollment increases, CIS faculty will need to spend more time teaching CIS graduate courses and training CIS graduate students. The potential for continued growth in a CIS graduate program is evidenced by our success in actively recruiting students (e.g. through our website and by creating and distributing pamphlets and other materials at the annual Cognitive Science Society meeting and to undergraduates in departments of cognitive science, psychology, linguistics, philosophy, and computer science nationwide[3]). An example of a looming need is for CIS faculty to develop and teach a Computational Modeling Foundations graduate course (COGS 206). New faculty hires in CIS will fulfill this need and others related to serving the CIS graduate program.

3.3 Interdisciplinary Opportunities

Cognitive and Information Sciences at UC Merced has demonstrated a firm commitment to excellence in interdisciplinary research. Several of our faculty conduct research or collaborate with scientists in other disciplines, especially with faculty in the School of Engineering. For example, a psycholinguist is collaborating with a computer scientist to develop virtual agents that gesture and communicate "naturally." An engineer studying pattern recognition is connecting with a vision researcher who conducts eye-movement recordings. A cognitive linguist with expertise in conceptual semantics is collaborating with a psychologist studying visually-guided reaching movements. An expert in judgment and decision-making is collaborating with a political scientist on ballot propositions. And a computational neuroscientist exploring neural network modeling is interacting with a neurophilosopher experimenting with dynamical systems theory. And there is clear potential for novel inter-group collaborations in the future, including topics such as bioethics, political philosophy, and geographic information systems. With additional hires in the areas listed in the next section, there will be dozens of robust interdisciplinary research

[3] See our website and the recruiting pamphlet at http://cogsci.ucmerced.edu

collaborations, extramural funding opportunities, and educational initiatives that span SSHA, Engineering, and Biological Sciences.

We will continue to initiate and foster interdisciplinary opportunities in teaching, research, and extramural funding. Within SSHA, we highlight our support for growth in the number of Philosophy faculty. Just as there are many synergies between Philosophy faculty and Cognitive Science faculty in CIS, additional Philosophy faculty would provide many course opportunities for Cognitive Science majors and indeed all other majors around the university. We also would like to establish connections with other colleagues in the humanities. Hiring a computational linguist would allow us to make this bridge. Hiring in the area of cognitive engineering and spatial analysis would make for interesting and unique connections for research with Maurizio Forte in virtual heritage. In Natural Sciences, we support growth in neuroscience. Hiring a cognitive neuroscientist in the next three years will round out undergraduate Cognitive Science offerings and encourage interaction between Biology and Cognitive and Information Sciences. In the School of Engineering, we continue to offer support for hires that open up new lines of interdisciplinary research, including intelligent systems, information sciences, design, and data analysis. Achieving a critical mass of such cognitive and computational scientists would help UC Merced achieve one of the five core goals it outlined in its 2009 Strategic Vision, to "build internationally renowned, multidisciplinary expertise in cognitive science and intelligent systems that leverages UC Merced's expertise in the natural and applied sciences, engineering, humanities and arts." One of the objectives of that core goal is to "establish the Cognitive Science and Intelligent Systems Research Institute (CSISRI)."

3.4 Faculty Development for 2010-2013

Our strategy for hiring new faculty is justified by our undergraduate enrollment numbers (Cognitive Science is the 4th most popular major in SSHA), but those teaching needs are not the primary motivation for our planned hires. Our strategy for hiring new faculty is primarily motivated by an identification of our strengths and boosting them to secure our top ten status in cognitive science programs worldwide. Table 1 outlines our optimal strategy for growth of the CIS faculty unit in ways that will capitalize on these existing strengths, most importantly, and will also fill in gaps in our coverage of research and teaching areas. Over the next three years, we wish to increase our core faculty by six FTEs.

<u>Table 1. Strategic Faculty Searches for the Next Three Years:</u>
2010-2011: i) Cognitive Science & Technology, ii) Cognitive Neuroscience
2011-2012: iii) Computational Linguistics, iv) Philosophy of Mind
2012-2013: v) Visual Perception, vi) Spatial Analysis

These six positions are sought over the course of the next three years into 2013, with the first two searches to take place during the 2010-2011 academic year. We note at the outset that each of these positions has some potential to be a cross-school or cross-area appointment, although ideally each search should have some flexibility in this regard. We intend to include broad interests on search committees, including representatives from both SSHA and the School of Natural Sciences for the Cognitive Neuroscience search and including representatives from both SSHA and the School of Engineering for the Cognitive Science & Technology search, for example. During all of these searches, extra measures will be taken to solicit applications from women and minorities.

Cognitive Science and Technology (2010-2011)
Level: Assistant or Associate

Goal: We intend to hire an applied cognitive scientist to *expand our existing strength* in technological and computational aspects of CIS, facilitate industry cooperation, strengthen ties with Virtual Heritage/SSHA and CSE/SoE. Our last faculty recruitment effort (search began 2007-8) focused on a Cognitive Engineering hire. The search was nearly successful. A hiring case for a candidate with expertise in both human-computer interaction (HCI) and visual perception achieved majority faculty support when the position was "deferred" by administration in response to the economic crisis. Freezing this position has crippled our plans to steadily advance our curricula into cognitive science applications to technology, and adversely affected our undergraduates. Many students pursue the cognitive science major because they are interested in the development and use of technological applications, and more generally, applied cognitive science. For some, expertise in this area is key to employment opportunities. (Comparison point: UC Berkeley Cognitive Science majors often obtain jobs in industry, for instance, Google and Yahoo!) Our students continue to ask when COGS 128 (*Cognitive Engineering*) will finally be offered, and we hope to be able to meet their needs soon.

Possible research strengths: Human-computer interaction, cognitive robotics, visualization, motor control, attentive user interfaces, virtual environments.

Possible teaching contributions: *Cognitive Engineering* (UG), *Perception and Action* (UG), *Computational Modeling Foundations* (Grad), *Cognitive Robotics* (Grad).

Possible research synergies: Matlocks' human-computer interaction, Maglio's work on service science and virtual environments, Kallmann's (CIS Affiliate) work on artificial intelligence, Newsam's (CIS Affiliate) work on pattern recognition, Noelle's work on computational neuroscience, Carpin's (CIS

Affiliate) work on robotics and motion path planning, and Kello's work on computational neuroscience and virtual environments.

Estimated start-up: ~$125K

Expected lab space requirements: one 20'X20' room and one 10'X10' room

Cognitive Neuroscience (2010-2011)
Level: Assistant

Goal: We intend to hire a cognitive neuroscientist to *fill a gap in our coverage*, most likely using electrophysiological methods (EEG) to study the neural bases of cognition, broadly speaking. EEG methods are inexpensive and feasible relative to brain imaging, and hiring a cognitive neuroscientist trained in a cognitive science or psychology department would be far cheaper (particularly regarding start-up package) than hiring a similar individual trained in biology or related departments. Last year, a neuroscience candidate was recruited as a target of opportunity (UC Presidential Postdoc) through SoNS. The candidate was transferred to SSHA to be hired as part of the CIS faculty, but our offer was declined because the start-up package was much smaller than the candidate expected. A candidate with a cognitive science background would of course need sufficient lab space, but would have start-up expectations more in line with SSHA budget constraints.

Possible research strengths: Learning, memory, motor system, attention.

Possible teaching contributions: Potentially easing the teaching burden in the campus's most impacted major, Biology, this FTE could teach *Neuroscience* (UG), *Cognitive Neuroscience* (UG), and *Proseminar in Cognitive Neuroscience* (Grad).

Possible research synergies: For this position, there is great potential for fruitful collaboration with the computational cognitive neuroscience work of Noelle (SoE/SSHA), as well as with the neural network and dynamic systems modeling work of Kello, Yoshimi, and Spivey (all SSHA).

Estimated start-up: ~$200K

Expected lab space requirements: one 20'X20' room and one 10'X10' room

Computational Linguistics (2011-2012)
Level: Assistant

Goal: We intend to hire a cognitive and information scientist with a solid background in linguistic theory in addition to training in computational and/or

experimental methods. This hire is likely to be relatively inexpensive, and require little or no lab space. This position will *expand our existing strengths* in Computation and in Language, and strengthen ties with SoE, perhaps in research areas such as automated speech recognition, data mining, and cryptography.

Possible research strengths: statistical natural language processing, corpus analysis, latent semantic analysis, speech recognition, speech perception, natural language understanding.

Possible teaching contributions: COGS 5, *Introduction to Language and Linguistics*; COGS 180, *Topics in Cognitive Science*; *Computational Modeling Foundations* (Grad), and will develop new undergraduate and graduate courses, including *Introduction to Computational Linguistics*.

Possible research synergies: Matlock's research in cognitive linguistics, Kello's work on speech and reading models, Spivey's research on sentence processing, Newsam's (CIS Affiliate) research on data mining, Carreira-Perpiñán's (CIS Affiliate) work on speech processing, and Yoshimi's research on philosophy of mind.

Estimated start-up: ~$80K

Expected lab space requirements: one 10'X10' room

Philosophy of Mind (2011-2012)
Level: Assistant.

Goal: We intend to hire a philosopher who will *fill a gap in our coverage* of the cognitive and information sciences, where we currently have only two faculty with relevant expertise. Recently, a great many philosophers of mind have begun synthesizing experimental findings from cognitive science and neuroscience, and applied results from robotics and artificial intelligence, to formulate and support their logical arguments for various theories of how the mind works. By hiring in the area of Philosophy of Mind, we simultaneously smooth out potholes in CIS's ability to teach enough courses in this important area and lay the groundwork for what will eventually become a full-fledged Philosophy program of its own at UC Merced in the future. This hire would be comparatively inexpensive, and would require little or no lab space.

Possible research strengths: agency, moral psychology, mental causation, metaphysics of mind, bioethics, perception, personal identity, animal cognition, concepts, embodied cognition.

Possible teaching contributions: Introduction to Philosophy (UG), Introduction to Logic (UG), Philosophy of Mind (UG), and perhaps develop new courses such moral psychology, bioethics, free will and agency, metaphysics of mind, or animal cognition (UG or Grad).

Possible research synergies: Yoshimi's research on consciousness and dynamical systems, Vanderschraaf's research on moral and political philosophy, Noelle's research on cognitive control, and Spivey's research on unconscious perception.

Estimated start-up: ~$50K

Expected lab space requirements: none

Visual Perception (2012-2013)
Level: Assistant or Associate

Goal: We intend to hire a vision scientist who will *expand our existing strength* in Perception & Action, and may strengthen ties to both the School of Natural Sciences (potentially assisting with the teaching burden of the impacted Biology major), and the School of Engineering, with potential connections to computer vision research.

Possible research strengths: visual perception, visuomotor coordination, visual neuroscience, computer vision

Possible teaching contributions: COGS 140/PSY 161 *Perception* (UG), COGS 141/PSYCH 162 *Visual Perception* (UG), and perhaps develop new graduate courses such as *Visual Neuroscience* (Grad), and/or *Computational Approaches to Human Visual Perception* (Grad).

Possible research synergies: Noelle's research in computational cognitive neuroscience, Spivey's research in eye movements and visual cognition, Matlock's work in spatial language, Newsam's and Yang's (CIS Affiliates) work in computer vision, and Kallman's (CIS Affiliate) work in motion path planning.

Estimated start-up: ~$100K

Expected lab space requirements: two 10'X10' rooms (possibly shared with pre-existing)

Spatial Analysis (2012-2013)
Level: Assistant

Goal: We intend to hire a spatial analysis scientist who will *fill a gap in our coverage* of cognitive and information sciences, providing connective bonds between our own faculty with expertise in areas such complex systems, ecology, neural networks, and statistics, and may strengthen ties to other areas in SSHA and SoE, such as virtual heritage, geographic information systems, cluster analysis, and geocomputation.

Possible research strengths: computational geography, complex systems, spatial statistics, ecology, archaeology

Possible teaching contributions: This hire could develop new courses such as *Geographic Information Systems* (UG), *Introduction to Complex Systems* (UG), *Complex Systems Analysis* (Grad), and *Computational Modeling Foundations* (Grad).

Possible research synergies: Westerling's research on ecological systems analysis, Chen's research on economic systems analysis, Vanderschraaf's work on evolution of conventions, Guo's (CIS Affiliate) work on geocomputation, as well as Forte's (CIS Affiliate) and Aldenderfer's (SSHA Dean) work related to geographic information systems.

Estimated start-up: ~$80K

Expected lab space requirements: one 10'X 10' room (possibly shared with pre-existing)

3.5 Finances

The Cognitive and Information Sciences faculty have an outstanding record of extramural funding, as summarized in section 2.2. Continuing to aggressively seek grants from NSF, NIH, DARPA, NASA, NOAA and other agencies will help us to provide excellent training to students in our labs and sustain our ability to conduct world-class research in the years to come. The following trends also ensure that our Cognitive and Information Sciences faculty unit will thrive:

- Enrollments in COGS courses are high at UC Merced (Section 3.2).
- Nearly 200 new Cognitive Science related undergraduate programs or departments have been established at universities in the past 20 years, including 106 departments and programs in the U.S. alone (e.g., UCSD, MIT, Johns Hopkins, Indiana University, University of Rochester). Thus, this interdisciplinary topic has significantly more visibility and recognition than it used to.

- At the same time, the small number of actual PhD programs related to Cognitive Science make it quite achievable for us to secure a *top ten* position among them.
- Cognitive Science majors are rapidly increasing at other UC campuses (e.g., there are currently over 400 majors at UCSD).
- More and more cognitive scientists are needed in the work force in the 21st Century, especially those with additional strengths in computer science and engineering, management, or neurobiology.

Based on the growing popularity of cognitive science as well as hiring trends, we anticipate as many as 240 Cognitive Science majors at UC Merced by 2013. This could mean as many as 100 students in the Cognitive Engineering track (BS), 70 students in the Neuroscience track (BS), and 70 students in the Cognitive Science BA in general. (See Section 3.2 for planned emphases.) And it will also mean new courses and larger enrollments in the courses we already have.

To cover the courses needed by undergraduate Cognitive Science students and graduate CIS students, and to continue to provide service courses to other groups on the campus, including the impacted Biology major, we will need by 2013 a total of 14 Cognitive and Information Sciences faculty, counting our current 8 non-emeritus non-adjunct faculty plus the 6 requested hires.

In addition to administrative funding for faculty lines, we will continue to vigorously pursue extramural funding. Extramural funding will enable the Cognitive and Information Sciences faculty unit to develop innovative, interdisciplinary projects with colleagues in SSHA, such as Virtual Heritage and Geographic Information Systems, as well as with colleagues in Engineering and Natural Sciences. Several cross-school funded collaborations have already been established. For instance, Marcelo Kallmann has set up a motion capture laboratory with Teenie Matlock, Shawn Newsam, Stefano Carpin, and other faculty. The lab is useful to several other cognitive scientists and engineers at UC Merced, including Michael Spivey and David Noelle, as well as researchers who study virtual heritage and second life, including Maurizio Forte. As another example, Stefano Carpin, Marcelo Kallmann, Teenie Matlock, Shawn Newsam, and David Noelle were recently granted an NSF MRI award to purchase two humanoid robots, and related equipment, in order to study embodied models of human cognition and techniques for human-robot interaction (HRI). Extramural funding will also help support graduate students so they are not permanent teaching assistants. And it will help provide undergraduate students with research opportunities they need to succeed after graduation. The enhancement of undergraduate training resulting from this research support will in turn increase enrollment of Cognitive Science majors. Finally, the formation of a Cognitive Science and Intelligent Systems Research Institute (CSISRI), as recommended in the campus's 2009 Vision Statement, can be the synergizing conduit for an even greater number of extramural funding proposals, graduate training grants, and center grants -- especially if some very small portion of the indirect costs from those grants is allowed to come back and support the Institute itself, so that it can quickly become self-sufficient.

Strategic Plan
Humanities and World Cultures, 2010-13

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I. Overview of group

Humanities and World Cultures consists of three majors (Anthropology, History, Literatures and Cultures), three stand-alone minors (Arts, Writing, Spanish), one cross-disciplinary minor (American Studies) and four programs (Foreign Languages, Global Arts Studies, Media Arts Program, World Heritage, Writing). It encompasses a variety of academic programs with a focus on the nature of human cultures and societies, the varieties of human cultural expression, as well as practice in the arts. The distinctive experience of students in these fields is that they learn to read and critically analyze societies and cultures in relation to both general norms and patterns and particular sets of values and circumstances -- cultural specificity which mitigates against reductive approaches to social phenomena. Furthermore, this critical engagement fosters empathy and understanding of other cultures vital in a global society.

We share common intellectual concerns which are addressed through a range of questions and methods. These common questions involve the creation, preservation and understanding of our cultural heritage; studies of societies and cultures past and present; questions of justice, aesthetics, and ethics; religious or spiritual practices and beliefs. We share common concerns with the construction and production of human culture – whether in the arts, political and social institutions – and processes of social and cultural change. The study of humanities and world cultures provides both tools for students to express their understanding of the world and critical and analytical perspectives within which those practices can be located.

Most of our faculty are members of the Graduate Group in World Cultures; we also have faculty members participating in the Social and Cognitive Sciences Graduate Group, the Sierra Nevada Research Institute; WCH faculty are involved with planning for cross-school programs in Environmental Science and in Spatial Analysis, and for a planned Spatial Analysis and Research Center. Within the UC system, faculty have been involved with UC Humanities Research Institute, the UC Institute for Research in the Arts, the Pacific Rim Research Group and UC-MEXUS.

Humanities & World Cultures courses enrolled a total of 6138 students in 2009-10; through the Writing Program in particular, we provide vital support for General Education, although all the fields in the program teach many students from other fields. At the same time, we offer advanced training in key fields of human endeavor, that provide skills in imaginative and empathetic inquiry and critical analysis to prepare students for the world of the 21st century.

II. Snapshot

	Senate Faculty	Majors Spring 10	Minors Spring 10	Total Enroll 2009-10
Anthropology	4	18	11	433
American Studies			1	
Arts (MAP)	1		47	789
GASP	2			228
History	5	72	31	546
Literature	5	70	10	391
Spanish	1		80	273*
World Heritage	1			64
Writing	1		67	272**
TOTAL (incl. all language and writing	20	160	247	6138

* Spanish courses included are only SPAN3, 4, 10, 11, 103, 105, 106, 141, 142, 180

** Writing courses included are only WRI 25, 30, 100, 125,130, 131, 150

Senate Faculty
Virginia Adan-Lifante
Susan D Amussen
Gregg Camfield
Robin DeLugan
Kevin Fellezs
Maurizio Forte
Jan Goggans
Gregg Herken
Kathleen Hull
Ignacio Lopez-Calvo
Sean Malloy
Manuel Martin-Rodriguez
Ruth Mostern
Holley Moyes
Robert Ochsner
Sholeh Quinn
Dunya Ramicova
Linda-Anne Rebhun
Cristian Ricci
ShiPu Wang

III. Introduction

Mission and Vision

The University of California has a three-fold mission of teaching, research, and service. The mission of Humanities and World Cultures is to develop innovative undergraduate programs which provide training in the intellectual skills of particular fields, while emphasizing the connections among them. Humanities and World Cultures locates the study of human societies and cultures in time and space, using methods ranging from textual, visual and musical analysis, archival and archaeological research, and participant observation; it teaches the practice of the arts – music, film, visual arts, and writing – in relation to their history; language instruction provides students with important skills for interacting in a global context.

Goals

Our goal is to provide a model of intellectual excellence that values particular disciplinary traditions and artistic practices while exploring the ways those traditions interact and can fruitfully engage each other. Specifically we hope to:

- Nurture junior scholars as they become intellectual leaders in their fields
- Continue to recruit excellent scholars at the junior and senior level
- Contribute to a model of interdisciplinary inquiry among undergraduates, graduate students and faculty.

Opportunities & Challenges

A combination of established senior scholars and outstanding junior faculty with broad collaborative interests provides us with the opportunity to develop an innovative, intellectually rigorous set of undergraduate and graduate programs, while stimulating new areas of research for all faculty.

At the same time, both the graduate program in World Cultures (currently developing a full program tentatively called “Cultures and Society”) and all the undergraduate programs in HWC have created imaginative curricula with marginal resources. If the University has been under-resourced, and SSHA relatively under-resourced in comparison with the rest of the University, HWC has been under-resourced within SSHA. Four of our programs have only one ladder faculty; one has only two. Of our approved majors, Literatures and Cultures is hindered in any attempts to expand to its original vision, as is History, and Anthropology is unable to meet its basic needs. None are adequately able to provide enough course offerings that students may graduate within their major. **This is neither intellectually nor practically sustainable.** Most faculty teach a range of courses more common in regional universities than in our peer institutions, and many teach overloads or, via independent study groups, the equivalent of an overload class, to ensure students will have enough units to graduate in their major. As the number of students on our campus approaches 5000, it will no longer be tenable to have key disciplines of the research

university operating with such marginal resources. Our undergraduate majors do not have an adequate range of electives, and in many areas, there are no ladder rank faculty available to teach required introductory courses when a faculty member goes on leave; in History and Anthropology, we have no one with expertise in the area of a required course. In the absence of stable funding for lecturers, we need a critical mass of ladder faculty in each of our programs in order to support recognizable, sustainable, as well as intellectually defensible and compelling programs of study and research. In addition, too many faculty are without colleagues in adjacent fields (conceptual, temporal or geographical, not just disciplinary), which hampers the development of our graduate program.

IV Three year growth plan – overview

Over the next three years, we see the programs within HWC growing by slightly more than the overall growth in campus enrollment. This estimate takes into account the expected shift in majors to SSHA from the sciences and engineering. If SSHA enrolls 55% of student majors in three years as is currently anticipated, we expect to enroll c. 25% of SSHA majors, or about 600 majors.

Three-year Projections Based on Major Enrollment for SSHA during AY2007-08 and AY2008-09

	Major Enrollment Frequency		Major Enrollment as % of UG Enrollment		SSHA % UG Enrollment Remains Constant		SSHA % UG Enrollment Increases to 55%	
					Mean % of UG Enrollment	Projected Major Enrollment	Mean % of UG Enrollment	Projected Major Enrollment
Major	Fall 2008	Fall 2009	Fall 2008	Fall 2009	Fall 2012	Fall 2012	Fall 2012	Fall 2012
ANTH	4	18	0.1591723	0.5625	1.8†	92	2.85	145
ENGLISH/CW		46			2.3‡	117	3.87	197
HIST	64	75	2.5467569	2.34375	2.45	125	3.87	197
LITC	51	73	2.0294469	2.28125	2.16			
MAP					0.65*	32	1.03	52
SPANISH		21			1.5#	77	2.75	140
SSHA Enrollment		1051				1675		2805
TOTAL UCM UG Enrollment	2513	3200				5100		5100

† Based on projections included in Table A2
‡ Assumes that English has a slightly higher proportion of SSHA majors than LITC does at present – 7% rather than 6.5 – on it's way to being c. 10% of SSHA majors, or 5% of UG majors
* Projection based on assumption that half of current ARTS minors (i.e., 20 of 41 students; 0.65% of current UG population) would declare major if available
# Projection on Spanish majors is a combination of the Spanish track in LITC, and half the current Spanish minors become Spanish majors – i.e. .7%

The next three years will also see the following developments:

- the establishment of a new major in English and Creative Writing, and one in Spanish Language and Literature; each of these new majors draws on the resources of an existing major (Literatures and Cultures) and existing minors (Writing and Spanish);
- the development of the ARTS minor into a major in Multi-disciplinary Arts
- the establishment of a minor in Global Arts Studies
- the establishment of a minor in World Heritage

- the establishment of a minor in Japanese
- Implementation of the SSHA foreign language requirement

To support our growth plan, we are asking for the following:

- Release of two positions authorized in 2008-9 for which searches were frozen
- Fourteen new FTEs
- replacement for a retiring faculty member Gregg Herken; this position is included as a search, but is not a new FTE.
- 4 new lecturers for the writing program will be required, and the conversion of 15 Unit 18 lecturers to LPSOE. (This assumes that responsibility for CORE 1 and CORE 100 are shifted to College One.)
- 5 full time lecturers in Foreign Languages
- Continuing funding for lecturers and Visiting Artist positions within MAP
- conversion of the FTEs for our existing President's post-doctoral fellows (DeLugan, Fellezs), per the Provost's written commitment

While we recognize that these requests are higher than stated allocations allow, this a conservative, if optimistic, list: as individual program plans make clear, our needs are greater than what we have listed here, particularly if the University wishes to shift enrollments toward SSHA. Furthermore, since the last two years have seen no appointments in our area, we have front-loaded our request into the first year of the plan period.

The list that follows is ranked for the first year, but not the years following. (The first position is listed to indicate an area of development, but not considered part of the ranking as it replaces an existing FTE.) The ranking was established as an unhappy consensus of the group: all positions represent critical needs in a desperately understaffed set of programs. We gave first priority to ensuring that no program had only one faculty; then to the position in Biological Anthropology, a required area for the Anthropology major, that was approved in 2008-9 and then frozen. The rest of the positions are in a rough rotation, recognizing when positions were last filled. The ladder rank positions are as follows, with our preferred year of hiring:

Year	Program	Description of Position	Rank	Status
2010-11	History	US Ethnic: Chicano	Junior	Replace existing FTE
	MAP	Music	Senior	New
	World Heritage	Architecture/Conservation	Senior	New
	Anthropology	Biological Anthropology	Junior	Approved 2008
	Literature	English Renaissance	Junior	New

	(English)			
	Literature (Spanish)	Spanish Linguistics	Junior	New
	History	Colonial America	Senior	New
	GASP	Music: Asia/Transnational	Open	Instead of AH appt approved 2008
	MAP	Architecture/Sustainability	Senior	New
2011-12	History	Modern Latin America	Junior	New
	Literature (Eng/Creative Writing)	Romantic/Victorian Literature	Senior	New
	GASP	Art History: pre 20th C transnational	Open	New
	World Heritage	Museums and Cultural Resource Management	Open	
2012-13	History	US West/Environmental	Rank open	New
	Literature (Eng/CW)	Post-colonial literature/English	Open	New
	Literature (Spanish)	Spanish Golden Age	Open	New
	Anthropology	Socio-cultural Anthropology	Senior	

In addition to these ladder faculty, we propose to convert 15 unit 18 lecturers over the three-year period to LPSOEs in English/Writing (6 in 2011, 4 in 2012, 5 in 2013), and to add 5 full time lecturers in Foreign Languages (1 in Chinese, 1 in Japanese, 1 in French, and 2 in Spanish); we need to retain existing lecturers in MAP as well as the Visiting Artist position.

In 2013-15, we envision ourselves growing by another 20-25 ladder faculty members. GASP would reach a sustainable size to become a major. In addition to the organic growth of existing programs, we propose to expand our programs to include additional areas of study that will be important in our maturing university:

- hire at least two ladder rank faculty members in Literature and Cultures, with a specialization in comparative literature, one in Japanese/Chinese and one in French or Arabic
- hire a scholar of religious studies, preferably Islamic World. Depending on the research focus of that person, they would initially be part of either Literature & World Cultures, Anthropology, or History.

We also envision creating an interdisciplinary honors major in Humanities & World Cultures, which will draw on existing majors, but provide opportunities for interdisciplinary senior seminars.

Our long term expectation is that from 2015-20, existing programs will continue to grow, and we will add to our existing majors a major in Religious Studies.

V. Resource Requirements over three years

A. Faculty

The positions we are requesting over the next three years are listed here; a full description of the positions in the context of particular programs and their strategic plans is available below, in section VIII.

2010-11:

Information only – replacement FTE: History: Comparative Race and Ethnicity in the US(19th-20th century): History of Comparative Race and Ethnicity has been one of the fastest growing and most intellectually stimulating fields in the history profession over the last three decades, employing innovative and interdisciplinary methodologies to interrogate issues of identity, migration, language, and power in the United States and its contested borderlands. Hiring in this field would enrich the intellectual diversity of the history faculty and allow us to meet the considerable student demand for classes in this area. In particular we seek a scholar of comparative race and ethnicity whose specialties include Chicano/Latino History. The History faculty have received formal and numerous informal communications from current and prospective students expressing grave concern over the lack of curriculum in Chicano/Latino History. In light of our student body demographics and UCM's status as a Hispanic Serving Institution, it is vital that we address this crucial need immediately. We anticipate that this hire will also build further connections among the disciplines and support the Hispanic Studies cluster in the graduate group as well as the World Cultures graduate group in general.

1. **MAP** Music

We need a music specialist with a broad spectrum of experience, and an interdisciplinary vision for the music curriculum to enhance the musicology curriculum offered by GASP. Music can potentially connect to many other areas of endeavor at UC Merced. As a twenty first century research university, UC Merced needs to develop a non-traditional approach to teaching music. Instead of focusing on traditional instruments, the projected music curriculum will concentrate on digital music technology and on exploring interdisciplinary connections while still offering strong foundation in traditional instruments and voice courses for those students who wish to continue their music education while at UCM.

2. **World Heritage**: Conservation architect

The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage. The International principles guiding the preservation and restoration of ancient buildings need specific interdisciplinary expertise in conservation and architecture. In this profile it is required a relevant international experience in preservation, documentation and conservation projects of built heritage with a particular focus on cultural landscapes, archaeological sites, rural and urban contexts. The candidate

should have also an interdisciplinary knowledge of specific technologies applied to this field (photogrammetry, architectural relief, CAD, 3D modeling) in relation with preservation and conservation aspects.

3. **Anthropology:** Biological Anthropologist (Assistant Professor): The frozen search is for a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology program in Section VII.A below. Given the many needs of UCM to which a position in biological anthropology might contribute, the search was broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race. Office and laboratory space in SSM is already allocated for this position, and necessary start-up funds will vary depending upon the expertise of the preferred candidate. We anticipate, however, that start-up funds to cover initial laboratory and/or field costs will be less than $100,000.

4. **Literature and Cultures/English and Creative Writing:** Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Moreover, such a scholar would support both the graduate group and would provide synergies with Professor Amussen in History, thus increasing the attractiveness of the graduate program; it could also lead to collaboration with the performing arts. In 2005, UCM agreed on search for British literature hire, which ultimately failed. Thus, it is clear that even the earliest vision of UCM's literature program would include British literature, and anecdotal feedback from students supports that need.

5. **Literature and Cultures/Spanish:** Spanish-language Linguist. Linguistics is key to the development of any top tier department of Hispanic Studies. In Dartmouth, 2 faculty members out of 16 teach linguistics.

6. **History**: Colonial America and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world; a senior hire will provide visibility for our program. This position would also be key in recruiting graduate students and building the graduate program.

7. **GASP**: Music studies (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality.
We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[4] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

8. **MAP**: <u>Sustainable Architecture</u>
Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

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[4] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

2011-12

GASP Art history (open rank): due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

History: Mexican/Latin American History (18th-20th century). This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the Hispanic Studies cluster as well as the World Cultures graduate group as a whole.

English/Creative Writing: Romantic/Victorian British Literature (senior). In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.

World Heritage: Museums and Cultural Resource Management, Assistant Professor Cultural Resources Management (CRM) regards theory and practice of managing cultural resources (natural and cultural heritage, tangible and intangible heritage). National and international experience in museum studies, cultural resource management, research and teaching on heritage management with an emphasis on musealization aspects, communication, knowledge and expertise in new media and digital technologies, web museums, virtual museums. This profile should be able to train new generations of managers in charge of natural and historical parks, galleries, museums, international organization and/or other NGOs involved in heritage assessment, interpretation, and management.

2012-13

Anthropology: Socio-cultural Anthropologist (Associate or Full Professor): a third socio-cultural anthropologist will contribute to each of our four focal research areas, with research and teaching interests that complement those of our existing faculty in socio-cultural anthropology. Similar to our position in biological anthropology, the search for this position may be broadly defined (or subsequently tailored, in consultation with colleagues across campus based on converging needs), since such a colleague might articulate with various graduate groups or ORUs established on campus by that time. For example, this position might bring expertise in the following general research areas: global environmental justice and policy with obvious cross-campus links to the School of Natural Sciences and SNRI; subjectivity and subject formation, which could build links across SSHA in particular with psychology, the humanities, and the arts; or globalization studies, which has the potential to forge cross-school and cross-campus research collaborations. A ladder-rank faculty member is required, as only a tenure-track faculty member can contribute to the development of interdisciplinary graduate groups and ORUs on campus. The addition of this socio-cultural anthropologist will also facilitate flexibility in teaching rotations for anthropology faculty, as a whole, thus permitting more regular instruction of anthropology courses incorporated in the World Cultures graduate program, the American Studies minor, and new World Heritage program, while also facilitating faculty sabbaticals for the anthropology faculty, as a whole. This position will require office space in SSM and modest start-up funds; no laboratory space is required.

History: US West/Environmental (19th-20th century). Environmental history is a vibrant and rapidly growing sub-field. Hiring in this area will deepen ties between the History program and the rest of the campus and offer the possibility of collaboration and significant grant funding. A Western Environmental historian may work on questions such as historical water rights, resource extraction, erosion, or climate change: all topics of immense contemporary urgency that benefit from a historical perspective. This position offers synergies with current faculty in Literature, Archaeology, Engineering, and Earth Systems Science, and would support the World Cultures graduate group as well as the History major.

English/Creative Writing: Colonial and Post-Colonial Literature in English. This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.

Spanish: Golden Age (or trans-Atlantic Golden Age/Colonial). It is quintessential in any Hispanic Studies department because it represents the foundation of modern Hispanic literature in its three main genres: narrative,

theater and poetry. It represents the flourishing in arts and literature in Spain, coinciding with the political rise and decline of the Habsburgs dynasty. In Dartmouth, 3 out of the 9 faculty members in Iberian Studies teach Golden Age (including Portuguese, Race and Gender Studies), and one out of 7 faculty members in Latin American literature teaches Colonial literature.

B. Space and Facilities

In Literature and Cultures, History, Writing, and GASP, the only space needs are offices for new faculty. Anthropology, Foreign Languages, Media Arts, and World Heritage all have specific space needs for teaching and/or research. In three years we will need research lab space for 2 biological anthropologists, 2 archaeological anthropologists, and 2 world heritage scholars; we will need teaching lab space for the arts (3 rooms), anthropology (2 classrooms), Foreign Languages and world heritage. Some of this space has been allocated in the new SSM building.

Anthropology:
The Anthropology program needs sufficient “damp” and “wet” laboratory space for both research and teaching for some faculty. The lack of sufficient research laboratory space may hamper attracting and retaining top faculty, while the lack of sufficient teaching laboratory space will undermine maintenance of the Anthropology major and minor. Pending completion of SSM, our short-term strategy in AY 2007-08 turned to securing research laboratory space at Castle for both current and anticipated faculty in biological and archaeological anthropology. Anthropology research laboratory space planned for SSM—perhaps augmented by the current biological anthropology laboratory at Castle or core facilities elsewhere on campus—is sufficient for current and anticipated faculty in these two sub-fields. This may not be true for future colleagues, however, particularly if we hire faculty whose research includes analysis of phytoliths, pollen, or genetic material. The inability to reconfigure SSM anthropology laboratories to permit the addition of fume hoods (due to building specifications, including the lack of back-up power) necessary for such research means that additional research laboratory space must be identified in SEI and/or SEII. Thus, anthropology faculty must be included in planning for SEII or these needs must be anticipated as space in SEI is reallocated with the completion of SEII.

Anthropology also needs a commitment from the Provost's office regarding dedicated teaching laboratory space for undergraduate education in both archaeological and biological anthropology. Dedicated space is needed because substantial instructional collections must be stored on-site; institutions or agencies lending these archaeological and osteological collections impose strict security requirements for such storage, and off-hour access and layout space is required for students working with collections over the course of a semester for laboratory classes and/or individual

undergraduate research projects. We have identified one room (COB 110) that can suffice in the short term, and use of the adjoining room (COB 114) would be desirable if that space is relinquished by the Arts program upon completion of SSM or at some later date. In the long-term, anthropology faculty will require two dedicated, approximately 1,200 ASF teaching labs—one for archaeological laboratory classes and discussion sections, and the other for biological laboratory classes and lower division discussion sections. No Anthropology teaching laboratory space has been designated on campus. If COB 114 should become available (i.e., if Arts should request and be allocated substitute space that better suits their needs), the Anthropology program might use COB 110 (once dedicated to Anthropology Instruction) for both archaeological and biological anthropology teaching labs. If Anthropology teaching lab space cannot be dedicated within COB, then it must be found in SEI or SEII. Given the delayed construction schedule for the latter building, however, this could severely impact necessary laboratory instruction for undergraduate students. These instructional spaces need to be identified before the end of AY 2009-2010 to clearly demonstrate that necessary resources are available for the program as part of the WASC accreditation process and for instructional improvement grant opportunities through NSF to outfit the teaching laboratory space (see below).

Anthropology expects to secure internal or external funding to develop these instructional infrastructure to support undergraduate education. This is particularly critical given the substantial financial investment required to support biological anthropology, in particular. Resources already acquired to support lower division instruction include two locking metal storage cabinets, a glass display cabinet and casts of fossil hominids skulls, selected primate skulls and skeletons, and a modern human skeleton. This teaching collection was made possible, in part, through a grant received from the CRTE in AY 2008-2009. Additional materials required to satisfy needs for upper division biological anthropology courses include casts or type collections used to assess age, sex, ancestry, pathologies, and other physical characteristics from human skeletal remains; basic osteometric equipment and/or hardware and software to support digital geometric morphometrics; and possible sample preparation equipment such as machinery to make bone thin sections or take x-rays. Costs will depend upon the next faculty hire within this sub-field, but expenses for the skeletons and models needed for anticipated methods courses are estimated at $50,000. Similarly, upper division archaeological laboratory courses require modest laboratory equipment for either student workstations (e.g., digital scales, microscopes, calipers, hand lenses) or the lab as a whole (e.g., flotation machine, ultrasonic cleaner, flatbed scanner, oversize scale), and field equipment is required for an archaeological field course or field school (e.g., GPS units, digital cameras, compasses, screens, shovels, trowels, tape measures, total station, etc.). It is anticipated that the total cost for both the archaeological laboratory and field equipment will not exceed $75,000. Such courses would also benefit

from geological, faunal, and floral type collections, which might be purchased or established in conjunction with faculty in Natural Sciences, while development of some computer hardware and software (e.g., quantitative and qualitative analysis) capabilities for the teaching laboratory would also be undertaken. Such collections might require approximately $25,000 in funding. Finally, additional cabinetry and basic laboratory furniture for 16 lab stations supporting computational or analytical work is necessary, including lab benches, adjustable chairs, electrical connections, and task lighting. It is anticipated that costs for such infrastructure will not exceed $100,000 Anthropology faculty are pursuing internal and external sources of funding to acquire necessary instructional laboratory materials.

Foreign Languages
The teaching of Foreign languages requires special equipment to allow the practicing of speaking and listening. A dedicated language lab has been designated in SSM building, and we expect that to meet our needs for the next five years.

Media Arts Program
Teaching art technique and art practice requires specialized and dedicated classrooms due to unique pedagogical needs. Though a variety of courses in art technique and practice have been offered at UC Merced since opening its doors to students in 2005, specialized classrooms and labs are required in order to fully develop art technique and practice courses. For instance, while lecturing is part of teaching technique and practice, students primarily learn "hands on." Students draw, sculpt, use digital equipment, and sing in these classrooms. A section of the new SSM building (scheduled to open in 2011) has been designed to serve the needs of the art technique and practice curriculum. There are classrooms, labs and offices specifically designated for teaching of art technique and practice. Two classrooms have been allocated for the digital media course needs. Additionally, there are extra large faculty offices to accommodate faculty artists working with students in one on one independent or directed study format. This specially designed space is more than adequate to serve the needs of MAP in its present form as well as for the projected B.A. and graduate Program.

World Heritage
In addition to existing teaching and research lab space, each new faculty member will require research lab space. It may be possible to combine World Heritage teaching labs, but that depends to a great extent on the research of the people hired.

C. Library
New and current faculty in all fields of HWC will need additional library resources, which are in some areas sorely inadequate at the present. These include basic teaching resources as well as material necessary for faculty to

pursue their research. In fields such as anthropology and history, many vital resources are not yet available electronically; in other cases, UC Merced has not subscribed to resources faculty need to do their work. In particular, fields of the humanities tend to use older scholarly resources: unlike fields in which only the latest data are relevant and electronic journal articles are the disciplinary standard, older monograph literature is often revisited to gain additional insights and assess new hypotheses. Furthermore, important reference material which is not available through interlibrary loan must also be acquired. We are aware of potential opportunities to acquire all or part of personal libraries of retiring faculty at other California institutions, and we hope that the Library will support or initiate these or other efforts to acquire classic monograph series, in addition to any other material necessary for faculty to do their jobs.

D. Assessment

Programs in HWC have all chosen to develop qualitative assessment procedures. As the number of students increases, and with it the number of papers to be read, we need to provide some support for FAOs. We propose the following scale to acknowledge the work of FAOs:
Minors, Majors up to 100 students: a summer 1/18
Majors over 100 students: a summer 1/9
Program Review: When a program in HWC is undergoing program review, the FAO should receive a teaching release.

E. Staff Support

-- one staff member to provide support for teaching/administration of group (could initially be shared with CRHA)
-- By 2012, 50% instructional technology staff support to support World Heritage, Digital humanities, digital arts as well as potential hybrid course delivery ventures.
-- a 50% instructional technology position in the Writing program (soft money)
-- by 2013, we will need a 50% coordinator for languages other than Spanish.

VI. Grants and Outside Funding

The fields in Humanities and World Cultures typically do not provide extensive external funding opportunities. However, faculty in the group have received funding to participate in programs at UCHRI, for travel and research; California Partnership for the San Joaquin Valley (through the Great Valley Center), and UCM's Graduate and Research Council to monitor changes in the quality of life and social efficacy of two targeted Merced County communities; and the Bureau of Land Management to develop source-specific obsidian hydration rates for cultural resource management and archaeological research in Lincoln County, Nevada. In addition, anthropology faculty are part of a grant application to the NIH in partnership with other faculty on campus.

VII. Public Service

HWC faculty have been involved in a wide range of public service activities in the Merced area and in the state more generally. These activities include:
- participation in CURAJ—Community-University Research and Action for Justice, a Central Valley-wide initiative—that networks the members of the UC academic community with community-based organizations to address pressing Central Valley issues.
--Professors Camfield and DeLugan are on the Chancellor's Task Force to Promote Community Engaged Scholarship.
- Professors DeLugan and Hull are also working to strengthen the support structure and communication network at UCM for faculty interested in developing and collaborating across campus on regional research as well as service-learning and student internship opportunities.
- Professors Cristian Ricci and Robin DeLugan have organized the Human Rights film festival
- History 190 has placed students in internships that serve local arts/historical organizations
- the Chicano/a Literature series has featured artists and writers in community settings;
- Professor Martín-Rodríguez writes a periodical column on literature for *La Voz: Hispanic Cultures and News from the Central Valley*
- Hull is a regular presenter at the MUHSD Robert Fore Excellence in Science retreat for high school science teachers in Wawona; both DeLugan and Hull have given presentations at the Challenger Learning Center
-*Wilma McDaniel: the Okie Poet Laureate* opened to the public in September of 2009, a celebration of the life and work of the poet Wilma McDaniel, curated by Goggans and her research assistant.
- The Center for Research in Humanities and Arts offers programs that are open to the community, from the Human Rights Film Festival to lectures and talks by our own faculty and visiting faculty.
- CRHA funded speakers for the California Exhibition Resources Alliance photographic exhibit, ***Hobos to Street People: Artists' Responses to Homelessness from the New Deal to the Present.***

VIII. Program Strategic Plans

A. Anthropology

The Anthropology program at the University of California-Merced (UCM) distinguishes itself by focusing research and teaching on a select group of common research themes relevant to our local, state, and global communities. The undergraduate major emphasizes methodological skill and intellectual rigor in addressing specific issues within these themes, and promotes undergraduate research opportunities—including working on faculty research, service-learning, and individual research—that deepen learning experiences and attract students to our program. Anthropology faculty currently contribute to two interdisciplinary graduate groups, and we are also building our program in anticipation of initiating a disciplinary graduate program at some time in the future.

This document presents a plan for growth of the Anthropology program over the next five years, including plans for strategic hires in biological anthropology in AY 2010-11, socio-cultural anthropology in AY 2012-2013, and another in biological anthropology in AY 2013-2014 to support undergraduate, interdisciplinary graduate, and anticipated disciplinary graduate programs; development of dedicated damp teaching laboratory space in COB; continued development of appropriate damp and wet research laboratory space on campus in SSM, SE I, and/or SE II; and enhancement of library resources for undergraduate instruction. In addition, this plan looks ahead to avenues for intra- and inter-disciplinary research and partnerships involving Anthropology both within and beyond SSHA.

CHALLENGES

The Anthropology program must address challenges that range from those similar to any start-up program at UCM to those unique to this diverse discipline. Within the next five years, the Anthropology program must:

- Recruit additional ladder-rank faculty in the three core sub-fields sufficient to support the undergraduate Anthropology major and minor requirements, interdisciplinary graduate instruction in conjunction with faculty in both SSHA and Natural Sciences, and the longer-range goal of a stand-alone anthropology graduate program;
    - Currently, the Anthropology program lacks ladder-rank faculty in one required area of undergraduate instruction (biological anthropology), exposing our undergraduate students to risk that required courses may be unavailable.
    - Projected rotations require a total of five ladder-rank faculty for minimal coverage of undergraduate and graduate instruction (within one interdisciplinary graduate group) yet do not account for periodic faculty leave. A total of seven anthropology FTE are necessary to handle both instruction and contingencies for leave, as well as manage anticipated administrative responsibilities related to WASC

programmatic assessment.
    - Current and requested additional Anthropology faculty FTE and projected rotations for the initial five ladder-rank faculty do not take into account potential future faculty commitments to dedicated GE in courses such as CORE
- Develop sufficient “damp” and “wet” research laboratory space for faculty and affiliated graduate students whose specializations necessitate such space;
    - Current "damp" lab allocations in the SSM building will accommodate three ladder-rank faculty (one already hired beginning AY 2006-2007, one to start AY 2010-2011, and a third to be hired in the future) although FTE necessary to sustain the Anthropology program in the next five years will require two additional labs
- Acquire dedicated teaching laboratory space for undergraduate education in both archaeological and biological anthropology;
    - Current "damp" teaching laboratory space is shared with other disciplines for courses that do not require such damp space, prohibiting the development of the teaching space to fully meet program needs and the application for grant funds to support such lab development
- Invest in instructional infrastructure in socio-cultural, archaeological, and especially biological anthropology to support undergraduate education;
- Improve library resources in ethnographic, archaeological, and biological anthropology primary literature and multimedia; and
- Identify and develop intersections for interdisciplinary partnerships in faculty, graduate and undergraduate teaching, and research within and beyond SSHA, including cross-campus collaborations as well as collaborations with faculty throughout the UC system and/or regional institutions of higher education.
    - The breadth of research encompassed within anthropology may support a variety of interdisciplinary graduate groups to which ladder-rank faculty might contribute, although specific proposals for many such programs are still under development.

Building on our current strengths, while also considering long-term needs that fulfill our stated mission and initiatives within the UCM community at large, the anthropology faculty have identified four initial cross-field teaching and research areas for the program:

- indigeneity, race, ethnicity, and the nation-state;
- transnationalism, migration, and demography;
- health, nutrition, and the environment; and
- heritage, tourism, and public culture.

These themes and their potential cross-campus connections are considered

more fully below.

Data from the American Anthropological Association, other UC anthropology programs, three years of anthropology instruction at UCM, and student response to the major and minor allow us to anticipate how the program will grow over the next five years and, therefore, justify FTE for additional faculty beyond those necessary to minimally serve undergraduate majors and minors, interdisciplinary graduate students, undergraduate general education, and the long-term goal of a disciplinary graduate program. We also recognize that as the Anthropology program grows, its potential interdisciplinary contribution to UCM will likely increase as well, supporting continued growth in four focal research areas or beyond. Therefore, the 5-year period covered by this Strategic Plan will be used to continue to fill basic needs for undergraduate instruction; track progress, enrollment, and emerging faculty partnerships within and beyond SSHA to facilitate future strategic planning; and envision future mid- to long-term goals with respect to faculty research contributions, graduate education, and the national and international profile of the program within the discipline.

Teaching Opportunities and Enrollment

Student response to the major and minor has been positive, since interest in the program was initially cultivated by faculty and demonstrated by student inquiries during the 2006-07 academic year. As of September 2009, 18 students are enrolled in the Anthropology major and 11 students are enrolled in the Anthropology minor. The major enrollment is approximately 0.5% of the current undergraduate student population at UCM. Moreover, the enrollment in the major is exactly on target with program projections for enrollment the 2008-2013 Anthropology Strategic Plan, which noted "that as many as 18 students will declare the Anthropology major within one year of program initiation." Based on comparisons with other UC campuses for which Anthropology majors account for approximately 0.5 to nearly 3% of the total undergraduate population, we estimate that Anthropology majors at UCM will eventually represent at least 1% of the total undergraduate population. . As indicated in Table A3, enrollment in anthropology courses has also grown steadily since 2006—not simply due to the increasing number of undergraduate students or the addition of faculty and lecturers, but as an increasing percentage of the total undergraduate population. We anticipate continued growth in the coming years in both lower and upper division courses. Professors DeLugan, Hull, and Rebhun have all sat on graduate students exam, thesis, and/or dissertation committees for World Cultures graduate students, some of whom have either been advanced to candidacy or completed their degrees.

Table A.1. Three-year Projections Based on Major Enrollment for SSHA during AY2007-08 and AY2008-09

Major	Major Enrollment Frequency		Major Enrollment as % of UG Enrollment		Mean % of UG Enrollment	Projected Major Enrollment Based on Mean %		
	Fall 2008	Fall 2009	Fall 2008	Fall 2009		Fall 2010	Fall 2011	Fall 2012
ANTH	4	18	0.1591723	0.5625	1.5†	34	53	77
COGS	56	87	2.2284123	2.71875	2.4735811	95	109	126
ECON	50	50	1.9896538	1.5625	1.7760769	68	78	91
HIST	64	75	2.5467569	2.34375	2.4452534	94	108	125
LTCU	51	73	2.0294469	2.28125	2.1553484	83	95	110
MGMT	177	190	7.0433745	5.9375	6.4904372	250	286	331
POLI	117	158	4.6557899	4.9375	4.7966449	185	211	245
PSY	329	372	13.091922	11.625	12.358461	476	544	630
SOC	0	28	0	0.875				
TOTAL UCM UG Enrollment	2513	3200				3850	4400	5100

† ANTH percentage is minimum projection based on comparison with other UC campuses; see figures in Tables A.2 for more realistic projections based on UCM enrollment data

Note: This table demonstrates that most majors that have been in existence for four or more years have apparently peaked and/or stabilized in terms of their percentage share of undergraduates

Table A.2. ANTH Major Projected Enrollment Based on Enrollment for AY 2009-10, Augmented by Additional “Home–grown” Majors†

	FR	SO	JR	SR	Total Majors
Fall 2009	7	1	8	2	18
Fall 2010	10	14	18	8	50
Fall 2011	10	17	31	18	76
Fall 2012	10	17	34	31	92

†This projection assumes seven FR (rather than four) will subsequently declare ANTH major during their SO year

Table A.3. Anthropology Course Enrollment Growth AY 2006-07 to AY 2009-2010.

	AY 2006-07	AY 2007-08	AY 2008-09	AY 2009-10
Total course enrollment	99.00	166.00	271.00	438.00
Enrollment as percentage of the total undergraduate population	8.18%	9.49%	10.69%	13.57%
Average # students/course	24.75	23.71	27.10	39.82
Average # students/instructor	49.50	55.33	67.75	108.25

Hiring/FTE priorities are as follows:

→**Biological Anthropologist (Assistant Professor**): The frozen search is for a junior biological anthropologist, who will bring a specialization in human biology and be poised to articulate with the initial cross-field teaching and research areas identified for the Anthropology program above. Given the many needs of UCM to which a position in biological anthropology might contribute, the search was broadly defined to encompass research interests and methodological expertise in demography, health, diet, adaptation, or biocultural approaches to either contemporary or past human populations. In addition to providing critical mass for sustaining the major (i.e., avoiding risk that required classes may not be offered in a timely manner), instruction of several courses that serve as electives in the Human Biology track of the Biology major, and important leadership for developing the biological anthropology curriculum and teaching laboratory, this faculty member will engage with graduate groups in the social sciences, humanities, and possibly biological sciences as well as other campus initiatives including the proposed medical school. Research and teaching in biological anthropology may address issues of human physiological, morphological, and genetic adaptability, including race. Office and laboratory space in SSM is already allocated for this position, and necessary start-up funds will vary depending upon the expertise of the preferred candidate. We anticipate, however, that start-up funds to cover initial laboratory and/or field costs will be less than $100,000.

→**Socio-cultural Anthropologist (Associate or Full Professor):** Our next

priority is to hire a third socio-cultural anthropologist no later than Fall 2012. This position is critical to the further development of each of our four focal research areas (see above), with research and teaching interests that complement those of our existing faculty in socio-cultural anthropology. Similar to our required hire in biological anthropology, the search for this position may be broadly defined (or subsequently tailored, in consultation with colleagues across campus based on converging needs), since such a colleague might articulate with various graduate groups or ORUs established on campus by that time. For example, this position might bring expertise in the following general research areas: global environmental justice and policy with obvious cross-campus links to the School of Natural Sciences and SNRI; subjectivity and subject formation, which could build links across SSHA in particular with psychology, the humanities, and the arts; or globalization studies, which has the potential to forge cross-school and cross-campus research collaborations. A ladder-rank faculty member is required, as only a tenure-track faculty member can contribute to the development of interdisciplinary graduate groups and ORUs on campus. The addition of this socio-cultural anthropologist will also facilitate flexibility in teaching rotations for anthropology faculty, as a whole, thus permitting more regular instruction of anthropology courses incorporated in the World Cultures graduate program, the American Studies minor, and new World Heritage program, while also facilitating faculty sabbaticals for the anthropology faculty, as a whole. This position will require office space in SSM and modest start-up funds; no laboratory space is required.

→ **Biological Anthropologist (Open Rank**): As noted above, the final hiring priority within the span of this Strategic Plan is a second biological anthropologist during AY 2013-14. While a lecturer in biological anthropology might help service the major through periodic instruction of ANTH 5 in the short term (see Appendix B), a lecturer is unable to contribute to upper division laboratory instruction, since such instruction is generally based in faculty research collections. In addition, anticipated continued growing demand for ANTH 5—as a course simultaneously fulfilling a science requirement for SSHA students and a social science requirement for NS and Engineering students—may necessitate more frequent rotation and, thus, faculty support for, biological anthropology. Therefore, a ladder-rank faculty will eventually be required, with a preferred methodological specialization that will complement that of the biological anthropologist hired in AY 2010-11. We envision that this faculty member might take advantage of existing core campus equipment for research or, perhaps share laboratory space in SE II (e.g., if the individual has expertise in human genetics or isotopic studies of human remains). Given the wide variety of laboratory and start-up needs for biological anthropologists, Anthropology faculty will consult with the SSHA Dean on definition of this position to work within anticipated resources.

B. Foreign Languages

Overview: A considerable number of students enter UC Merced expecting to learn a second language as part of their college education. Others already have experience with the foreign language they want to learn, but desire to become fluent or, in the case of heritage learners, gain a better understanding of the culture and language they partly learned at home. Since we live in a multicultural society, the Foreign Languages Program strives to provide students with the opportunity to learn a second language, a skill appreciated by most employers, a requirement for some graduate programs, and an essential tool to conduct research overseas. Learning a foreign language and gaining knowledge of the diverse cultures around the globe, as well as in the United States, is fundamental for a better understanding of our world and the peoples that inhabit it. Therefore, the Foreign Languages Programs at UC Merced will keep promoting the study of foreign languages and cultures from an interdisciplinary perspective while encouraging the research on foreign language acquisition and teaching. For this reason, one of our goals is the implementation of the one year Foreign Language requirement approved by the SSHA faculty on the academic year of 2006-2007.

***Teaching*:** The Foreign Languages Program faculty teaches lower division courses in four language programs: Chinese, French, Japanese and Spanish. In addition, it contributes to undergraduate programs such as the minor in Spanish. All courses in the Foreign Language Program are considered general education courses.

Chinese: Chinese has been offered at UC Merced since Spring 2007, mostly at the elementary level. Chinese courses have been taught by a part-time Lecturer. However, during the 2009-2010 academic year, the three sections of CHN 1 and the one section of CHN 2 offered had a full or almost full enrollment. Consequently, in the next five years there will be a need for opening at least one more section of CHN 1 and CHN 2 every academic year and for offering Intermediate Chinese courses starting Fall 2010.

French: French has been offered at UC Merced since Fall 2006, mostly at the elementary level. French courses have been taught by a part-time Lecturer. However, during the 2009-2010 academic year, the three sections of FRE 1 and the one section of FRE 2 offered had a full or almost full enrollment. Consequently, in the next five years there will be a need for opening at least one more section of FRE 1 and FRE 2 every academic year and for offering Intermediate French courses starting Fall 2010.

Japanese: Japanese was first offered at UC Merced in Fall 2006. Since then, the Japanese elementary and intermediate courses have been taught by one full-time Lecturer. In Fall 2009, a part-time lecturer was also hired in response of the growth of the Japanese program. One of the goals of the Japanese program is to start offering upper division courses on the academic

year of 2011-2012, and a minor in Japanese for the academic year of 2012-2013.

Spanish: Spanish has been offered at UC Merced since Fall 2005. The Spanish Program is the largest of all foreign language programs. It offers lower division and upper division courses. At the lower-division level, the Spanish Language Program offers two tracks: one for non Spanish Heritage Speakers (SPAN 1-SPAN 4) and another for Spanish Heritage Speakers (SPAN 10-SPAN 11). As of Spring 2010, the Spanish Language Program faculty includes one full-time Lecturer SOE, two full-time Lecturers, one part-time Lecturer and two Teacher Assistants (ABD). Some of the Spanish Language program faculty contribute to the minor in Spanish. The number of sections that the Spanish Language area offers at the lower-division level grows every academic year. For the next five years, we anticipate the addition of at least one section of SPAN 1 and SPAN 2 every academic year. Similarly, and due to the popularity of the minor in Spanish, increasing the number of courses and sections is a priority for this program.

The following table summarizes enrollements in Foreign Languages from 2005 to 2010:

FLAN ENROLLMENTS 2005-2010

	2005-06	2006-07	2007-08	2008-09	2009-10	Anticipated enroll. 2011-12
Chinese	n/a	30	31	75	92	130
French	n/a	56	43	65	93	130
Japanese	n/a	72	76	94	124	140
Spanish	LD 78 UD 26 Total 104	LD 115 UD 68 Total 183	LD 97 UD 113 Total 210	LD 172 UD 156 Total 328	LD 239 UD 221 Total 460	LD 300 UD 300 Total 600
Total all	**104**	**341**	**360**	**562**	**769**	**1000**

C. Global Arts Studies Program (GASP)

GASP defines the arts broadly in order to promote an interdisciplinary study of the arts. Unique among UCs and other research universities in the U.S., the GASP curriculum integrates subjects conventionally housed in disparate departments and offers students a broad multicultural and transnational understanding of the arts through courses that investigate the effects of formal conventions and innovations, industrialization, colonialism, commercialism and globalization on art practices from a balanced, inclusive range of critical perspectives.

Within three years, we expect to not only be contributing to the History program, but to also offer a minor. In five years, with an additional 3 faculty, we would be able to propose a major. Given our current enrollments (see Chart A), we estimate that a minor in GASP would draw more than 50 students. To make a minor sustainable, we need 2 new hires (including the previously allocated art history hire) in the next two years in order to be able to launch a Minor in GASP, with a total of 4 faculty members, by Fall 2013. Many current GASP courses are cross-listed in history, thus contributing to the History Major by Fall 2010. As such, it is vital to increase the size of GASP faculty to better serve students who wish to acquire knowledge in the history of the arts, as well as those with a more general interest in expanding their understanding of global cultural history.

Chart A. The enrollments in courses taught by the existing GASP faculty since 2006

	Fall 2006	Spring 2007	Fall 2007	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010
Semester Total (Art History)	10	27	39	47	50	62	56	14
Semester Total (Music)	40	n/a	38	62	36	41	111 *	49
Annual Total		**77**		**186**		**189**		**230**

*These include enrollments in the ethnomusicology course offered by a lecturer.

In order to offer a truly global and cutting-edge curriculum, and to complement the strengths of the two existing Americanists in GASP as well as those in the current History Program, GASP needs 2 FTEs for 2010-12—one in art history (previously approved), and one in music—to be able to provide the minimal number of courses for a GASP Minor to launch in 2013. By 2015, with the addition of 3 additional ladder faculty, we expect to launch a major.

<u>Position Descriptions</u>

1. Music studies (open rank): In order to fulfill a GASP minor, we request a music FTE in 2011-12. We seek a music scholar who specializes in a musical tradition of Asia who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality.

   We seek an Asian specialist for two significant reasons. First, given the student population at UCM, where the largest group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear.[5] Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way.

2. Art history (open rank): due to an unsuccessful search in 2007 and a suspended position in 2008, we request to be given 1 art history FTE in 2012-13. The priority will be to hire an art historian who pursues comparative and innovative research that deals with issues of globalization and postcolonialism in the pre-20th century period. Preference will be given to a scholar with a solid foundation in early modern European art traditions, and an additional specialization in gender studies.

3. GASP seeks a music scholar who specializes in a musical tradition of Latin America (including the Caribbean) who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. Rationale: there are a number of faculty whose research encompasses Latin America and a Latin American specialist could provide synergy to a Latin American studies program or minor. Additionally, there is a large student population who identify as Hispanic, indicating strong student interest in courses that deal with Latin American culture.

4. Art history (open rank): GASP seeks an art historian who specializes in artistic traditions of Asia within a transnational context. Priority will be given to scholars whose work focuses on pre-20th century periods, as well as those whose scholarship investigates issues of race, nationalism, gender and/or sexuality in relation to artistic production. This will be an important position for GASP and UCM students for two significant reasons. First, given the student population at UCM, where the largest

[5] According to the Campus Enrollment by Ethnicity table drawn from the Institutional Planning and Analysis (IPA) Enrollment Table, in Fall 2009, Asian/Pacific Islanders numbered 1,050, while the next two largest groups - Hispanics and Whites – numbered 1,028 and 699 respectively.

group self-identify as Asian/Pacific Islander (outnumbering Hispanics and Whites) but whose interests in terms of curriculum have gone largely unheard, the need for classes that address those interests is clear. Second, since current GASP faculty specialize in Asian American cultural production, a specialist in Asian cultural production would complement and strengthen the transnational scope of the program in a compatible way. Finally, a pre-20th century specialist will complement the work of Professor Mostern in History.

5. GASP seeks a music scholar who specializes in a musical tradition of Europe who frames it within a transnational context. Priority will be given to scholars whose work focuses on issues of race, gender and/or sexuality. Rationale: European musical traditions play a significant role in the music we listen to today. In order to provide a well-rounded major (which this hire could conceivably allow GASP to become, provided the art history component of GASP is growing at the same rate), GASP will need a Europeanist.

In AY 2010-11, GASP will require a FTE for Kevin Fellezs. As a UC President's Postdoctoral Fellow, Fellezs's first five years of salary are paid by UCOP. Fellezs was hired in AY 2006-07. In AY 2010-11 it will be time to convert him into a UCM tenure-track FTE effective AY 2011-12. As per the memo of 12/2/09 from Provost/EVC Keith Alley to the UCM Deans, *this is one of four such positions that is already accounted for in the FTE allocations* and, thus, need not be considered in the further allocation of ladder-rank faculty lines to GASP.

The two existing faculty members of GASP offer a unique curriculum consisting of courses in the faculty's respective areas of expertise—art history and music studies in the U.S.—as well as those that provide a global perspective on the studies of the arts. These include:

GASP 2 Introduction to Music Studies (Music/Global)
GASP 3 Introduction to Visual Culture (Art History/Global)
GASP 31 Critical Popular Music Studies (Music/Global)
GASP 32 Jazz History (Music/U.S.)
GASP 34 American Musical (Music/U.S.)[6]
GASP 101 Visual Arts of the Twentieth Century (Art History/Global)
GASP 121 Asian American Music (Music/U.S.)[7]
GASP 135 African American Music (Music/U.S.)
GASP 141 History and Practice of Photography (Art History/Global)
GASP 151 Topics in Visual Culture: Museums and Art Controversies (Art History/U.S.)
GASP 175 Race and Nationalism in American Art (Art History/U.S.)

[6] This course touches on Asian American issues in discussions and readings when viewing *Flower Drum Song*, for example.
[7] This course is still under consideration by the Curriculum Committee.

D. History

Overview

History is one of the oldest and most stable of academic disciplines. Its insights, methods, and pedagogy are centered upon the creation of narratives that explain human activities as they change over time. History's distinctiveness as a discipline is its examination of phenomena that occur in many places (such as land ownership, religious conversion, migration, and state formation) through an empirical focus on particular places and times. It unites the social scientific search for general principles and the humanities focus on cultural specificity and authored text. Successful history programs offer courses that span geographical and temporal locations.

History was a part of the founding vision of the School of Social Sciences, Humanities, and Arts at UC Merced. In 2003, a historian (Gregg Herken) was one of the first two faculty hires in SSHA. Another historian was added the following year (Ruth Mostern), and another the year after that (Sean Malloy). Two more historians (Susan Amussen and Sholeh Quinn) joined the faculty in 2008. In 2005, History was a track of the World Cultures and History major, one of nine opening-day majors planned by a systemwide task force. History became a free-standing major in 2006. In 2008, History became the first major at the university to offer an approved Honors program.

History enrolls more majors than any other major in HWC and the fifth highest in SSHA. We collaborate closely with the Global Arts Study Program (GASP), World Heritage (WH), Literature, and Anthropology, cross-listing courses and sharing electives, and we contribute fully to the World Cultures graduate group. A student whose dissertation focused on history was among the first UC Merced students to receive a Ph.D.

The anticipated retirement of Gregg Herken at the end of the Spring 2010 semester necessitates a full-time US history lecturer hire for 2010-11 and an immediate US History search simply to retain our current staffing. We need to expand our faculty to a minimum of eight members by 2012.

Challenges and Opportunities

- Strengths: The history faculty is successful and productive, and has attracted a number of graduate students. Our enrollments and enrollment growth are robust, and student evaluations for all history faculty are strong. The integration of history with GASP and WH supports UC Merced's interdisciplinary orientation. The history research, teaching, and curriculum bridges cutting-edge approaches such as transnational and digital history with strengths in traditional sub-fields such as political and social history. Our Honors program makes History an appealing major for Merced's most academically ambitious undergraduates.

- Weaknesses: The history program is woefully understaffed, especially in US history and in modern world history, particularly in light of the anticipated retirement of Gregg Herken. A successful history curriculum requires students to take courses that concern many historical periods and global locations. The UC Merced history program lacks coverage of many eras and world regions, compromising our ability to deliver a methodologically appropriate major. The only way for History faculty to participate in graduate education is for the program to hire lecturers to teach some upper-division courses as well as lower-division courses. This is educationally problematic, and risky in light of fluctuations in funding for these positions.
- Opportunities: The next three years offer a chance for the history program to make focused and targeted hires that enhance the strengths of the program, group, school, and campus. The history strategic plan and curriculum are well-organized and have consensus support of the faculty, allowing us to make good use of resources. The four Priority I hires laid out in this plan are the minimum we need to have a small but intellectually coherent program with adequate faculty rotations and a sufficient number of upper-division and lower-division offerings; we will be able to deliver an effective major and contribute to graduate education and synergistic activities on campus.
- Threats: If the History program cannot grow at a desirable rate, our most ambitious undergraduate students will transfer to other campuses. We may lose younger faculty to other universities. We will have inadequate staffing to contribute to graduate education. Our students will have to take classes from lecturers, even at the upper-division level, which will diminish their opportunities for intellectual mentorship and continuity. Finally, we will continue to offer a major that is not aligned with that of peer institutions.

Current Areas of Research Concentration

The History program has two tracks: US History and World History. The US History track has two faculty specializing in mid-twentieth century diplomatic history, including Gregg Herken, who will retire at the end of the Spring 2010 semester. The World History track has three faculty, each of whom specializes in an era in the history of a particular country and its civilization (China-Mostern, England-Amussen, Iran-Quinn) and all of whom also have an interest in transnational questions. All members of the program teach thematic courses as well as courses in their era and location of expertise. All members of the History faculty have a record of publication and grant funding consistent with UC expectations.

Current Undergraduate Teaching

The History major currently enrolls 75 students, 2.4% of the total UC Merced undergraduate population. The history minor currently enrolls 35 students, an additional 1.1% of the undergraduate body. Many History courses meet general education requirements and elective requirements for other majors, and History courses have an interdisciplinary enrollment.

History has the distinction of offering the only Honors major on campus, an opportunity for our finest students to work one-on-one with a faculty advisor and a second reader to complete a year-long piece of original research in their senior years.

In Fall 2009 History enrollments totaled:

Course Number	Course Name	Instructor	Enrollment
H10	World History to 1450	Quinn	49
H16	US History	Johnston (graduate fellow)	59
H80	Chinese History to 1350	Mostern	48
H100	Historian's Craft	Quinn	23
H117	History of South Asia	Meeks (instructor)	17
H130	The Cold War	Chi (instructor)	38
H139	US Race and Ethnicity	Malloy	27
H190	Applied Research	Malloy	4
H193	Honors Thesis Research	Malloy	2
TOTAL FALL 2009 HISTORY ENROLLMENT			**267**

Contribution to Graduate Education

All of the members of the History faculty are also members of the World Cultures graduate group and actively contribute to graduate education. The History contribution to graduate education is summarized in the following table (not including numerous independent study courses):

Name	Courses Offered	Committees Chaired	Committee Memberships
Amussen (since 2008)	WCH 201	From Union Institute & University: Vicky Gabriner, Ben Justesen, Elizabeth Hohl (completed or almost	N/A

		completed); Kathleen Halecki and Martha Sullivan (in progress)	
Herken (since 2003)	H 203, "The Historian's Craft"; H 250, "The Cold War, 1941-91"; H 200, "The Uses & Abuses of the Past"; H 299, Directed Reading: modern U.S. political history	Trevor Albertson Richard Ravalli	
Malloy (since 2005)	• U.S. Social/Cultural History • Race, Empire, and U.S. Foreign Policy	• Johnston (Ph.D.) • Deflin (MA)	• Williams (Ph.D.) • Ravalli (Ph.D.) • Winter (Ph.D.) • Acevedo (Ph.D.)
Mostern (since 2004)	• Humanities and New Media (twice) • China and World History (once)	• Goger (MA) • Hua (Ph.D.) • Meeks (Ph.D.) • Williams (Ph.D.)	• Albertson (Ph.D.) • Bond (CSUS MA) • Gainor (Ph.D.) • Grossner (UCSB Ph.D.)
Quinn (since 2008)	n/a	n/a	• Hill (Ohio University Ph.D.) • Venosa (Ohio University Ph.D.)

Proposed Faculty Hiring

Assuming that History retains its current share of the student body, and assuming an increase of 650 students per year in the UC Merced undergraduate population, there will be 120 history majors, 56 history minors, and 427 students enrolled in history courses by 2012. With the planned shift of majors to SSHA, and an expansion of the faculty, these numbers are conservative estimates.

	2009-10	2012 (assuming 60% increase)
#majors	72	120
#minors	31	56
Majors as % of total UCM student body	2.4	2.4
Minors as % of total UCM student body	1.1	1.1
Total enrolled students Fall 2009	536	857
Majors:faculty	13:1	n/a

In order to meet the requirements of the history curriculum and offer the necessary number and breadth of elective courses for that student body, we will need to offer 20 courses per year.

	2009-10	2012-13
# required lower division courses	4 (H10,11, 16, 17)	4
Minimum # lower division electives	2 (one per semester	2
# required upper division courses[8]	2 (H100, H191)	4 (2 sections each of H100 and H191)
Minimum # upper division electives[9]	6	10
TOTAL	14	20

For the purposes of calculation, we assume that each faculty member should teach a notional two undergraduate courses per year per faculty member. (This is a rough estimate that allows for graduate teaching, sabbaticals, leaves, and course remissions. Based on these calculations, UC Merced could support a History program with 9-10 faculty members.

We recognize that we cannot expect to make eight new hires in the next three years. However, it is important to contemplate these calculations to demonstrate what a sustainable growth plan would require in a resource-adequate environment. The **smallest** number of hires that will allow us to maintain a minimally functional History program in the next three years is **four**: one immediate hire to replace Gregg Herken, and three new hires. With an eight person program, we will be able to rotate each required lower division course between two expert members of the ladder-rank faculty, to more closely cover the globe and the major historical eras, to fill our most pressing lacunae, and to

[8] Assuming that honors thesis instruction remains an overload assignment.

[9] Each major must take six upper division electives over two years. Calculations assume a 35 student enrollment cap, given that we lack the TAs to grade the papers that must be assigned in upper division courses; when we have a significant number of graduate students, we may begin to enroll more students in upper division courses.

offer a marginally adequate number of classes for our students. The resulting 15:1 student-faculty ratio would be similar to that in other UC History departments.[10]

However, we want to emphasize that the minimum is not ideal. We have looked for comparison not just at other UC campuses, but also at small research universities. Among public universities, small research universities are rare, with the College of William and Mary most closely approximating our expected size of about 8,000 students. (It is important to note that 8,000 is less than half the size of the smallest of our sister campuses. It does not seem that any of the UC campuses can serve as good comparison schools for us). On the other hand, small, prestigious research universities are a bit less rare among private schools, with Brandeis, Brown, and Rochester being the three AAU members that enroll between 5 and 9 thousand students, and Dartmouth and Brown the two Ivy League schools. The departments at these universities range in size from 14 to 38, with an average of 28.6 faculty.

Rank I Priority Hires

Our most urgent and immediate need is authorization to hire a full-time US History lecturer for 2010-11 as a temporary replacement for Gregg Herken.

Our four highest priority permanent hires include three US History positions (the first of which is a replacement for Gregg Herken), and one World History position. At the end of this hiring phase, we will have four World History faculty and four US History faculty, with each track evenly split between specialists in early history and in modern history. The hires can be summarized on as follows:

Year	Positions
2010-11	• US: Colonial History (Rank: Senior) • US: History of Comparative Race and Ethnicity (Rank: Junior)
2011-12	• World: Mexican History (Rank: Junior)
2012-13	• US: Western/Environmental History (Rank: Junior)

- American History: Colonial and Atlantic World (17th-18th century): Colonial history has been energized in recent years through its attention to Atlantic dimensions of the field, to the role of Indigenous peoples in the Americas, and the relationship of Spanish, French, and English colonial empires across the Americas. We propose a senior hire in Colonial and Atlantic world history. This position would provide an anchor for the first half of the US history survey course; connect to the scholarship of Amussen on Britain and the Atlantic world, and Hull on the early contact period; a senior hire will provide visibility for our program.

[10] At UC Davis, over the past 5 years there have been between 490 and 412 majors, with a major/FTE ratio from over 17 to 13.2; at UC Riverside, there are approximately 460 majors in history or double majors with a large history component, with a major to FTE ratio of 16.4.

- American History: History of Comparative Race and Ethnicity (19th-20th century): History of Comparative Race and Ethnicity has been one of the fastest growing and most intellectually stimulating fields in the history profession over the last three decades, employing innovative and interdisciplinary methodologies to interrogate issues of identity, migration, language, and power in the United States and its contested borderlands. Hiring in this field would enrich the intellectual diversity of the history faculty and allow us to meet the considerable student demand for classes in this area. In particular we seek a scholar of comparative race and ethnicity whose specialties include Chicano/Latino History. The History faculty have received formal and numerous informal communications from current and prospective students expressing grave concern over the lack of curriculum in Chicano/Latino History. In light of our student body demographics and the UCM status as a Hispanic Serving Institution, it is vital that we address this crucial need immediately. We anticipate that this hire will also build further connections among the disciplines and support the planned Hispanic Studies graduate group as well as the World Cultures graduate group.
- World History: Mexican/Latin American History (18th-20th century). This position fills two gaps in the geographical and temporal range of the world history group. We currently have three faculty with expertise on the vast Eurasian land mass, but none who study the Americas outside of the United States. Given both our geographical location and our student population, research on Mexican/Latin American history is extremely important, and has been the subject of substantial student demand. This position is also synergistic with our planned Comparative Race and Ethnicity hire. Furthermore, all current world history faculty work before the eighteenth century, so it is also important to engage more modern periods. This will enhance our ability to teach the required world history survey sequence. Mexican/Latin American history also provides an important scholarly link to other humanities and social science faculty in SSHA, and supports the planned Hispanic Studies graduate group as well as the World Cultures graduate group.
- American History: US West/Environmental (19th-20th century). Environmental history is a vibrant and rapidly growing sub-field. Hiring in this area will deepen ties between the History program and the rest of the campus and offer the possibility of collaboration and significant grant funding. A Western Environmental historian may work on questions such as historical water rights, resource extraction, erosion, or climate change: all topics of immense contemporary urgency that benefit from a historical perspective. This position offers synergies with current faculty in Literature, Anthropology, Engineering, and Earth Systems Science, and would support the World Cultures graduate group as well as the History major.

Rank II Priority Hires

The goal of the next growth phase will be to expand the History program from a faculty of 8 to a faculty of 12. While we need to make more hires and see the direction of future campus growth before we can create detailed descriptions for these future positions, our general needs are clear. We need to make three more hires in World History in order to have a bare-minimum coverage of each world region, and we need to make one more hire in modern US history to meet projected student demand. We have identified several thematic areas that will inform our future positions: health, medicine, and environment; race, gender, ethnicity, and migration; and spatial and digital analysis. We anticipate the following future positions:

- Modern World: Africa/South Asia/Southeast Asia
- Modern World: Continental Europe/Imperialism
- US: Twentieth Century Social/Cultural History
- Premodern World: Africa/South Asia/Southeast Asia

Metrics for Evaluating Success

- Enrollment: We aim to maintain or increase our major share at 2.4% of the total student body and our minor share at 1.1% of the student body. We aim to maintain or increase our total student enrollment as a percentage of the student body. We aim to admit and graduate Ph.D. and MA students with a History focus through the World Cultures graduate group.
- Program Maturity: We aim for some representation of all world regions and historical eras. We need adequate hiring to support research synergies among History faculty and between History and other faculty.
- Grants and Publications: We expect to see productivity at a rate and quality that is standard for research university faculty in the profession and in the UC system.

E. Literature and Cultures

Overview:
Having divided from the initial World Cultures and History egg, the Literatures and Cultures major is part of the second phase in the gestation of undergraduate programs in the Humanities. Literatures and Cultures in conception is a combination of Comparative Literature and Cultural Studies, but it began with just two tracks, one in Literature of the English-speaking world and one in Literature of the Spanish-speaking world. It is now time to move into a third phase, dividing the major into three: English, Spanish, and a residual Literatures and Cultures major that can continue to generate new programs in literary studies, in both individual languages and a program in Comparative Literature and Cultures. Furthermore, we propose that the new English major combine with the writing minor, and that the Spanish major combine with the Spanish minor

Strengths/Opportunities/Challenges:
Literatures and Cultures is the 6th largest major in SSHA (out of ten majors), with a slightly more than a 2:1 ratio between those in the English-language track and those in the Spanish-language track. Judging by NCES (National Center for Education Statistics) data, these numbers are low comparatively, as English is, in the comparison group of majors offered by SSHA, the third largest major in B.A. granting colleges and universities nationally, and Spanish, while toward the bottom, should be about equal to Economics. If Literatures and Cultures were pulling the expected majors from traditional English and Spanish majors, it would trail Psychology by about a 2:3 ratio, would exceed History, Political Science, or Sociology by about 2:1, and would exceed Economics by nearly 3:1. The gap between expectations and performance probably has four causes, all of which our strategic plan seeks to address:

(1) The name of the major is not readily recognized.
(2) The number of majors in the Spanish-language literature track is always going to be influenced by the students studying the Spanish language, so it is now (for the most part) a subset of Spanish minors.
(3) The separation of English-language literature from the writing program eliminates the important and traditional synergies between reading and writing in English.
(4) The obvious career tracks for Literature majors in any of the modern languages are not clearly supported. For example, the lack of name recognition could make it for a UC Merced graduate to compete in the job market as a translator, as a journalist, or as a high school teacher with a B.A. in Literatures and Cultures.

We thus believe that new Spanish and English majors would significantly bolster enrollments in both of the new majors compared to the old. Indeed, with more properly defined majors UC Merced might come closer to the enrollment ratios seen at other U.S. universities. Given our location and the consequent

attractiveness of study in Spanish, we expect the new configuration to attract about 10-15% of SSHA majors, somewhere on the order of twice our current 6.5%. The advantages would be to:

- help balance the majors in SSHA, an objective worth pursuing as faculty in the Humanities are much less expensive than those in Psychology, Cognitive Sciences, or Business, requiring no laboratory spaces, lower start-ups, and lower salaries.
- Support general education (see the Writing Program's strategic plan)
- Introduce students to cutting-edge research in English- and Spanish-language literatures and cultures
- Bolster our ability to improve educational outcomes at all levels in the Central Valley by providing UC caliber graduates who can enter post-secondary education in both English and Spanish.
- Provide clearer and broader career trajectories for our students, including easier paths into graduate and professional programs.

None of this would come at any cost to the graduate program and would probably improve ladder-rank faculty research output by broadening the faculty base for university service (again, see the Writing program's proposal to convert a number of Unit 18 lecturers to Lecturers P/SOE; P/SOE faculty can serve on any Senate Committee that does not deal with personnel issues for ladder-rank faculty, and their explicit dedication to pedagogy means that they would be in an ideal position to work on assessment, general education, and similar tasks. A similar approach to Unit 18 lecturers in Spanish would provide even more Senate faculty to serve on committees).

More importantly, by blending current faculty in the LITC major with faculty in the two minors, the two new majors would enable us to come much closer to the numbers of faculty expected from a small, prestigious research university in the fields of English, Spanish, and Comparative Literature. Among public universities, small research universities are rare, with the College of William and Mary most closely approximating our expected size of about 8,000 students. (It is important to note that 8,000 is less than half the size of the smallest of our sister campuses. It does not seem that any of the UC campuses can serve as good comparison schools for us). On the other hand, small, prestigious research universities are a bit less rare among private schools, with Brandeis, Brown, and Rochester being the three AAU members that enroll between 5 and 9 thousand students, and Dartmouth and Brown the two Ivy League schools. Judging against the benchmarks that these schools provide, and assuming our target enrollment at the end of three years will be five thousand and our maximum will be eight thousand, we will need to expand our regular faculty in both English and Spanish.

English: Including those in both literature and writing, we have Gregg Camfield and Jan Goggans full time; Manuel Martín-Rodríguez in both English and Spanish; and Robert Ochsner, a member of the LIT group as well as the one Senate faculty member in the Writing Program (currently a full-time administrator, Ochsner is, we hope, open to being lured back to

50% time in teaching). The average of the five comparison schools is 27 "regular" faculty members.[11] We will need to increase our faculty size substantially in order to be even remotely comparable. Conversion of Unit 18 lecturers now in the Writing Program will provide much of this necessary expansion (15-16 faculty), but steady hiring of tenure-line faculty in English-language literature will also be required

Spanish: Including those in both Literature of the Spanish-speaking world and Spanish language, we have Ignacio López-Calvo and Cristián H. Ricci full time; Manuel Martín-Rodríguez in both Spanish and English; and Virginia Adán-Lifante, who is a member of the Literatures and Cultures group (the one Senate faculty member in the Spanish program) as well as the Language Coordinator. The average of the five comparison schools is 10 "regular" faculty members.[12] We will need to increase our faculty size substantially in order to be even remotely comparable.

Implementing these two new majors will not be inordinately difficult inasmuch as each will use courses already listed in the catalogue. It will not be inordinately expensive, inasmuch as the resources already allocated to the minor programs with which they will be merging will augment resources currently allocated to the two Literature tracks. Maintaining Literatures and Cultures on top of these two majors will not be difficult either, as the overlap in courses will mean that all of the courses Literature majors will need to graduate will be readily available.

We should be able to begin the process of spinning off the two majors this academic year, as a Spanish proposal is nearly complete and an English proposal is not far behind. We would expect that with WASC review, the new majors would be available for 2011-12.

Research, Grants and Awards:
The five faculty members who form the original core of the Literatures and Cultures major have each received a variety of grants and awards, from an Endowed Chair (Camfield), National Endowment for the Humanities (López-Calvo, Ricci), Chiang Ching-Kuo Foundation for International Scholarly Exchange (López-Calvo), American Institute for Maghrib Studies (Ricci), Newberry Library (Martín-Rodríguez), Recovering the U.S. Hispanic Literary Heritage (Martín-Rodríguez), and funding via the Graduate Resource Council, since the campus's

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[11] We are using Brown University's definition, which is roughly equivalent to our Senate membership. Brown University has 33 "regular" and 12 "non-regular" (i.e. part-time or visiting adjuncts) faculty in English; William & Mary has 39 "regular" and 11 "non-regular;" Dartmouth 30 and 29; Brandeis 18 and 6; Rochester lists only their regular faculty, at 23. All of these include some writing faculty in the "regular" group.

[12] We are using Brown University's definition, which is roughly equivalent to our Senate membership. Brown University has 10 "regular" and 1 "non-regular" (i.e. part-time or visiting adjuncts) faculty in Hispanic Studies; William & Mary's Hispanic Studies has 10 "regular" and 3 "non-regular;" Dartmouth's Spanish and Portuguese Department has 16 and 10; Brandeis University's Hispanic Studies has 10 "regular" faculty (they only list their regular faculty); Rochester lists only their regular faculty, 4.

first year. Additionally, despite heavy teaching and service loads, the faculty's scholarship has remained robust, with recent books (Ricci, López-Calvo, Goggans, Martín-Rodríguez) and peer-reviewed articles in top-tier professional journals from all faculty members, as well as new projects in online publications and public humanities, all of which have expanded the boundaries of research in the area of literary and cultural studies.

Teaching (current and projected):
Along with teaching our normal course load, faculty in both English and Spanish concentrations have pursued teaching areas which hold out innovative promise:

1. Environmental literature and writing: UC Merced's ongoing relationship with Yosemite, its new designation as a system-wide Natural Reserve, and the availability of the Wawona Research station, which houses at least 30 students, offer an exciting opportunity to build on creative writing and literary studies in the area of nature writing, national parks, and environmental literature. Faculty in both the English and Writing tracks have experience in putting on workshops, working in natural reserve systems, and teaching environmental literature. Courses in these areas will serve as a major draw to incoming students, highlighting the campus's proximity to Yosemite and its many avenues of research taking place within the park.
2. The Central Valley and California Studies: Faculty members in the writing program have already established an ongoing series of lectures by writers in the Central Valley and Greater California. The literary archive of Central Valley and Dust Bowl writer Wilma McDaniel arrived at Kolligian Library through faculty efforts, and an ongoing project introduces students to the public humanities by putting them to work curating an exhibit of Mark Twain in the Sierra foothills. California Studies, in general, offers students new ways to understand cultural production of various generations while also helping them to understand the current conditions of their own lives.

3. The faculty members in the Spanish-speaking world have developed a series of activities to improve the visibility of the program and to fulfill the goals of UC Merced's as a "Hispanic-serving institution:" organization of international conference, inviting scholars, writers and activists such as Luis Leal, Víctor Fuentes, Dolores Huerta, Najat El Hachmi, Cristina García, David W. Foster Mary Alice Waters, and Landry-Wilfrid Miampika, among others. They have also organized, along with different student associations (Amnesty International, MEChA, Latin American Student Association, Ballet Folklórico, Persian Student Association, Muslim Student Association) and faculty members from other disciplines, cultural activities such as an annual Human Rights Film Series, theater performances. Since 2004, they have been participating in parents' orientation meetings and outreach activities. Finally, they have engaged

graduate students in conferences as well as in national and international academic publications. They have taught courses and seminars dealing with different academic issues such as race and gender, migratory phenomena, exile, and transculturation.

4. The area of Chicano/a literature has boasted very healthy enrollments since UCM's opening days, and it encompasses teaching, research projects and academic/community events. The Chicano/a Literature series has brought more than twenty authors, artists, and scholars to campus and community venues. Three different research projects in this area have offered graduate and undergraduate students hands-on research opportunities. As the one area that brings together the two proposed majors, Chicano/a literature may serve as a model for the development of future areas of intersection between the proposed majors. The proposed creation of an interdisciplinary Chicano/a Studies major (currently under development) will also have a positive impact in this area.

Graduate Programs

Literature faculty members work hand in hand with the entire graduate group. Faculty offer graduate courses and have assumed the role as major advisor, committee chair, or committee member for Camfield (all doctoral, director of one dissertation, committee member of two); Goggans (director of one dissertation, committee member of two MA theses, and three doctoral); Ricci (director of one MA thesis, member of two doctoral committees and co-director of three dissertation committees in Italy and Spain); López-Calvo (director of 4 dissertations and member of three other doctoral committees, and member of a doctoral committee in Spain); Martín-Rodríguez has served as director of four Ph.D. and one M.A. committees.

In order to best expand the range of courses offered in each track and to provide –albeit on a small scale – the kind of academic program expected within the UC System and to serve the unique needs of the vastly underserved Central Valley, we anticipate the following hires over the next three years:

English

In addition to writing faculty conversions (see MWP plan), the English program will need to hire the following:

1. Early Modern British Literature. Since the beginning of serious study of literatures in modern (as opposed to classical) languages at the end of the 18th century, Shakespeare's works have been the most important and most studied in the corpus of English literature. That importance has not diminished, though Shakespeare's oeuvre is now usually studied in a wide range of contexts, including that of the early modern period, which was a major transitional period in Western

history as well as an important period in the consolidation of the English language as we know it. No program in English can be without a scholar of the period. Among the comparison schools, Dartmouth has the most innovative faculty configuration, yet even they have 3 faculty members dedicated to early modern English literature. Moreover, such a scholar would support both the graduate group and would bolster offerings in History, and, perhaps, the performing arts.

In addition, the newly reconceived English and Creative Writing major hopes to ultimately expand widely enough to utilize faculty strengths to offer students a secondary subject matter state accreditation in English. Many students in the Central Valley who major in literature hope to become teachers, and offering them the accredited means to achieve that goal will serve both them and the university itself. Rubrics from the California Commission on Teacher Credentialing clearly mandate that any program qualified by the state must include a course on Shakespeare. Thus, the inclusion of a hire in this area is imperative, since as an already established program, with declared majors, student need and demand has already been established, and a credential program could span programs in English and Spanish literatures, helping to prepare students in both concentrations for the vocation of teaching.

2. Romantic/Victorian British Literature. In this period, a number of artists and critics successfully defined imaginative literature as a primary medium of cultural discourse, moved literature out of elite circles into a much broader milieu, and validated the prophetic strain in literature as the most important. Not only are the literary forms and functions of this period enduringly popular, the very shape of literary study, as we know it, was created in this period. No program in English can be without a scholar of this period, either. Even the smallest of our comparison schools (Brandeis) has three faculty whose scholarship is mostly or substantially in this area; the most innovative (Dartmouth) also has three.
3. Colonial and Post-Colonial Literature in English. This is one of the most important emerging sub-fields in English literary studies, responding to the more rapid flow of ideas and people globally, exemplified by the outpouring of important literature from around what once was the British Empire. The focus could be wide or could concentrate on one of several areas, eg. Literature of Indian subcontinent, Australasia, Non-U.S. North America, Africa, all of which have rich traditions and active practitioners in English. Could also look at diasporas, connecting well to grad group.
4. Some combination of literature of identity (eg, ethnic literatures, lit by women, queer theory, etc) in English
5. A creative writer of significant stature to be brought in as a senior hire.

Spanish:

1. Spanish-language Linguist. Linguistics is key in the development of any top tier department of Hispanic Studies. In Dartmouth, 2 faculty members out of 16 teach linguistics.

2. Golden Age (or trans-Atlantic Golden Age/Colonial). It is quintessential in any Hispanic Studies department because it represents the foundation of modern Hispanic literature in its three main genres: narrative, theater and poetry. It represents the flourishing in arts and literature in Spain, coinciding with the political rise and decline of the Habsburgs dynasty. In Dartmouth, 3 out of the 9 faculty members in Iberian Studies teach Golden Age (including Portuguese, Race and Gender Studies), and one out of 7 faculty members in Latin American literature teaches Colonial literature,

3. Gender and/or race, area and period open, expertise in colonial literature or 19th century Latin American literature, preferred. In Dartmouth, 90 % of the faculty members in the Department of Spanish and Portuguese work on these fields. Two of them teach 19th C Latin American literature and four teach 19th C Iberian Studies.

Metrics of Success:

The first measure of success will be the establishment of the two new majors. Other measures will in part depend on this first success.

Faculty: We'll use the normal criteria articulated by the APM.

Graduate students:

- conference papers delivered
- publications
- grants and awards received
- time to degree
- job placements.

Undergraduate students:

- Increase in the number of majors, with a quick burst as when the two new majors are approved, as we expect many minors in Spanish and Writing convert to majors in Spanish and English respectively. We expect steady growth over the following years as the applicant pool becomes familiar with the change. By the time we reach a steady state in about six-to-eight years after both new majors are in place, we will expect to enroll around seven-to-ten percent of SSHA majors in English and three-to-five percent in Spanish.
- Publications in undergraduate journals.
- Involvement in research projects

- Placements in graduate programs.
- Employment.
- Community service.

F. Media Arts Program

Overview

In 2007 5% of all degrees Bachelor degrees in the UC System were conferred in Fine &Applied Arts. Since fall of 2005 **1, 868** students have enrolled in Media Arts Program courses.

Semester	MAP Total for Semester	MAP Total	Semester	MAP Total for Semester	MAP Total
Fall 2005	46	46	Spring 2008	129	486
Spring 2006	88	134	Summer 2008	22	508
Fall 2006	82	216	Fall 2008	219	727
Spring 2007	79	295	Spring 2009	268	995
Summer 2007	1	296	Summer 2009	95	1,090
Fall 2007	61	357	Fall 2009	351	1,441
			Spring 2010	427	1, 868

As shown above as of January 24, 2010 427 students have enrolled in the fourteen courses offered for spring Semester 2010 by the Media Arts Program (MAP). This number represents over 10 % of the 3,414 students enrolled at UC Merced. (Also, of the fourteen courses offered, nine have reached maximum enrollment.) Of the eighteen SSHA Programs, only one (**Psychology** which is the largest major on campus) has **higher** enrollment of students than MAP.

It must be noted that MAP is administered by one ladder faculty member in comparison to the other SSHA Programs and Majors which (with exception of Languages) all have between 7 and 2 ladder faculty members. For the past two years MAP has received funding for one visiting faculty (teaching 4 courses a year) and allotment of funding representing between two and four full time lecturers. Spring 2010 enrollment represents average of **60 students** per instructor and **30 students** per course.

The percentage of UC Merced students enrolled in MAP courses has been between 8 and 23 % since the campus has opened in 2005. Forty students have declared minor in Art as of fall semester 2009.

The statistics listed above indicate substantial student interest in the MAP curriculum, as well as its relevance to their chosen fields of study and the high quality of instruction. Additionally, the strong interest in MAP courses is a sign that UC Merced students seek a well-rounded education which must include the

arts. To deny our students the opportunity to study art is to deny them the education they deserve.

MAP courses are designed to give students tools to express themselves creatively and to offer them insight into how art is created. MAP aims to provide students with an environment in which they are free to explore, to experiment and to develop new techniques, but only after they have acquired the basic building blocks of each medium.

Courses also provide students with historical perspective on the various media represented in the Program and require writing and research in addition to the acquisition of technique and creative projects. (Global Arts Studies Program provides critical analysis and theory courses.)

The multidisciplinary focus of Media Arts Program is unique in the UC system. The strict division between art disciplines common to all UC campuses represents art education whose goals do not always adequately reflect the fluid state of the arts today. Contemporary artists employ multiple art media techniques to create works aimed at culturally diverse global audience.

MAP differs from many other university based art technique and practice programs by not emphasizing a particular art movement but by seeking to be inclusive. Throughout history the arts have been claimed as the exclusive domain by various constituencies from the Christian Church to cognoscenti of the avant-garde. The mass media and digital media have contributed to integration and cross pollination of art forms and their dissemination throughout the world. Thus MAP has been created in response to the trends and challenges of the twenty-first century. Its aim is to reflect and creatively confront the capacities of twenty-first century media arts which make it possible for artists to cross the traditional boundaries of art disciplines and to create new hybrid forms of art expression by integrating traditional artistic forms with digital technology. At the same time, MAP in its long term planning, wishes to bring attention to marginalized traditional art forms.

Every contemporary art form today utilizes digital technology. A research university campus provides a unique opportunity for exploration of the breaking down of established divisions between artistic and technological disciplines. A cross school position between SSHA and School of Engineering (which is necessary for fulfilling the mission implied in the name “Media Arts”) was proposed in 2006 but was denied. Current Strategic Plan requests this position again because it has the potential to attract students to both schools and is integral to of Media Arts Program’s long term goals. It also resonates with research interests represented in other SSHA Programs.

Whereas in the UC system technique and practice courses are generally open only to majors, MAP is designed to offer all UC Merced students access to both lower and upper division technique and practice courses. The long term vision of MAP offering courses to non-majors is crucial to the success of the Program, the Minor and the future B.A. This vision, if fulfilled, has the potential to attract students to UC Merced who would otherwise decide to study elsewhere by offering them a more focused art minor than the other UC campuses offer. The participation of non-majors is designed to integrate the Media Arts Program into

the academic goals of UC Merced students and thus to further amplify the interdisciplinary nature of the arts.

The National Endowment for the Arts*: Artist in the Workforce 1990 – 2005 Executive Summary Report* states that the artist population is growing more diverse; however Hispanic, Asian, Native American and African-Americans still represent only 20 percent of all artists. This statistic indicates a need to attract Hispanics, Asians, Native Americans and African Americans to study art on the university level. Students listed in the categories above are more likely to have been denied arts education before their arrival on a university campus. Many public schools have eliminated or curtailed art education curriculum. Throughout history the arts have represented one of the most inclusive populist forms of expression and have been integral in the human struggle to overcome exploitation, racism and other political and social inequities. Underrepresented students should not be denied the power that art has to transform and transcend. It is no more appropriate to provide students with courses that only talk about art than it is to provide them with courses than only talk about science. The technique and practice courses offered at UCM represent a laboratory-like setting where students are given the opportunity to form their own understanding of what art is and the potential it has to enrich their lives, as well as the basis to develop new forms of artistic expression.

II. Program Goals

The five year MAP Strategic Plan is designed to implement the following goals:

- Strengthen the Minor in Arts by finalizing the development of a comprehensive curriculum in the visual arts, music, architecture and new media
- Finalize the Proposal for an Individualized B.A. in Multidisciplinary Arts (Architecture, Visual Arts and Music) with a 5th Year Master of Arts Credential (originally planned for submission in Spring 2009 but now planned for submission in Fall 2011 **contingent on the allocation of 2 FTE in 2010-2011)**
- Develop plan for Master of Fine Arts Graduate Program in New Media

III. Resource Allocation

A. Faculty

The Media Arts Program consists of a sole faculty member, Dunya Ramicova who has been in charge of the Program since 2004 (the two faculty members hired with funding allocated to the arts are no longer affiliated with the arts, though the courses they offer are part of MAP planning for the B.A. The minor in Art consists of courses taught by both MAP and GASP faculty.)

Currently, Professor Ramicova is charged with administering an art technique and practice curriculum which at other University of California campuses is distributed over an array of schools, and departments with faculty members

numbering in the dozens. The task is daunting and frustrating since it is clear that the Program has strong potential to grow and to put UC Merced on the cutting edge of art education as well as making UCM more attractive to students. Without additional faculty much of MAP mission will remain not only unfulfilled but also endangered.

Proposal for **B.A. in Art** exists. It is designed to be implemented **with three ladder faculty members**, one visiting **Artist in Residence position** and **four full time lecturers.**

In the meantime, the existing Minor in Art needs to be revised, preparing ground for the eventual degree Program as well as graduate level courses.

It is important to note that the Minor in Art is interdisciplinary and that the B.A. Proposal utilizes for its requirements courses already offered by other SSHA Programs. Furthermore, the arts are naturally interdisciplinary in that their influence reaches into many areas of academic study at UCM such as digital technology, literature, history, psychology, management, anthropology and more.

The MAP strategic planning for FTE allocation is as follows:

1. Secure the continuity and development of the arts technique and practice (MAP) curriculum and the success of B.A. Proposal, 5th Year Master of Arts Credential and potential for development of Master of Fine Arts Graduate Program **by hiring two ladder faculty members in 2010-2011.**

Two positions have been identified which fit into the current and future plans of SSHA and the university: music specialist and sustainable architecture specialist.

1. <u>Music</u>

We need a music specialist with a broad spectrum of experience, and an interdisciplinary vision for the music curriculum to enhance the musicology curriculum offered by GASP. Music can potentially connect to many other areas of endeavor at UC Merced. As a twenty first century research university, UC Merced needs to develop a non-traditional approach to teaching music. Instead of focusing on traditional instruments, the projected music curriculum will concentrate on digital music technology and on exploring interdisciplinary connections while still offering strong foundation in traditional instruments and voice courses for those students who wish to continue their music education while at UCM.

<u>2.Sustainable Architecture</u>

Architecture has the potential to broaden the interdisciplinary collaboration with the School of Engineering as well as support one of the stated research themes of the university. Additionally, only two of the ten UC campuses offer undergraduate or graduate degrees in architecture: UC Berkeley and UC Los Angeles. This makes the offering of an architecture concentration/minor within MAP attractive since it has a promise of drawing more students to UCM. Curriculum in sustainable architecture adequate to give UC Merced BA degree holder opportunity to seek admission to a graduate Architecture Program will be possible with the hire of one specialist. MAP visual arts curriculum already offers

or is in process of developing lower division courses foundational for the upper division architecture curriculum. With the addition of two history of architecture survey courses that can be taught by a lecturer, the curriculum will be viable.

Here it is necessary to clarify that in the art technique and practice qualified candidates do not have PhD degrees (with some exceptions in music where there are professors with PhD degrees teaching Music Theory which is part of music technique and practice education. More common degrees for those who teach music technique and practice are Doctor of Musical Arts, DMA or Doctor of Music, DM. Faculty members teaching music technique and practice may also have Master of Music, MM degrees.) The most common terminal degree in the arts is Master of Fine Arts. However, highly acclaimed and accomplished practicing artists without terminal degrees teach at many music, performing arts and visual arts departments in the UC system and universities all over the world. To advance, practicing artists/academics have to meet criteria as stringent as those imposed on other academics, and to believe otherwise is to disrespect a large segment of the academe.

2. Seek **a cross school (SSHA and School of Engineering) position in 2011** to fulfill the mission of MAP to facilitate the exploration of the integration of technology and art and to provide students with a truly twenty first century art education.

This is a crucial part of MAP planning whose core is the exploration of digital technology in the arts and new media. Planning for this hire will be facilitated by the completion of the SSHA building where appropriate facilities for teaching courses in media arts and technology will be available (Please, see section B.) The basis for development of collaborative research and courses representing a bridge between technology and the arts already exists as at least two faculty in computer science and engineering (CSE) have research interests that are already aligned with this vision. Professor Kallmann's research interests include 3D modeling, computer graphics, and computer animation. Professor Newsam's research interests include image processing, digital libraries and multimedia.

3. **Secure the continuation of the funding for lecturers who are essential to the success of MAP.**

It is standard throughout the UC system to employ lecturers to teach art technique and practice. In the research conducted in the fall of 2008 which surveyed thirty seven UC art technique and practice departments, fourteen departments employed more lecturers than ladder faculty. Though long term planning for MAP does not envision a larger number of lecturers than ladder faculty, UC Merced has been in the fortunate position to attract excellent practicing artists who are willing to teach as lecturers. The five lecturers that have taught MAP courses in the past four years not only have significant professional credentials but have given many hours of dedicated service above and beyond of what is required of them. A Chair (half a million dollar endowment) in art technique and practice has been fully funded by Isabel Coates as of June 2008.

It is not clear when this endowment will become available to fund lecturers and/or visiting faculty as requested.

B. Space

Teaching art technique and art practice requires specialized and dedicated classrooms due to unique pedagogical needs. Though a variety of courses in art technique and practice have been offered at UC Merced since opening its doors to students in 2005, specialized classrooms and labs are required in order to fully develop art technique and practice courses. For instance, while lecturing is part of teaching technique and practice, students primarily learn “hands on.” Students draw, sculpt, use digital equipment, and sing in these classrooms. A section of the new School of Social Sciences, Humanities and Arts building (scheduled to open in 2010) has been designed to serve the needs of art technique and practice curriculum. There are classrooms, labs and offices specifically designated for teaching of art technique and practice. Two classrooms have been allocated for the digital media course needs. Additionally, there are extra large faculty offices to accommodate faculty artists working with students in one on one independent or directed study format. This specially designed space is more than adequate to serve the needs of MAP in its present form as well as for the projected B.A. and graduate Program.

MEDIA ARTS PROGRAM STATISTICS.

MAP courses consist of curriculum in **Visual Arts** (Drawing, Painting, Form in Space, and Photography), **Architecture, Music** (Instrumental and Voice), and Theater

The statistics provided for the other UC campuses include only Visual Arts, Architecture and Music, since the courses taught by MAP in Theater are primarily design oriented.
Statistics are provided for Academic Year 2009 -2010 for Media Arts Program. The statistics for the other UC campuses are from fall 2008. Anecdotally, lecturer FTE has been lowered at other UC campuses in the arts.

	Media Arts Program UCM -**2009-2010**	UC San Diego	UC Berkeley	UC Riverside	UC Davis
# Ladder Faculty	**1**	UCSD has no Architecture – **55** Faculty	**78** Faculty	Riverside has no Architecture – **16** Faculty	Davis has no architecture **32** Faculty
# FTE Lecturers	**3** & **1** Visiting Faculty	**43** Lecturers **1** Adjunct	**45** Lecturers **8** adjuncts	**3** Visiting Faculty 1 Adjunct	**25** Lecturers

	teaching 4 courses/year		**2** Visiting		
# Students in Major	N/A	B.A. offered	B.A. offered & A.B. (non-professional architecture degree)	B.A. offered	B.A. offered
% of all UCM Students enrolled in MAP in 2009 - 2010	Based on **3,414** students enrolled, **23 %**				
Total # of students enrolled in all classes 2009-2010	**789**				
#MA students	N/A				
# PhD students	N/A	Degrees offered: MFA & PhD, AM & DMA	Degrees offered: MA, MFA, PhD	Degrees offered: MFA	Dgrees offered: MA, MFA, PhD
# students in Minor	**40**				

	2008-9	2012-13 (assume 60% increase)
#majors	N/A	B.A. Proposal to be submitted Fall 2011 – Arts majors represent c.5% of all UC degrees granted – UCM **low estimate 2% of** 5,000 students = **100** students
#minors	**40**	**64**
Majors as % of total UCM student body	N/A	N/A

Minors as % of total UCM student body	**ca. 1 ½ %**	**ca. 1 ½ %**
Total enrolled students	**582** (including summer session 2009-95 students)	**872**
Majors: faculty	?	n/a

	2008 - 2010	2012-2013
#required lower division courses for Minor in Arts	One MAP One GASP	same
# required upper division courses for Minor in Arts	Four MAP or GASP	same
# required lower division courses for B.A. in Art	N/A	**Seven**
# required upper division courses for B.A. in Art	N/A	**Nine** & Senior Comprehensive Requirement

G. World Heritage

Introduction

World Heritage is an emerging interdisciplinary and cross-disciplinary area that includes architecture, history, archaeology, art history, geography, anthropology, management, law, and other disciplines. Thus, faculty in this field brings together the humanities, social sciences, policy, and management, consistent with the interdisciplinary intent of the World Cultures program within SSHA. It is a great challenge to start at UCM a World Heritage Program, because there a very few cases of such educational programs at the international level, therefore it means that there are strong potentialities to get students, funds, visibility and relevance in a very short time. UCM is the ideal place for creating an innovative program like WH, since it is a new campus and it is able to develop advanced forms of learning, research and communication, according to a multidisciplinary approach.

In the next three years, with the addition of two additional faculty members, we will be able to launch a World Heritage minor, as well as a track within the World Cultures Graduate program (or its successor).

The key features of the program, strongly technology-oriented, will permit to create a new discipline and innovative profiles for new jobs in the field of humanities, CRM (Cultural Resource Management), economy, computer science, educational purposes and many others. GISs, 3D Landscapes, 3D documentation, laser scanning, virtual reality, virtual communities' environments will constitute the interdisciplinary and technological background able to engage students and instructors in very innovative and promising directions of learning, teaching and research.

The University of California, Merced has the opportunity to develop a comprehensive program that will bring together faculty from different fields to work with students and technicians in the process of reconstructing the world cultural and natural heritage. The development of the World Heritage program will also have many immediate and long-term benefits for SSHA and UC Merced. These include providing a unique minor (see the last section of the document) and, eventually, a major, within SSHA to attract students to UC Merced, fostering and engendering interdisciplinary across Schools within UC Merced, and attracting international graduate students who are seeking—and will be willing to pay for—a graduate program in this field. A World Heritage program will offer a range of funding possibilities to faculty throughout the humanities, an area in which financial sustainability is often challenging.

For the foreseeable future, the creation of a specific Institute of World Heritage, the first in USA, would be the ideal house for this kind of studies, education and research.

Finally the key word "World Heritage" represent a natural link with the UNESCO's activities (and so with Yosemite Park which is also in the World Heritage List) and with international institutions and stakeholders working in this field.

TOPICS

--Interpretation and Evaluation (the traditional work of the humanities--why should we care about THIS monument)
--Variation and Transformation (history and geography--how heritage changes over time and across space)
--Management (heritage sites, parks, museums, archives, libraries, tourism, and heritage in the community--taking care of heritage)
--Communication and Media (how heritage can be interpreted and communicated through different digital technologies and media)
--Meaning and Memory (how heritage influences culture, how culture influences heritage)

Expertise Areas

Documentation (archaeological fieldwork, data recording, data capturing, surveys and reliefs)

Technology (state of the art of digital technologies in virtual heritage)

Conservation and Preservation (architectural analysis, monitoring, archaeometry)

Restoration (architecture, artifacts, techniques)

International Policy (CRM, laws, legal issues, international institutions)

Museums and Parks (management, analysis, policy, communication)

Interpretation and Communication (sites' interpretation and media)

Virtual Communities (social networks, cyber-heritage, embodiment, social heritage)

Staffing

Position 1 (2010-11): Architecture and Conservation, Associate Professor

Position 2 (2011-12): Museums and Cultural Resource Management, Assistant Professor

2013-15:

Position 3 Natural Heritage, Assistant Professor

Position 4 International Heritage, Full/Associate Professor

Infrastructure

The activity of the World Heritage (WH) Program at UCM is articulated in different multi-tasking spaces: training labs, research labs, and virtual rooms. The training labs are shared spaces (with the three schools across campus) where the students learn software, implement case studies and use technological

devices. The training labs are located in the Kolligian Library, and currently serve, in particular, the following courses: WH01 Introduction to World Heritage, WH02 Cyber-heritage, WH110, Reconstructing Ancient Worlds, WCH (World Cultures and History) 298 – 001 Mindscape and Cultural Landscapes. The labs are specific spaces dedicated to multidisciplinary research projects of virtual heritage (cultural and natural) and cyber-archaeology. These spaces host digital archives, data, metadata and specific software and hardware: in particular the Powerwall, just installed, can display in 3D and in stereo archaeological data and models (reconstructed, simulated and acquired in the fieldwork). We are planning to organize research workshops and advanced courses in this collaborative environment. In addition, planned networking connections with other Powerwalls (e.g, at UC Davis and at the California State Park headquarters in Sacramento) will allow us to share collaborative environments and participatory learning activities between students, professors, and researchers.

Virtual Heritage Lab

The Virtual Heritage Lab (directed by M.Forte), created under the umbrella of the WH program, SSHA, III floor, is a research multidisciplinary space for grad and MA students involved in research and educational projects in WH. Applications and software: GIS, remote sensing, photogrammetry, photomodelling, 3D modeling, virtual reality, computer graphics, laser scanning, geometrical post-processing, game engines.

Powerwall

Co-PI M. Kallmann is currently PI on the CNS-0723281 award “MRI: Acquisition of Equipment to Establish a Cognitive Sensorium and Visualization Facility at UC Merced”. The main component of this on-going project is the development of a facility for operation of the stereo multi-tile Powerwall visualization system. The visualization system is already fully operational, and a Vicon full-body optical tracking system is currently being integrated in the same room for initiating full-body collaborative visualization projects. The facility is reserved for visualization and motion capture uses and is available full-time for research development. The facility is interdisciplinary and a scheduling system is being prepared for accommodating the needs of multiple future projects. The facility has received maintenance support from UC Merced and also research support from the Center for IT Research in the Interest of Society (CITRIS). Due its high visibility, the facility is also becoming an important research showcase for UC Merced. All these activities are ensuring the continued development of the facility and its related research and educational projects.

Additional spaces/labs are necessary in the field of remote sensing and spatial technologies and in the area of conservation/archaeometry.

Active Research Projects

WH faculty and students are currently engaged in 5 different research projects: The Virtual Museum of the Western Han Dynasty (in collaboration with Xi'an Jiaotong University); Cyber-archaeology in virtual collaborative environments (in collaboration with UCB, UC Davis); 3D Copan (in collaboration with University of New Mexico, Fondazione Kessler, ETH); 3-Digging at Catal Huyuk (in collaboration with Stanford University); Virtual Teramo (in collaboration with Italian National Research Council); Virtual Worlds (Consortium of 7 international partners).

Grants

-World Heritage Faculty and students have received a significant number of large grants to carry out their research, from the Pacific Rim Research Program,, Microgeo, UCCP,: GRC, National Endowment for Humanities, CNR, Italian National Research Council, CITRIS.

H. Merritt Writing Program
Five Year Strategic Plan: 2010 - 2015

A. Overview

The academic mission of the Merritt Writing Program (MWP) divides into three main areas of curricular responsibility and two secondary functions of academic support. Each applies exclusively to undergraduate education:

Primary curricular mission:

- university-writing requirements for freshmen (2 courses)
- upper-division writing requirements (6-7 courses)
- minor in writing (12-15 courses)

Secondary functions:

- support for general education (e.g., Core 1 and Core 100)
- support for tutoring, mentoring, learning communities, supplemental instruction, and Summer Bridge.

Although some of these responsibilities and functions overlap, they are distinct enough to require separate administrative oversight distributed among three half-time appointments (a director, 50% appointment, and two assistant directors, each with 50% appointments), and several coordinators. The MWP also has two administrative-support staff, one for personnel and grant management and the other for assessment and scheduling.

MWP courses are taught entirely by Unit 18 Non-Senate lecturers, 35 of whom have full time appointments with a five course teaching load and another 10 with part-time appointments. Most of these 45 lecturers are routinely assigned to teach any of three courses that nearly all freshmen must complete (i.e., WRI 1, WRI 10 and Core 1).

Total enrollment in MWP courses each semester exceeds 30% of all undergraduates, or more than 1,000 students per semester in AY2009/10. For Humanities and World Cultures, the MWP generates about 51% of total credit hours, and for SSHA the MWP produces 28% of all the school's credit hours. Officially, 63 students have declared their intention to complete the minor in writing, making that program among the larger minors in SSHA.[13]

Since 2005 the entire MWP has convened to evaluate students' writing progress by reviewing results of pre- and posttest samples of in-class writing or by noting specific learning outcomes in cumulative examples of writing produced

[13] Enrollment information is from official data of the Office of Institutional Planning and Analysis.

throughout the semester. The outcomes that are assessed include organization and development of substantial ideas; quality, tone and logical consistency of an argument with a clear purpose for the intended audience; and command of the appropriate style and formal conventions of academic discourse. Students who earn passing grades demonstrate in their course portfolios that they have met or exceeded specific standards that have been established for each MWP course.

Except for the director's position, currently there are no dedicated FTE lines assigned to MWP lecturers; however, after six years of employment in the MWP, lecturers will qualify for post-six continuing appointments that are supported by dedicated FTE lines. In AY20010-11, as many as eight MWP lecturers will undergo review for post-six positions, and a significant number will be eligible for this review in subsequent years.

This pending change in the review and appointment of lecturers will have long-term implications for the MWP and the university. Accordingly, this five-year plan anticipates some of the challenges that this change poses and recommends a number of strategic responses.

B. Strengths/opportunities/challenges

General Education

About one-third of all MWP appointments are needed to staff Core 1, a writing-intensive course that fulfills a general education requirement for freshmen. There are several compelling reasons to transfer administrative and related funding responsibility for Core 1 from SSHA/HWC/MWP to the Office of Undergraduate Education. Unlike the dean of SSHA, the College One dean has primary responsibility as an advocate for resource allocations in support of Core courses. The recent appointment of the Vice Provost for Undergraduate Education as dean of College One ensures that funding for Core courses can be requested as part of long-term planning for the development of a university-wide curriculum for general education. Further, the MWP was never intended to be the sole academic unit for delivery of Core courses; instead, as originally planned by the founding faculty and as noted in the 2007 WASC response to our Application for Candidacy, that responsibility is best attended to by faculty from throughout the university.

Recommendation 1: Starting in AY 2010-11, <u>College One will have full responsibility for funding and staffing the Core 1 curriculum</u>. Since this change will be entirely administrative, it should not require any new resources.

Under the current model of Core 1 delivery, the MWP independently recruits and hires Unit 18 lecturers to staff Core 1 discussion sections. An Assistant Director (50% appointment) of the MWP serves on the Core 1 Advisory Committee, co-supervises Core Friday events, conducts orientations for new discussion leaders, and works closely with all the Core 1 discussion leaders to maintain consistency of instruction in about 30-

35 discussion sections per semester. The Assistant Director also conducts formative and summative assessment of learning outcomes for Core 1. In all other respects College One already has academic and support personnel assigned for the delivery of Core 1. The proposed recommendation would entail shifting current resources for the 50% Assistant Director position from the MWP to College One.

> **Recommendation 2**: By the end of AY 2010-11, phase out all Core 100 equivalencies staffed by the MWP.

In Spring 2006 and 2007, students completed the upper-division requirement for general education by taking Core 100, a course that replicates some features of Core 1 as it attends to all eight guiding principles of general education. For various reasons of cost, staffing and sustainability, Core 100 was suspended after its second year.

In Spring 2008, the Academic Senate approved a two-year plan that has allowed students to fulfill an upper-division general education requirement by taking one of the following MWP courses: WRI 100, 116, 117, 118 or 119. Like Core 1 and Core 100, each of these five writing courses already addressed or was modified to address all eight guiding principles of general education. Equivalency of MWP courses with Core 100 was based solely on this alignment with the eight guiding principles; in other words, the writing curriculum has served as a temporary alternative to Core 100 pending development of a general education curriculum that will satisfy the upper-division requirement.

Since these courses were not originally intended to serve this general education function, having them continue indefinitely as Core 100 equivalents potentially undermines development of the curriculum for the MWP minor in writing and a pending major program (to be discussed later). In effect, these courses were originally meant to be interrelated building blocks of the professional track in writing, but we are delaying development of that track in order to serve students who are fulfilling the upper-division requirement for general education.

For the last two years the MWP has waived prerequisites to our upper-division courses so that any student can enroll in Core 100-equivalents without having to complete WRI 25 or WRI 30 and WRI 100. We have also suspended plans to make WRI 100 a "gateway" course that introduces writing minors to areas of specialization in creative and professional writing. To further develop the minor program as the foundation for a major in writing, we need to resume enforcing prerequisites and begin implementing planned changes to our upper-division curriculum.

By the end of Spring 2010, the MWP will have fulfilled its two year commitment to provide an alternative to Core 100. We understand that this support for upper-division general education will likely need to continue for AY2010-11; we also recognize the possibility that one or more writing courses could be part of a long-term, multifaceted solution to the delivery of upper-division general education. Nevertheless, the MWP has reached the point of being overcommitted in support of general education, with

potential negative consequences for the MWP's mission and main responsibilities. In meeting those responsibilities, we must shift resources from a separate (non-MWP) general-education curriculum in order to develop our own curriculum. That shift will allow us to build out our e-portfolio system of assessment; refine online delivery of hybrid writing courses; and implement a proposed sequence of gateway and capstone courses for the writing minor as a foundation for a new major in literature and writing.

Major in English and Writing

> **Recommendation 3**: Merge the minor in writing with the major in English/American literature to establish a new English and Writing major.

In each previous Strategic Plan that the MWP has submitted since 2006, a main objective has been development of a major in writing. Realistically, this stand-alone major will not emerge without the appointment of Senate faculty to the MWP, a point discussed in Recommendation 4. As a related consideration, since the state's deficit problems remain unsolved, we will likely have several more years of inadequate state support for higher education. Under these circumstances of severely limited resources and competing resource needs of existing academic programs, a relatively cost-efficient means to establish a new major would be to merge two existing programs. Thus, rather than postpone indefinitely the creation of a stand-alone major in writing, the faculty in American/English literature and the MWP are proposing a new dual track major in English and Writing, with one track in literature and a separate but complementary track in writing.

This plan will combine instructional resources that can expand the range of courses offered in each track and achieve efficiencies in operations that cannot be matched by separate majors. Similar to the undergraduate English degree at UC Santa Cruz, the proposed tracks will allow students to focus on literature or writing as their primary area of interest, but they will also complete the same gateway (i.e., entry-level) and capstone courses that faculty from each track will jointly staff. This collaboration among faculty in each track will strengthen assessment of program learning outcomes and distribute instructional workload in ways that enhance curricular breadth and depth.

Except for UCSF, all UC campuses offer a B.A in English literature and most offer a B.A. in writing (UCR, UCSC) or a closely related degree in communication (UCD, UCSD), journalism (UCI), linguistics (UCLA) or rhetoric (UCB). These are well established majors[14] that draw students to other UC campuses; a comparable degree option at UC Merced, specifically as it combines literary study with writing theory and praxis, should attract students to our campus who do not currently identify us as a viable alternative. Similarly, students interested

[14] At UC Santa Cruz, their combined literature and writing B.A. degree is tied for fourth place for the largest number of undergraduate degrees awarded (UCSC Institutional Research & Policy Studies, 2009 data, http://planning.ucsc.edu/portrait/docs/ucsc_profile.pdf, p2)

in careers as English teachers will have opportunity to complete writing and literature courses that fulfill requirements for a Single Subject teaching credential in English. A full proposal for this new major is forthcoming.

Recommendation 4: Appoint qualified MWP lecturers as Lecturers with Potential Security of Employment (PSOE).

During their fifth year of employment at a UC campus, Unit 18 lecturers undergo review for "post-six" status for continuing appointments, a process that has already begun for eight MWP lecturers. If continuing status is affirmed, then each post-six lecturer's appointment is supported by an FTE line for three years, and is thereafter subject to renewal every three years unless an academic program is discontinued or the lecturer fails to perform at accepted levels of instructional and professional competence.

Although these post-six appointments do not confer the equivalent of tenured status, they nevertheless do allocate a line to the lecturer whose sole responsibility is for teaching (the instructional workload for MWP lecturers is five courses annually). In contrast, lecturers with Potential Security of Employment (PSOE) or SOE appointments teach the same number of courses as Unit 18 lecturers but are also members of the academic Senate who are expected to fulfill service responsibilities. In other words, unlike Unit 18 lecturers, P/SOE lecturers can contribute to essential administrative functions of the university in ways that broaden distribution of service tasks and therefore proportionally lessen the service workload of ladder faculty.

Salary scales for P/SOE lecturers are nearly identical to those for non-Senate Unit 18 appointments (http://www.ucop.edu/acadadv/acadpers/tab0809/tabcont.html). Upon closer inspection, in some respects Unit 18 lecturers are actually more expensive to employ since, by union regulation, they must be paid for any non-teaching work they do or alternatively receive an instructional workload credit, which is an indirect form of payment that requires hiring someone else to teach a course that the Unit 18 lecturer would have otherwise taught. P/SOE lecturers would not receive additional compensation for fulfilling their service responsibilities.

Although lecturers are expected to teach as their main responsibility, many of those affiliated with the MWP are also active writers who publish regularly in respected poetry and fiction journals or chapbook series. Others actively publish on composition and pedagogy, present at professional conferences, and serve on editorial boards. As Unit 18 lecturers, this scholarship has no official status and therefore is not included in reports of faculty productivity. P/SOE lecturers, in contrast, are required to submit annual bio-bibliography reports that include this information.

Unit 18 lecturers with Continuing Appointments will have an FTE line assigned to their position. We are proposing that over the next five years approximately half the lecturers in the MWP (15-16) be appointed instead with P/SOE status.

Recommendation 5: Appoint an Assistant Director for Instructional Technology

The MWP had already begun a full transition from paper portfolios of student-course work to e-portfolios. We are also requiring all Unit 18 lecturers who undergo post-six review for continuing appointments to submit an e-portfolio that documents their teaching effectiveness and their engagement with the scholarship of teaching and learning.

The proposed Assistant Director position will be grant-funded (50% of full-time). In addition to implementing a robust e-portfolio system, this appointment will help coordinate assessment functions for efficiently tracking academic performance of students. A digital system of data collection will further provide the MWP with relevant information about program learning outcomes. As a related responsibility, this position will conduct training sessions for students and faculty on the use of e-portfolios and their integration within the university's course management system, UCMCROPS/Sakai.

C. Research, Grants and Awards

Since 2005 the MWP has been awarded over two million dollars in grants from federal, state, and private sources. These include the U.S. Department of Education (Title V and FIPSE), the Spencer and Hewlett foundations, numerous state of California writing project grants, and several UC-system grants (one Humanities and two Institute for Research in the Arts).

Most often these grants have funded academic-support programs such as tutor training, peer mentoring, learning communities, supplemental instruction, TA training, and summer "bridge" experiences for entering freshmen. With these external resources we have also sponsored the university's *Undergraduate Research Journal;* helped pay for publication of the *Fairy Shrimp Chronicles*; co-sponsored our campus Common Read Project; paid to have Alan Weisman, author of *The World Without Us*, address the Core 1 class in Spring 2010; and funded undergraduate and graduate student researchers to attend professional conferences. These are important contributions to the university's mission as a student-centered research university, and key examples cited in our Capacity and Preparatory Review report that was recently submitted (July 2009) to WASC.

As previously noted, Unit 18 lecturers in the MWP have published in refereed journals, delivered invited papers at professional conferences, and routinely given public readings of their creative work. As one notable example of creative

scholarship, in 2009 Jared Stanley won the international Crashaw Prize for poetry with his collection titled *Book Made of Forest*.

D. Resource and Space Requests

In Fall 2009 the MWP administrative staff was moved from the 3rd floor of SSHA to the 2nd floor, away from all the (45) lecturers who rely on their support and from the director and both assistant directors. Lack of direct access to support staff impedes efficient operation of the MWP, and it significantly undermines the director's ability to assess the job performance of key personnel. Assuming the MWP will no longer be staffing Core 1 discussion sections, several offices in the inner area of COB's third floor should become available in Fall 2010. At that time returning the MWP support staff to the inner section of the 3rd floor will not affect allocation of "outer" offices reserved for faculty. We are requesting this change in office location as part of the MWP's five year plan.

Approximately 85% - 90% of all MWP staffing is for campus or system-wide requirements in writing such as WRI 1 and WRI 10 and the "core" curriculum for general education (Core 1 and temporarily for Core 100). Nearly all of the remaining 10% - 15% supports our minor in writing. If the university meets its projected goals for new enrollment in Fall 2010, then we will need to staff courses for about 1250 freshmen and 145 transfers.

To staff university writing requirements for freshmen (WRI 1, 10 and writing-intensive discussion sections of Core 1), we will need about 30 lecturers. This total allows for a 10% failure in freshman writing courses resulting in additional sections that are needed for students retaking a course.

For AY 2010-11, the MWP will also continue to offer an "equivalent" of Core 100 so that juniors and seniors can fulfill the upper-division requirement for general education. The relevant courses for this purpose are WRI 100, 101, 117, 118, and 119. After AY 2010-11, the Writing Program will no longer staff additional sections of these courses as a temporary alternative to Core 100. We project a need for 4 lecturers who will staff these courses for the upcoming academic year.

Additionally, the MWP staffs several School and major-program requirements. For Natural Science majors, we annually offer about 10 sections of WRI 116 (Science Writing in the Natural Sciences) as the main option available to NS students who must fulfill a School requirement in communication. To staff WRI 116 we anticipate hiring two full-time lecturers. Similarly, Psychology majors are now required to complete WRI 101 (Writing in the Disciplines: Psychology). To staff approximately 4 sections of that course, we anticipate hiring one full-time lecturer and one part-timer whose appointment might be upgraded to a full-time position if enrollment in WRI 101 and/or 116 warrants that change.

Enrollment each semester in writing minor courses has been strong; preliminary indications based on students taking more than two minor-program courses suggest that as many as 75 students plan to complete the minor in writing, or 10-15 more than have officially declared this intention. Another 50 are likely to take at least one writing course as an elective. Based on these projections, we will need 2-3 full-time lecturers.

Currently (AY2009-2010), the MWP employs the equivalent of 40 full-time Non Senate Faculty lecturers (equivalency is based on total number of sections taught by full-time and part-time hires). For the upcoming academic year, AY2010-2011, we are requesting funding that will enable us to offer enough sections of required writing courses for freshmen and juniors—about 40-41 positions.

University-writing requirements for freshmen:	30
Upper-division writing & GE requirements:	8
Minor in writing:	2-3
	40-41 lecturers

If the MWP succeeds in having Core 1 responsibilities transferred to College One, then we will be hiring 10-11 fewer lecturers; also, if we no longer staff sections of Core 100 equivalent courses, then 3 fewer lecturers will be needed. The net result is shown in the following table, with the last two columns indicating assignment of lecturers to teach Core 1/100 sections versus no assignment for those courses.

Five Year Projections for MWP Hiring

Academic Year	Projected Enrollment			Lecturers needed:	
	Total	New Freshmen	Transfers	+ Core 1/100	- Core 1/100
2010 - 2011	3593	1258	153	41	28
2011 - 2012	4018	1348	155	42	29
2012 - 2013	4335	1430	157	43	30
2013 - 2014	4605	1513	160	44	31
2014 - 2015	4981	1572	189	45	32

As this table shows, by transferring responsibility for Core 1/100 to College One, the MWP will achieve a much more manageable size of 32 lecturers by AY2014-15.

Further reductions can be achieved by gradually assigning TAs to teach courses that fulfill university, school or program writing requirements. Unfortunately, there is no obvious metric for estimating how many TAs might be available to teach writing courses since they would also be needed to staff discussion sections in growing undergraduate majors. Staffing of Core 1 discussion sections could also include TAs, but the scalability of that course beyond a threshold of 1500 freshmen poses significant problems for the existing Core 1 curriculum.[15]

D. Metrics of MWP Success and Public Service

The Merritt Writing Program generates the majority of FTE for Humanities and World Cultures. Despite generating more than half the FTE for HWC, we receive no allocations for Senate-faculty appointments. Overall, MWP course enrollment averages about 18-19 students per section in classes with a 20 student cap, or about 90 students total in the five classes that full-time lecturers teach. The total cost per full-time lecturer appointment averages about $51,240 with benefits. On average, the cost of hiring lecturers is about 40% lower than the cost of hiring ladder-faculty (estimated at $87,500 regardless of rank and not including benefits). Calculated in terms of instructional units, each lecturer teaches about 320 units (90 students annually X 4 units per section = 320 units). This total exceeds the break even point for a steady-state writing program; it also indirectly supports the hiring of additional ladder faculty through our accumulated FTE.

Through grant support for the MWP's Summer Bridge (SB) Program, we have had remarkable success in preparing "at-risk" freshmen for their first year at UC Merced. Compared to other freshmen at our campus with similar academic and demographic profiles, the first 40 freshmen to complete SB have performed at a much higher level academically than their peers. Confirmed by an independent evaluator, the academic success of SB also has a financial counterpart in that last year (Summer 2009) we generated over $105,000 in Summer Session funds that the EVC distributed to the Schools.

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[15] Current projections by Institutional Planning and Analysis have our campus enrolling about 1500 new freshmen in Fall 2013. Since Lakireddy auditorium cannot accommodate more than 375 students for lectures, each increment of 375 students requires another lecture presentation and a related commitment of faculty time to this course. Also, since the Core 1 discussion sections are writing-intensive, those classes are capped at 20 students, and classrooms with a 20 student maximum are already fully utilized. Moving additional discussion sections to larger classrooms would negatively affect space utilization audits and related campus requests for new instructional buildings. That shift would also create scheduling problems for other courses with 25 or 30 student discussion sections. Conversely, increasing class enrollment from 20 to 25 or 30 students per Core 1 discussion section would negatively affect writing instruction and significantly increase workload, with risk of union grievances. However these spatial, curricular and workload matters are resolved, the current form of Core 1 should not be expected to scale up in sync with annual increases in the number of freshmen.

As related pedagogical point that demonstrates MWP instructional effectiveness, 2005-2009 UCUES data show that UC Merced freshmen who began at our campus (first two sets of bar graphs) identify themselves as weak writers, typically below the average of all other UC campuses. Yet by their junior year, these students match or exceed their other UC peers in confidence levels for writing ability. [The last two sets of bar graphs represent transfer students who completed freshman-writing requirements elsewhere.]

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The MWP cannot take full credit for this increased confidence among our students, but we can demonstrate through extensive assessment of writing and general education courses that our students improve significantly as writers. In sum, as a relatively inexpensive unit of the university, the Merritt Writing Program makes a pedagogically vital and arguably essential contribution to students and faculty.

E. Summary of Staffing Requests for AY 2010-2011:

1. Appoint 40-41 full-time lecturers. Specific staffing needs are shown below:

WRI 1:	40 sections (1250 freshmen; about 60% failure rate for the AWPE and about 10% failure rate in Fall semester sections of WRI 1)
WRI 10:	55 – 60 sections (1250 students, including those from AY 2009-2010 who deferred taking this course until their sophomore year, as is the policy in the School of Engineering)
WRI 11	2 sections
WRI 25	3-4 sections
WRI 30	2 sections
WRI 100	6 sections (fulfills Core 100)
WRI 101	5 sections (fulfills Core 100)
WRI 105	2 sections
WRI 110	2 sections
WRI 116	10-12 sections (fulfills Core 100)
WRI 117	6 sections (fulfills Core 100)
WRI 118	1-2 sections (fulfills Core 100)
WRI 119	4 - 5 sections (fulfills Core 100)
WRI 120	1 section
WRI 125	2 – 3 sections
WRI 130	1 – 2 sections

WRI 131 2 sections
WRI 150 1 section
Core 1: 65-70 sections (1250 freshmen plus about 100 who did not take this course their freshman year)
USTU 10 2 sections
USTU 110 1-2 sections

2. Convert Unit 18 lecturers with Continuing Appointments to P/SOE positions

Fall 2010: 6 PSOE
Fall 2011: 4 PSOE
Fall 2012: 5 PSOE

3. Appoint an Assistant Director for Instructional Technology (50% position). This position will be entirely grant supported and will not require allocation of any additional stateside resources.

Psychological Sciences Strategic Plan[16]

0. Executive Summary

Psychological Sciences has become a key discipline to UC Merced, with high undergraduate and graduate student enrollment, substantial external grant funding, and internationally recognized scholarly productivity and excellence in developmental, health, and quantitative psychology. Its primary need is to hire new ladder rank faculty to reduce the extremely high student/faculty ratio and the over-reliance on Unit 18 lecturers. Psychological Sciences has 7 (15%) of SSHA's approximately 46 faculty. By any metric, Psychological Sciences is drastically understaffed. If faculty were allocated in proportion to the number of majors (39%), for example, Psychological Sciences would have 18 faculty. This strategic plan outlines a three year hiring plan that would add 10 new ladder rank faculty, recognizing that the current budget situation may preclude meeting that goal fully. Secondarily, there is need for additional laboratory research space. The Social Sciences and Management building will provide that space when it opens in 2011 or 2012, as it is equipped with labs ranging from 450-600sf. Psychological Sciences faculty anticipate being allocated at least one of those labs per faculty member, commensurate with other UC campuses. The Appendix to this document provides information concerning the strategic planning criteria outlined by CAPRA and by the Provost.

[16] The administration has not requested that strategic plans be in any particular format. Consequently this strategic plan continues to use the format from past years requested by former Interim Dean Hans Bjornsson.

1. The Mission and Challenges

The Psychological Sciences Section of SSHA offers a broad undergraduate curriculum spanning all its subspecialties, and it offers graduate training with focused excellence in Developmental Psychology, Health Psychology and Quantitative Psychology. The main challenges are a shortage of ladder rank faculty given enrollment, and a shortage of space.

2. The Vision

Psychology has been identified as one of seven "hub disciplines"[17] in science—a key discipline with high scholarly activity that involves frequent and strong links to other disciplines (the other six hub disciplines are Mathematics, Physics, Chemistry, Earth Sciences, Medicine, and Social Sciences). Hub disciplines are both disciplinary and inter-disciplinary at the same time. The Psychological Sciences faculty believe that the scholarly reputation of UC Merced depends crucially on fostering the growth and excellence of all these hub disciplines. The role of Psychological Sciences at UC Merced is to be such a hub by creating disciplinary excellence with strong inter-disciplinary links.

3. The Overall Goals and Strategies

Psychological Sciences aims to

- Develop a writing-intensive undergraduate Psychology curriculum with opportunities for undergraduates to work on faculty research.
- Develop scholarly excellence in Developmental, Health, and Quantitative Psychology, reflected in successful publication and grant production.
- Develop a graduate training program in Psychological Sciences that produces research-oriented doctoral graduates who work in research settings in education, in government, and in the private sector.

4. The Organization and Administration

The Psychological Sciences Section of SSHA was created in Fall 2007, and has functioned as an independent organizational unit since then. It is currently staffed by seven ladder rank faculty: Assistant Professor Michelle Chouinard, Assistant Professor Yarrow Dunham, Assistant Professor Michael Hoyt, Professor William Shadish (Academic Personnel Chair), Assistant Professor Anna Song, Associate Professor Jack Vevea, and Professor Jan Wallander. In addition, a number of Unit 18 lecturers teach undergraduate Psychology courses. A proposal to recognize Psychological Sciences as a Bylaw 55 Unit accompanies this strategic plan.

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[17] Boyack, K.W., Klavans, R., & Borner, K. (2005). Mapping the backbone of science. *Scientometrics, 64*, 351-374.

5. Education

Psychological Sciences is the second largest major at UC Merced. In Spring 2010, it served 340 Psychology undergraduate majors (39% of the 871 SSHA declared majors). The ratio of Psychological Sciences majors to Psychological Sciences ladder rank faculty is 48:1—far higher than for any other SSHA major (except MGMT, which has no faculty). The Psychology minor serves 66 students, third highest in SSHA. Psychological Sciences undergraduate courses have about 20% of all SSHA credit hour production. The undergraduate major is writing intensive and provides many opportunities for undergraduates to participate in faculty research.

At the graduate level, Psychological Sciences currently has eleven graduate students, and its training program functions as part of the Social and Cognitive Sciences (SCS) graduate group. This is 41% of the total number of graduate students in the SCS graduate group and 26% of the total number in SSHA. The faculty are near completion of a CCGA and WASC application for an independent graduate group in Psychological Sciences. Two years ago, the faculty took several steps to increase the publicity of our graduate training. The payoff is occurring now—applicants for Fall 2010 have increased dramatically compared to previous years. Preliminary data provided about the number of applications for graduate training in the SCS graduate group on January 22, 2010, showed that 34 of 55 applicants were to Psychological Sciences; three more applicants listed both Cognitive Science and Psychological Sciences. Applications to Psychological Sciences this year are more than triple the average number of applicants to Psychological Sciences in past years, and more than triple the application pool of the nearest competitor: Cognitive Science with 9 applicants. Consistent with the high demand for graduate training in Psychology at other UC campuses, we anticipate continued growth in the applicant pool in future years.

6. Research

Psychological Sciences emphasizes three areas of research: Developmental Psychology, Health Psychology, and Quantitative Psychology.

Developmental Psychology at UC Merced currently focuses on childhood, with interests in cognitive development, language, and social development. Faculty in this area have strong overlapping interdisciplinary interests with the UC Merced Cognitive Science area. Future developmental hires will build on these strengths, but also expand the breadth of developmental interests at UC Merced into developmental neuroscience, and will broaden the age of our focus to include research with infants. In accord with this, our next priorities are hiring faculty members with research interests in these areas. Such hires would build on the program's current strengths, and would add to the interdisciplinary potential of the psychology area, due to further potential cross-collaborations with cognitive

science. Developmental neuroscience is a particular future hiring priority; as a cutting-edge research area, it potentially spans developmental, cognitive, and health psychology, as well as offering cross-disciplinary collaborations with cognitive science and human development/biology.

Health psychology deals with interactions between behavior and physical health, considering the full dimensions of both of these concepts. At the most general level, health psychology includes research into how behavior affects physical health as well as how physical health affects behavior. To do so, health psychology draws upon multiple knowledge bases of psychology. For example within health psychology, there are social psychologists who study cultural influences on health; cognitive psychologists who study health decision making; developmental psychologists who study family influences on children's health; and physiological psychologists who study behavioral effects on the neural, cardiovascular, and immunological systems that are often the proximal causes of diseases. Health psychology also includes activities to promote physical health and prevent disease, which draws broadly from clinical psychology all the way to public health. Such interventions can be applied at different levels, from individuals all the way to the public in general. Examples include psychological interventions that prevent health problems or ameliorate existing health problems, such as the delivery of culturally-appropriate health promotion information, and prevention programs to aid elementary and high school students to avoid unhealthy lifestyle habits (e.g., related to obesity, substance use). Health psychology faculty will bring research and teaching interests that will be highly useful in UC Merced's quest to develop biomedical and population health research and education programs. Health psychology also usually fares extremely well in generating, often large amounts, of extramural research funding, often in large amounts.

Our priorities are to add faculty in health psychology who can bring teaching and research expertise in areas such as (a) experimental study of behavior-health links, (b) intervention and prevention program development and evaluation, (c) cultural disparities in health, (d) biological mechanisms linking behaviors to physical health (e.g., employing measures of nervous, cardiovascular, endocrine, and immunological systems), and (e) meta-analysis of effects in health psychology. Interests in health issues prevalent in the Central Valley will continue to be of high priority within the aforementioned research areas. Furthermore, we are keen on building strengths within these areas in health issues during childhood and adolescence, to continue forging links with the developmental psychology area. However, we will also consider expanding coverage in the faculty group into health psychology applied to adult and aging periods as we grow.

Quantitative Psychology is the study and development of the research designs and statistical methods that are used by psychologists (and other social, behavioral, and biomedical scientists) in their work. Compared to Developmental

and Health Psychology, which are envisioned eventually to have large numbers of faculty, Quantitative Psychology will have a proportionally smaller number of full-time faculty, but will also have enough faculty to offer doctoral training in Quantitative Psychology. The rapid addition of such faculty early in program development is essential to the development of a strong psychology program, for several reasons. First, it provides a good means of ensuring competent teaching of crucial graduate level quantitative courses in psychology that are required in every high-quality doctoral Psychology program. Second, it serves as a catalyst for improving the statistical analysis of research data for the two substantive areas of health and developmental psychology, improving the likelihood of successful publication. Third, given that UC Merced does not have a statistics department, unlike most mature universities, quantitative psychology can be a source of faculty who can provide critical statistical consultation on extramural grants. Such consultation is essential for large grant-supported research programs that we hope to encourage in developmental and health psychology. Importantly, this expertise will benefit grant applications outside psychology as well. Fourth, the American Psychological Association (APA) has identified quantitative psychology as an area that needs an increased supply of trained faculty members. The web site of the Task Force for Increasing the Number of Quantitative Psychologists http://www.apa.org/science/bsaweb-tfinqp.html states:

> "Acknowledging the fact that the number of quantitative psychologists is dwindling at the same time that there is a pressing need for training and education in all aspects of quantitative methods, the APA Council of Representatives authorized a special task force in 2006…. The Task Force…was charged with addressing both the pipeline of qualified students and opportunities for training in quantitative psychology (with an emphasis on early undergraduate education through postdoctoral training)."

The quantitative psychology program at UC Merced will help respond to that need. Mostly, we will choose hires in quantitative psychology that complement the needs typical of developmental and health psychology. Thus we place high priority on hiring faculty with skills in (a) longitudinal data analysis, (b) multilevel modeling, (c) categorical data analysis, and (d) structural equation modeling. A second level priority would be a hire in psychometrics such as in item response theory; psychometrics forms the backbone of many quantitative psychology programs, so exposing quantitative psychology students to that area is important. Finally, the two current quantitative psychology faculty members (Shadish, Vevea) are experts in meta-analysis. Currently in the United States, there is no training program specializing in meta-analysis. So we will give special priority to recruitment of faculty who can contribute to the development of such a training program in meta-analysis.

In the long term, Psychological Sciences may expand beyond these three specialties, although such predictions are hard to make at this time. Likely candidates for long term expansion would include any of the physiological specialties in Psychological Sciences, or Social Psychology. Much will depend on

the mix of interests represented on the faculty at that time. For example, some health psychologists are trained as social psychologists, and they may find it attractive to expand the social psychology offerings.

7. Interdisciplinary opportunities

Psychological Sciences currently envisions three primary venues for interdisciplinary collaboration. First, Psychological Sciences has been successful in seeking and hiring faculty who have overlapping interests that can support the Cognitive Science program, such as Yarrow Dunham, a developmental psychologist who has strong cognitive training and interests, and Jack Vevea, a quantitative psychologist who has developed quantitative models of cognitive phenomena.

Second, faculty who will be hired in Health Psychology will contribute to interdisciplinary collaboration with faculty in the School of Natural Science and the School of Engineering who are involved in health research at UC Merced. For example, Professor Wallander led the recent successful effort to bring an interdisciplinary NIH-funded Center for Health Disparities Research to UC Merced.

Third, faculty who will be hired in Quantitative Psychological Sciences will contribute to the need for expert statistical consultation among faculty in the School of Natural Science and the School of Engineering who are involved in the creation of a medical school. For example, at the request of the Dean of Natural Science, Professor Shadish wrote a document describing models for statistical consultation and training that could be used at UC Merced in the short to medium term future.

8. Outreach

Psychological Sciences strongly supports efforts to attract a diverse student body at both the undergraduate and graduate levels. Specific figures on the composition of the current student body are not available from SSHA. However, Psychological Sciences tends to attract a large proportion of female students, as well as of underrepresented ethnic groups. The composition of our undergraduate research teams, and of our graduate students, also reflects that (specifics available upon request). Finally, Psychological Sciences faculty routinely participate in outreach efforts. For example, Dunham and Song have served on the SSHA Recruitment and Retention Committee, and a number of faculty have participated in recruitment forums for Psychological Sciences, SSHA, or UC Merced. Similarly, Wallander has served as a faculty speaker for the Transfer Student Recruitment into Psychological Sciences.

9. Resources

9.1. Faculty

Psychological Sciences has 7 (15%) of SSHA's approximately 46 faculty. *By any metric, Psychological Sciences is drastically understaffed.* If faculty were allocated in proportion to the number of majors (39%), for example, Psychological Sciences would have 18 faculty.

2009-2010 Academic Year Searches (start date July 1, 2010). Psychological Sciences is currently searching two position:

1. Assistant Professor in Developmental Psychology, preferably specializing in infant development, cognitive development, or developmental cognitive neuropsychology. The advertisement for this position notes that selected candidates with interests in learning disabilities broadly defined may be eligible for an endowed chair. *Note this position was a Full Professor position initially allocated in 2005, then filled by Carol Tomlinson-Keasey, then searched in two subsequent years without being filled, and finally downgraded to Assistant Professor this year. Developmental Psychology is the only Psychological Sciences specialty without a tenured faculty member, and such a member is our highest priority for new positions.*
2. Full/Associate Professor in Health Psychology, preferably specializing in child and adolescent health, cultural influences on health, experimental approaches in health psychology, or the prevention and treatment of health problems common in the Central Valley such as obesity or poor prenatal care.

CAPRA's instructions for submission of strategic plans said it is not "necessary to describe very long-term strategic aims not related to current resource requests". Given this instruction, coupled with the bleak budget picture for 2009-2010, we do not submit long term hiring plans in this document, though they are available on request. For next year, the Psychological Sciences strategic plan calls for the following hires.

Requested Searches over the Next Three Years. This year's strategic plan requests hiring preferences over the next three years at four per year. We realize that UC Merced has never allocated four positions in a year to Psychological Sciences. Nonetheless, we request this because it recognizes how badly understaffed we are compared to other areas. It is what we need to begin to reduce our student/faculty ratio and our dependence on lecturers. If either of the current academic year searches fails to result in a hire, our first priority is to continue to search that position(s) as our first priority in the subsequent year. After those positions are filled, we request authorization to search the following positions, in order of preference:

1. Full/Associate Professor in Developmental Psychology. The specialty of this hire should be in child and adolescent development, but otherwise we will seek to hire the best candidate that either complements existing areas (cognitive development, social development), or that introduces new areas

such as developmental cognitive neuropsychology or personality development.

2. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.
3. Full/Associate Professor in Developmental Psychology. The specialty of this hire should be in child and adolescent development, but otherwise we will seek to hire the best candidate that either complements existing areas (cognitive development, social development), or that introduces new areas such as developmental cognitive neuropsychology or personality development. This hire will give Developmental Psychology as many tenured faculty as Health Psychology and Quantitative Psychology have been allocated.
4. Full/Associate Professor in Health Psychology specializing in one of the areas not already hired.
5. Full/Associate Professor in Developmental Psychology specializing in one of the areas not already hired.
6. Full/Associate Professor in Health Psychology specializing in one of the areas not already hired.
7. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.
8. Associate/Full Professor in Developmental Psychology specializing in one of the areas not already hired.
9. Assistant Professor in Health Psychology specializing in one of the areas not already hired.
10. Assistant Professor in Developmental Psychology specializing in one of the areas not already hired.
11. Assistant Professor in Health Psychology specializing in one of the areas not already hired.
12. Assistant Professor in Quantitative Psychology specializing in either longitudinal data analysis or multilevel modeling.

In each of these cases, if the UC administration does not allocate sufficient funds to hire tenured faculty, we would replace the Full/Associate Professor lines with lower rank lines.

If all are successful, these searches would yield the following distribution of faculty hires across developmental, health, and quantitative psychology at the end of this period.

Start Date	Developmental	Health	Quantitative
Current Academic Year	2	3	2
July 1, 2010	3	4	2
July 1, 2011	5	5	3
July 1, 2012	7	6	4
July 1, 2013	8	8	5

9.2. Space

Psychologists require one office per faculty member, and laboratory space. Quantitative Psychological Sciences is probably the least space intensive area, where an allocation of 200-300 square feet of lab space per faculty member will suffice. Health and Developmental are more space intensive, requiring 450-600 square feet of lab space. However, these are averages, and space needs vary within areas. Needs are larger for faculty with active grant funding; and some health and developmental psychologists have fewer space needs. Although space within the Classroom and Office Building is extremely tight, we have been assured by the administration that sufficient space for these labs will be available on campus when the Social Sciences and Management (SSM) building opens in 2011 or 2012.

Therefore, for the seven current Psychological Sciences faculty, about 2650-3600 square feet of lab space is needed on campus. If both current searches are successful, an additional 900-1200 square feet will be needed by Fall 2010, for a total of 3750-4800 square feet of lab space (plus one office each). The Classroom and Office Building does not have sufficient space to meet these needs; but the new Social Science and Management (SSM) building scheduled to open in 2011 or 2012 should contain sufficient space for the medium term future. Consequently, our existing faculty have agreed to use less space until SSM opens; and we are letting new hires know of the temporary space shortage. So far, all potential new hires have expressed willingness to wait until SSM opens to have their lab needs met.

9.3. Finances

Psychological Sciences has the following financial needs:

1. Psychological Sciences has been allocated the equivalent of three FTE Lecturers during the 2009-10 academic year. This support needs to be continued to maintain current enrollment, and can be expanded to increase enrollment. Upper division undergraduate PSY courses are capped at 80, and nearly all reach their caps, so demand clearly exists to support expanded enrollment.
2. Psychological Sciences requires an allocation of teaching assistantships commensurate to its enrollment. It currently receives such an allocation and anticipates this will continue.

Although these financial needs are funded mostly by the university, Psychological Sciences strongly encourages its faculty to obtain extramural grant funding to help meet these needs. Active grants currently include:

1. Shadish, W.R. (Principal Investigator). A d-estimator for Single Case Designs. Institute for Educational Sciences, U.S. Department of Education. $974,523 total costs (2010-2013)
2. Shadish, W.R. (Co-Investigator and Campus Director). “University of California Educational Evaluation Center”, University of California Multi-

Campus Research Program and Initiative, $2,200,000 total costs (2010-14). John Yun (UC Santa Barbara), Principal Investigator.

3. Song, A.V. (Principal Investigator). "The Role of Perceptions in Adolescent Tobacco Use". NIH/NIDA/LRP (Pediatrics), $44,496 (2008-2010).
4. Vevea, J.L. (Consultant). "Vocabulary Development through Writing." Department of Education, Institute for Educational Sciences. $1,402,533 total costs (2006-2009).
5. Vevea, J.L. (Consultant). "Explicit Scaffolding for Word Learning." Department of Education, Institute for Educational Sciences. $1,017,477 total costs. (2008-2011).
6. Vevea, J.L. (Co-Investigator). “Measuring Vocabulary Knowledge with Testlets: A New Tool for Assessment.” U.S. Department of Education, Institute for Educational Sciences. $2,036,502 total costs.
7. Wallander, J.L. (Co-Investigator). “Brain Research to Ameliorate Impaired Neurodevelopment-Home-based Intervention*,”* NICHD/NIH. $2,375,000 total costs (2006-2011). Wally Carlo, University of Alabama at Birmingham, Principal Investigator.
8. Wallander, J.L. (Consultant). “Healthy Passages: A longitudinal, community-based study of adolescent health,” Centers for Disease Control, $31,000,000 (thus far; renewed yearly with appx. $4,500,000) (1999-open ended). Frank Franklin, University of Alabama at Birmingham, Principal Investigator.
9. Wallander, J.L. (Co-PI). Center of excellence for the study of health disparities in the rural and ethnic underserved populations, National Institutes of Health/National Center for Minority Health and Health Disparities, $1,302,414, 2009-present.
10. Wallander, J.L., (Consultant). “Promoting Use of Effective Early Intervention Programs.” , NICHD/NIH, $745,243 total costs. Holly Kreider, Socimetrics, Principal Investigator.
11. Wallander, J.L. (Consultant). “Psychological Tests and Assessment Online Resource.” NICHD/NIH, $750,000 total costs, Tamara Kuhn, Sociometrics, Principal Investigator.
12. Hoyt, M.A. (Principal Investigator). "Health-Related Quality of Life in Young Men with Testicular Cancer", Lance Armstrong Foundation, $110,000 total costs, (2009-2010).
13. Hoyt, M.A. (Co-Principal Investigator). "Biobehavioral Factors and Quality of Life in Men with Prostate Cancer", UCLA Cousins Center for Psychoneuroimmunology, $17,000 total costs, (2008-2011). Annette Stanton, University of California, Los Angeles, Co-Principal Investigator.

Pending grants include

14. Song, A. V. (Principal Investigator). " Sociocognitive Factors in Adolescent Risk Behaviors", NIH/LRP (Pediatrics), $35,000 (2010-2012).
15. Song, A. V. (Co-Investigator). " Ethnic Variations in Addictive Behaviors among Emerging Adults", NIH/NIDA. $2,463,430 total costs (2010-2014). Nolan Zane, University of California, Davis, Principal Investigator.

16. Dunham, Y. (Principal Investigator). “Minimal Groups and the Development of Social Category Knowledge”. National Science Foundation, $442,973.

These grants are particularly helpful to support graduate students in research assistantships.

10. Summary of requests for new resources.

In summary, the Psychological Sciences Section requests the following new resources:

1. We request 4 new FTE faculty lines to begin July 1, 2011.
2. Assuming current searches are successful, we request 9 faculty offices plus whatever laboratory space is available in the Classroom and Office Building for Fall 2010; and we request 13 offices plus 4500-6000 square feet of laboratory space in the SSM building for Fall 2011, assuming that building is open by then.
3. We request continued allocation of Lecturer funds, with consideration to an increase in that allocation to the extent that substantial new ladder rank faculty allocations are not made.
4. We request continued allocation of teaching assistant slots proportional to Psychological Sciences student credit hour production.

Appendix I: CAPRA Criteria

CAPRA's criteria for evaluating strategic plans requests answers to the following items. Our answers are italicized below each criterion.

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors), plans to achieve excellence and how this will be assessed (including accreditation issues, if any).

   Psychology is the largest major in SSHA but has only 7 ladder rank faculty and the highest student/faculty ratio in SSHA. About 60% of Psychology undergraduate classes are taught by Unit 18 lecturers. Far more ladder rank faculty are needed to support the major. We have improved the major by adding more writing requirements (e.g., a new course WRI 101 specific to Psychology is now required of majors), and by redistributing TAs to support this effort. For WASC accreditation purposes, we have created Program Learning Outcomes and an assessment plan to regularly assess whether we achieve those outcomes.

2. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, plans to achieve international excellence and how this will be assessed, estimated student demand for graduate programs.

   Psychological Sciences currently has eleven graduate students. Student demand for graduate training in psychology is very high, with 34 of 55 applicants to SSHA being in Psychology as of January 22, 2010. Other campuses average 2.5 graduate students per faculty member, a standard likely to be met at UC Merced within a few years, as well. Additional ladder rank faculty are needed to continue to grow graduate training and research excellence.

   The Psychological Sciences faculty is near completion of a revised draft CCGA application for a Graduate Group in Psychological Sciences. The application outlines assessment plans for the new graduate group, both assessing students within the group on a regular basis, and assessing the Group itself periodically.

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs

   Not applicable.

4. If applicable, support of or synergy with cross-school or interdisciplinary programs or research.

   Psychological Sciences currently envisions three primary venues for interdisciplinary collaboration. First, Psychological Sciences has been

successful in seeking and hiring faculty who have overlapping interests that can support the Cognitive Science program, such as Yarrow Dunham, a developmental psychologist who has strong cognitive training and interests, and Jack Vevea, a quantitative psychologist who has developed quantitative models of cognitive phenomena.

Second, faculty who will be hired in Health Psychology will contribute to interdisciplinary collaboration with faculty in the School of Natural Science and the School of Engineering who are involved in health research at UC Merced. For example, Professor Wallander led the recent submission of the letter of intent for an interdisciplinary center at UC Merced within the system-wide UC School of Global Health; and Professors Wallander and Shadish are active members of the UC Faculty Medical School Advisory Committee.

Third, faculty who will be hired in Quantitative Psychological Sciences will contribute to the need for expert statistical consultation among faculty in the School of Natural Science and the School of Engineering who are involved in the creation of a medical school. For example, at the request of the Dean of Natural Science, Professor Shadish wrote a document describing models for statistical consultation and training that could be used at UC Merced in the short to medium term future.

5. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

   Psychological Sciences faculty regularly give lectures in CORE 1. At the lower division level, PSY 1(enrollment around 300, offered each semester) is an option for filling school general education requirements, and PSY 10 (enrollment around 176, offered each semester) is an option for filling the quantitative methods general education requirement. The majority of students in both these courses are not Psychology majors. Only PSY 1 is prerequisite to upper division PSY courses. Consequently these courses are heavily enrolled by non-Psychology major as filling upper division general education requirements outside the major.

Faculty and Space Resources

1. Overview of faculty workload issues, including current and anticipated shortfalls or imbalances, as well as the school workload policy, including the likely extent of reliance on lecturer appointments. Note that permanently required lecturer lines should be requested as such by schools.

   Each Psychological Sciences ladder rank faculty member teaches two undergraduate and one graduate course per year. Psychological Sciences has been allocated the equivalent of three FTE Lecturers during the 2009-10 academic year. Lectures teach more than half of our courses and produce more than half of our credit hours. We believe this is far too high, and that much of the lecturer resources should be replaced by ladder rank faculty.

2. Balance of tenured and untenured faculty, and opportunities for mentoring.
   Developmental psychology has two untenured faculty members, and badly needs a tenured faculty to provide mentoring as well as leadership for program development. Thus, the reduction of the developmental psychology full professor search to assistant professor this year is a continued blow to that program. This position should be restored. Health psychology and quantitative psychology currently have one and two tenured faculty, respectively, with health psychology searching for an additional tenured faculty member this year. The faculty aims to have at least 50% of its faculty tenured within each area so as to avoid burdening untenured faculty with service demands.
3. An updated description of the school's space planning and allocation procedures.
   Until recently, the SSHA Dean made all space allocations. The SSHA Executive Committee recently assumed the duties of a space committee, and presumably will develop its procedures this year. The Psychological Sciences faculty has worked closely with the SSHA Dean to ensure sufficient space is available to existing and new faculty. Though there is currently a significant space shortage in the Classroom and Office Building, the opening of the new Social Science and Management Building in 2011 or 2012 should alleviate this shortage.
4. Special resource issues related to faculty hiring, e.g. plans to hire faculty cohorts or special facilities needs for new hires.
   Faculty being recruited to Psychological Sciences are told clearly about the existing space shortage, and of the likelihood that their space needs cannot be fully met until 2011 or 2012. So far, most recruits have been willing to wait until then. Psychological Sciences faculty may make arrangements to share labs with newly hired faculty until then, assuming the nature of the research allows that and the new faculty permit it. Otherwise, no special resource issues exist.
5. Special issues relevant to achieving diversity of UC Merced's faculty.
   The Psychological Sciences faculty is committed to increasing its gender and ethnic diversity. Currently, two of seven current faculty are women and one of seven is a member of an ethnic minority group.

Additional CAPRA Criteria

1. Academic plans should include a 5 year description of specific goals (and associated objective metrics) associated with each program that is requesting new faculty lines. These goals can be based on external assessments (e.g. ABET accreditation or CCGA approval), specific program expansion (e.g. adding a new track or graduate emphasis), or quantitative target (e.g. supporting a particular student growth rate). Moreover, the overall academics plans should prioritize and provide a timeline for all such goals described in the plan.

The need for additional faculty lines in Psychological Sciences is based substantially on the need to reduce the high 50:1 undergraduate student to faculty ratio. The ideal goal would be to reduce it to about 21:1, the goal specified for UC Merced as a whole. Substantial progress towards that goal is easily measured.

A related goal is to reduce the ratio of the number of courses taught by lectures in the undergraduate Psychology major from its current 60:40 ratio of lecturer taught courses to ladder rank faculty taught courses to a more reasonable 20:80 ratio. This will require a substantial infusion of new ladder rank faculty.

2. Academic plans should explicitly address *strategic constraints* on the campus, such as the need to balance more and less costly programs, the availability of research and teaching space, and start up funds.

   Not only is Psychological Sciences less costly than most programs in Natural Sciences and Engineering, the high grant productivity of Psychological Sciences faculty brings more revenue to the university compared to most other SSHA programs. However, Psychological Sciences does require more research space and higher startup funds than most other SSHA disciplines, though this is partly offset by the higher grant productivity.

3. Academic plans should consider the full life-cycle of existing programs, describing target sizes over the next five or more years and plans to reach a sustainable level given current budget constraints.

   Psychological Sciences already generates more resources (e.g., State-provided faculty lines and FTE TA funds) than other programs in SSHA, and so sustainability is not an issue.

4. Academic plans should include estimated resource requests for program review and ongoing assessment.

   The Psychological Sciences WASC Assessment Report recently submitted for the January 31, 2010, deadline requested a budget of $2250 to continue the use of the ETS Major Field Test with volunteer graduating seniors. Over the next several years, more students will graduate under the requirement in the 2009-2010 catalog to take this test before graduating, which will require substantially more resources. A reasonable estimate would be $30-$50 per student, with 100 students graduating each year, costing $3-5000 per year. This cost is likely to increase over time as more psychology majors enroll and graduate.

5. Academic plans should describe plans for coordination or even consolidation of programs within or between schools or between graduate groups to make the most efficient use of current and proposed faculty lines. Proposed hires whose teaching will be primarily outside of their home program, need to be explicitly cited in the plans for the programs in which they will be teaching.

   No plans exist to consolidate Psychological Sciences with any program, and all Psychological Sciences faculty teach within the discipline.

6. Proposed new undergraduate and graduate programs must be included in academic plans *well in advance* of the year in which they will be proposed.

Moreover, plans for new programs must include year-by-year hiring goals to achieve the necessary size to create the new program. Finally, any proposed new programs used as the basis for new faculty lines must include memos from the cognizant school or graduate groups' Dean and Academic Planning Chair stating a multiyear commitment to give high priority to faculty hires for this new program. These memos must be included in the academic plan voted on by the school faculty.

The Psychological Sciences faculty are already offering the undergraduate major and the graduate training program within existing resources. Continued faculty hires at whatever rate is feasible in the current budget situation will allow us to expand the quantity and quality of both programs. The Psychology major has grown substantially every year since its inception, though that growth is likely to slow somewhat as other majors (e.g., Sociology, Political Science) develop. Anticipated faculty growth is based on anticipated undergraduate major and credit hour growth.

Additional Criteria Specified by the Provost

1. An evaluation of research opportunities that will add critical strength in the existing research programs or that will allow the campus to embark on new areas of research vital to our future.

   The Psychological Sciences faculty participates actively in the development of both existing and new programs pertaining to health, as outlined in the strategic plan. An example of new research directions is the collaboration between health psychology and quantitative psychology in developing a health psychology quantitative synthesis program.

   In addition, given that the faculty have very high grant productivity, and that Psychology has been identified as a hub discipline in science, investments in hiring new Psychological Sciences faculty will add critical strength to all of the existing Psychological Sciences research areas (developmental, health, quantitative).
2. An assessment of each position's importance to supporting existing graduate and undergraduate programs that will allow for the development of new programs of instruction in the future.

   The proposed new positions aim to support existing undergraduate and graduation programs in Psychological Sciences, not to develop new programs. The primary needs here are to (a) replace the over-reliance on lecturers with teaching by ladder rank faculty and (b) the allocation of ladder rank faculty positions that would allow reduction of the student:faculty ratio to a level commensurate with good pedagogical practice.
3. An analysis of how the FTE will be used to support the principles and delivery of the general education curriculum.

Psychological Sciences faculty provide substantial support in general education. Specifically, they regularly give lectures in CORE 1. At the lower division level, PSY 1(enrollment around 300, offered each semester) is an option for filling school general education requirements, and PSY 10 (enrollment around 176, offered each semester) is an option for filling the quantitative methods general education requirement. The majority of students in both these courses are not Psychology majors. Only PSY 1 is prerequisite to upper division PSY courses. Consequently these courses are heavily enrolled by non-Psychology major as filling upper division general education requirements outside the major.

4. A detailed assessment of the space needs for each of the FTE and any plans that will allow current allocated laboratory space to be used to accommodate additional hires.

   A detailed description of space needs is provided in section 9.2 above. Regarding sharing existing space, Psychological Sciences faculty will make such sharing arrangements as are necessary and feasible to accommodate new hires until the SSM building opens in 2011 or 2012. However, faculty at UC Merced are allocated relatively little laboratory space, far less than at any other UC campus. One faculty member has no space at all, most have one converted office (@135 sf), and only two have more than that. Even faculty with active grant programs receive no additional space for that purpose. So space available for sharing is limited.

Social Science & Management (SSM) Strategic Plan – 2010-2013

I. Introduction

The SSM Group within SSHA comprises the disciplines of Economics, Management, Political Science, and Sociology. At its core, the scholars within the SSM Group study how humans structure their lives and how interaction among people within the confines of these institutional structures shapes the path of social and economic progress. While human beings around the world are fundamentally the same when it comes to their biological make-up, there is significant disparity in their material well-being. A puzzle that has confronted social scientists since the origins of their respective disciplines is: why are some countries so wealthy, while others are so poor? Furthermore, what are the consequences, both internationally and domestically, of this disparity in material well-being across different groups of people?

Without structure, society would be chaotic. To overcome collective action problems, for example, people delegate authority to governments with powers to coerce. They exchange goods and services within formalized markets. They live their lives based on a set of principles defined by their religions. Entrepreneurs

raise capital and hire workers because they see economic opportunities in producing and selling goods and services to potential consumers. What unites the SSM faculty's research is the desire to understand how and why institutions are formed and evolve and how they affect social and economic progress over time and across place. Given the importance of institutions in shaping economic, political, and social outcomes, the dynamics of institutional selection and change is a critical area of academic exploration and research.

Naturally, scholars of different disciplines bring their own expertise to the fundamental questions at hand, but it is important to emphasize that the intellectual spillovers across economics, management, political science, and sociology is what facilitates our understanding of human progress. For example, as noted above, entrepreneurs try to capture economic opportunities by harnessing financial and human capital, yet the productivity and profitability of their firms depends on the formal and informal policies that govern the organization. In other words, the scholarly study of managerial decision-making and firm performance depends on an understanding of social structures – the expertise of sociologists. As a second simple example of the linkages across the social science disciplines, consider the role of education in advancing human progress. Economists have documented convincingly that education contributes importantly to economic growth and generates so-called positive externalities (i.e., educating a child not only benefits her, but others within society). Yet, how do people go about deciding whether or not to provide education for others' children and, if so, at what level? Understanding how people solve these collective action problems is the fundamental question that political scientists address. In sum, economists' ability to understand the path of economic growth relies on their political science colleagues' explanations of political decision-making. It is these natural linkages that make the SSM Group ideally situated to address the problems that society faces today, whether it relates to health disparities, stewardship of the environment, or poverty.

II. The Importance of SSM to UC Merced

One measure of the role that SSM plays within the university is to consider undergraduate education. Simply put, training in the social sciences and in business and management is extraordinarily popular among UC students. According to the most recent UCOP *Statistical Summary of Students and Staff* (Fall 2008, p. 30), 22 percent of bachelor's degrees were conferred in the "social sciences" (which exclude psychology) and six percent were conferred in "business and management." By contrast, nine percent of undergraduate students graduated with a degree in psychology, 15 percent in biological sciences, seven percent in engineering, six percent in "letters," and five percent in "fine and applied arts."

In Table 1 below we delve more deeply into the popularity of the respective majors within SSM across the UC campuses (UC San Francisco is excluded

from the analysis). One issue that complicates the analysis is that three campuses (Berkeley, Irvine, and Riverside) offer undergraduate majors in management, while the remaining five campuses offer an economics degree with a business/managerial economics track. Therefore, we include data on total economics majors, majors in the managerial and non-managerial tracks, and, when relevant, management students. We also provide data on psychology majors as a comparative benchmark.

First, it is worth noting that the unweighted average of Psychology majors across the UC campuses – 8.6 percent – conforms to the reported percentage of bachelor's degrees awarded across the system – 9 percent. Second, this detailed analysis of individual majors confirms that the vast majority of the 28 percent of bachelor's degrees in "social sciences" and "business and management" reported in the *Statistical Summary of Students and Staff* are generated by SSM disciplines. Specifically, economics and management educate an average of 12.2 percent of students across the system, political science trains 5.5 percent, and sociology 4.8 percent – a combined total of 22.5 percent. Therefore, as UC Merced develops into a mature campus and achieves steady-state, the data from other campuses suggest that nearly a quarter of all of our students will choose to affiliate with an SSM discipline.

A second measure of the importance of the SSM disciplines to the growth of UC Merced relates to the inter-/multi-disciplinary emphasis that is prevalent across the campus. This emphasis was initiated in the founding idea that research institutes would serve as the catalyst to bring scholars together to understand and solve the major problems facing society today. Indeed, the problems that society faces with regard to the environment, health, or energy – the foci of UC Merced's current institutes – are inexorably linked to economic, political, and social issues. To the extent that UC Merced's institutes seek to offer realistic solutions to the problems that society faces, it is our contention that the present institutes would be better served with heavier involvement from economists, political scientists, and sociologists. After all, the most practical and realistic solutions will be determined by their economic, political, and social ramifications. Put another way, scientists and engineers might well understand the causes of society's ills when it comes to the environment, health, and energy and offer realistic fixes, yet the ability to implement such solutions depends on their economic, political, and/or social costs and benefits. Without understanding these tradeoffs, scientists and engineers will conduct their research within a vacuum and their work will be confined to a narrow audience who value theory over practicality.

Table 1
Declared Undergraduate Majors in SSM Disciplines (& Psychology) Across the UC System

Majors	**UCB**	**UCI**	**UCR ***	**UCD**	**UCLA**	**UCSD**	**UCSB**	**UCSC**	**Averages**
Term	AY 08-09	Fall 09	AY 08-09	Fall 09	Fall 09	WINT 10	WINT 10	Fall 08	
ECON	5.0%	11.0 %	7.7%	6.5% ‡	8.9%	11.1 %	13.2 %	11.4 %	9.4%
Business ECON track	0.0	8.6	3.5	2.3	5.2	4.2	12.0	8.4	
Non-business ECON track	5.0	2.4	4.2	4.2	3.7	6.9	1.2	3.0	
MGMT (separate major)	3.7	1.6	17.7	n/a	n/a	n/a	n/a	n/a	
ECON+MGMT	8.7	12.6	25.4	6.5	8.9	11.1	13.2	11.4	12.2
POLI	5.3	4.5	6.5	3.8	6.9	5.9	5.8	5.0	5.5
SOC	2.9	8.2	7.7	2.6	3.6	1.9	6.4	5.2	4.8
PSYCH	4.0	9.8	9.9	6.8	9.5	6.7	11.0	10.5	8.6

Note:
* Data on Riverside majors was unavailable, so degrees conferred by major was used instead.
‡ The managerial economics program is offered by the Department of Agricultural & Resource Economics, while the economics degree is offered by the Department of Economics.
Sources:
UCB: http://opa.berkeley.edu/analysesandreports/MajorsAndDegreesByAcadProgram.pdf
UCD: http://budget.ucdavis.edu/data-reports/documents/enrollment-reports/students-multiple-year-comparisons/emjudsc_fcurr.pdf
UCI: http://www.oir.uci.edu/enr/IIA03-enr-by-major-and-class-stdng-2009-10.pdf
UCLA: http://www.aim.ucla.edu/enrollment/enrollment_programs_fall.asp
UCSD: http://registrar.ucsd.edu/ver2/dservices/thirdweek/WI10/REGBDM03.WI10.PDF
UCSB: http://bap.ucsb.edu/IR/reg_reports/W10-STATS.PDF
UCSC: http://planning.ucsc.edu/irps/majors/2008/Fall_UndergraduateMajorsDeclaredandProposed(HC).pdf
UCR: http://sara.ucr.edu/degrees/2008_09/degmaj.html

III. Resource Request

Faculty

The SSM disciplines are expected to be very popular majors for students in steady-state, are central to offering inter-/multi-disciplinary solutions to society's problems, and all seek to advance graduate training that can exploit UC Merced's unique intellectual culture. The SSM Group seeks to achieve a critical mass of at least 10 faculty in each of our core disciplines (economics, political science, and sociology) as soon as possible. At that level each can offer a robust undergraduate major and begin the process of introducing graduate programs. Given the requirements to offer core graduate training in our respective disciplines, each area must achieve a critical mass of approximately 10 faculty who can cover both the undergraduate program requirements and begin to roll-out the graduate core courses.

To achieve critical mass, the Economics, Political Science, and Sociology areas each request two FTE in each of the following three academic years – 2010-2011; 2011-2012; and 2012-2013.

The SSM faculty view three new lines (one each in Economics, Political Science, and Sociology) as being critical to our mission to grow our respective disciplinary programs based on current and expected student demand. Further, we request another three additional lines (one to each discipline) to build toward critical mass.

Of the three mission-critical lines noted above, the SSM faculty places Economics as the highest priority, with Political Science and Sociology then ranked equally second. The SSM group ranks the next three requested FTE equally among the disciplinary areas.

We place no emphasis at the present time on Management FTE. Given the inchoate state of the Management Bylaw 55 unit and the administrative confusion surrounding the program, the SSM Group will maintain curricular authority over the Management undergraduate program and will administer the instruction with lecturer support.

Lecturer & TA Support

The lack of qualified TAs is significantly impacting our respective curricula. Courses that might have been offered (e.g., SOC 010) cannot be because of a lack of qualified graduate students to hold discussion sections or to staff labs. We have been forced to change the way certain courses (e.g., ECON 001) are delivered because TA support does not exist for a full array of discussion

sections. In other upper-division courses, assignments have been truncated or eliminated because of a lack of TA support to advise students and to grade. In order to successfully provide the coursework required for our undergraduate majors, we must have trained and qualified graduate students (or lecturers) available to TA our classes.

Because our disciplines have not achieved a critical mass of faculty to offer credible graduate programs, we have experienced a significant shortage of graduate students capable of supporting our courses, especially the more analytically or quantitatively oriented ones. We propose that some funding that would otherwise support TAs be allocated to our areas to hire lecturers/TAs from outside UCM. We could easily recruit ABD graduate students or recent PhDs from UC Davis or Berkeley to teach for us, or even act as TAs. We have developed strong expertise in specific areas of research in our respective disciplines (applied microeconomics in Economics; institutions and voting behavior in Political Science; and social movements in Sociology) so it is conceivable that graduate students from around the UC system may see an advantage to spend a year or two in Merced to work with faculty.

The resource requests from the disciplines are as follows:

Economics – For AY 2010-2011, economics foresees a need for 14 full-time TA FTEs (5.0 for 300 students in ECON 001; 3.0 for 180 students in ECON 010; and 2.0 each for ECON 100, 101, and 130), split roughly equally across the two semester. At present, economics has two graduate students. Thus, our undergraduate instruction is heavily impacted because of the lack of TA resources. In addition, to satisfy our demand for courses, we expect the need for a full-time lecturer in Economics.

Political Science – To help meet the demand for Political Science courses, a full-time Political Science lecturer will be needed for the 2010-2011 Academic Year. Political Science also anticipates the need for 10 full-time TAs during the 2010-2011 Academic Year. Six will be needed in fall semester and four will be needed in the spring.

Sociology – In fall 2010 our proposed lower division courses will require 6.5 TA FTEs, and we anticipate needing a similar number in spring 2011. We will need one research qualified TA to cover research methods in the fall, and one to cover our statistics labs in the spring. Also, given student demand for courses, Sociology will require a full-time lecturer during the coming academic year.

IV. Strategic Plans of the Individual Areas

In the sections to follow, we delineate the strategic planning ideas of the individual areas.

IV.1 The Strategic Plan for Economics at UC Merced (2010-2013)

Vision for the Program

The Economics Program's vision is to establish UC Merced as a center for excellence in applied research that offers practical insights for policy-making and management decision-making. The focus on applied microeconomics implies that the Program will add faculty who will have positive spillover effects for other programs not only within the social sciences, but also across campus. For example, Economics will have natural synergies with the development of the Management Program, as well as with the campus institutes dealing with Health Sciences, Energy, and the Environment.

The Economics Program offers students an analytically and quantitatively rigorous course of study that prepares them for a variety of professional pursuits and advanced graduate study, especially in economics, management, public policy, and law. What makes Economics a particularly valuable course of study is that students learn how to: frame economic, political, and social questions that have relevance to their everyday lives; identify multifaceted explanations for the causes and the consequences of the major issues that face policy-makers and business leaders; and use economic models and data from multiple sources to propose solutions to the vexing problems that face society.

Consistent with the Program's objective to establish UC Merced's research prominence in Economics, building a graduate program will be critical.

Strengths of the Program

There are currently five faculty within the Economics Program, plus one assistant professor line that was "frozen" in 2008-2009. A senior inaugural line that was vacant since 2004 was finally filled last year with the recruitment of Rob Innes from the University of Arizona's Department of Agricultural and Resource Economics. Given the significant challenges in senior recruiting in Economics, not just at UC Merced but across the country, UC Merced's recent success in attracting Innes should be viewed as a significant accomplishment and an indicator of the early achievements of the Program.

Given the scarcity of available faculty resources and the slow process of Program building, the faculty have chosen to grow the Program strategically. In particular, as noted above, the faculty have chosen to create a niche in the area of applied economics, meaning that they study real problems that policy makers and business leaders face. At present, given our faculty's interests, we have developed specific strengths in labor economics, industrial organization, political economy and public policy, and economic history. In order to offer a high-quality undergraduate major in Economics, and eventually a graduate program, in the

coming years we will need to add in the areas of public economics, health economics, industrial organization, and international and development economics.

While our size is relatively small, our faculty have made great strides recently in attracting attention to the university and our burgeoning program. For example, three faculty (Kantor, Neumann, and Whalley) are affiliates of the National Bureau of Economic Research, a prestigious research organization in Cambridge, MA. Kantor and Whalley recently won an NSF grant to study the development of higher education in the United States during its most formative phase of growth around the turn of the twentieth century. For the past three years the faculty (in particular, Neumann, Whalley, and Winder) have been able to support an on-going seminar series in labor studies with the financial support of the UCOP Contreras Fund. While resources are limited for building the "soft" academic infrastructure of the campus, our faculty have taken the initiative in fund-raising to support the growth of the intellectual enterprise.

Further, our faculty serve in positions within their respective fields that bring positive attention to UC Merced's Economics Program. For example, Kantor serves on the steering committee of the All-UC Economics History Group (an MRU), is an elected trustee of the Cliometrics Society, and serves on the editorial board of the two leading journals in economic history. Further, Innes serves on the editorial board of the leading environmental economics journal.

Present Challenges

The most significant challenge facing the Economics Program relates to numbers. Our goal is to create a center of research and teaching excellence in applied areas of economics, which means that we should be moving toward the establishment of a graduate program. Unfortunately, our faculty size has been constrained over the past several years. Graduate training in economics is highly regimented, with graduates expected to have mastered microeconomic theory, econometrics, and at least two substantive fields (most universities also require mastery of macroeconomic theory). While our faculty expertise in certain applied areas has been well established and bodes well for training students in these areas, our lack of faculty expertise in microeconomic theory and econometrics inhibits our ability to offer core graduate training. Further, because there are very few terminal master's programs in Economics and because successful students elsewhere are highly reluctant to switch programs, we are required to "home-grow" our graduate students who are critical to our successful research and teaching programs. Indeed, one of the most significant problems that we face is the dearth of qualified TAs for our courses. We anticipate that our faculty size will need to reach 12-15 faculty before Economics can establish a full-fledged graduate program. At our present rate of progress, graduate training in Economics at UC Merced is perhaps a decade away unless resources are

devoted to building a faculty of critical mass that can serve the undergraduate major and minor in Economics, service the core courses within the Management program, and offer core and field graduate training. In the end, a large enough faculty base to support a graduate program enhances our ability to offer a quality undergraduate curriculum, conduct research, and attract faculty hires.

Interdisciplinary Opportunities

Applied economists work on a variety of problems that cross traditional disciplinary boundaries. Of course, economists bring a unique way of thinking and a certain set of analytical tools to bear on the questions at hand, but increasingly economists have turned to other disciplines to shed light on individual or collective decision-making. For instance, the recent growth of behavioral economics has come to rely on research in psychology and cognitive science to better understand how people make decisions. Further, since many economic outcomes depend on collective decisions, understanding the political process or understanding group decision-making (say within the family, for example) requires that economists join forces with political scientists and sociologists. The Economic Program currently has close ties with both the Political Science and Sociology programs. The Political Science faculty's strength in political institutions complements the Economics faculty's emphasis in political economy (that is, the endogenous relationship between economic and political outcomes). Further, the Sociology faculty's expertise in collective action and its growing emphasis in education serves as a complement to the Economics faculty's research on the development of higher education and our general interest in how individuals and groups make decisions.

The Economics Program is committed to building bridges across the campus in bolstering the synergies that exist between the disciplines. For example, many environmental, energy, or management issues have an economic component that requires an understanding of how individual and markets respond to incentives. Without untangling how people, firms, or society's respond to various resource constraints, we will be ill-prepared to answer the vexing problems that developed and developing economies face today. As an example of Economics support of trans-disciplinary initiatives, The County Bank Endowed Chair in Economics and the All-UC Economic History Group is co-sponsoring a UC Merced Political Science conference that seeks to understand the determinants and effects of federal fiscal decisions. Clearly, such political decisions have economic ramifications, so it is important to Economists that we understand the rationale behind these decisions.

Resource Request for 2010-2013

The Economic Program has immediate needs to bolster its faculty in several fields of micro-economic study in order to build intellectual breadth and depth, support a broader set of program offerings at both undergraduate and graduate

levels, and take advantage of cross-disciplinary initiatives on campus. Priority field areas are public economics, health economics, industrial organization, and international / development economics, each of which offers its own scope for exciting cross-campus synergies. In particular, a health / development economist can create links to the Health Sciences, an environmental economist can create links to SNRI and to the Energy Institute, and an international or industrial economist can link to the Management program. More substantively, we must bolster our faculty along the lines of microeconomic theory and econometrics before we can begin to contemplate a graduate program.

As a start, the Economics Program calls for the immediate thawing of its "frozen" position. This assistant professor position was created by the resignation of Giovanni Mastrobuoni. We were unable to fill the position in 2007-2008 because of an extremely competitive market in economics that year (i.e., we made multiple offers but were turned down). While we understand that the campus faced extraordinary budgetary circumstances last year, we remain deeply concerned about the perverse incentives that such "freezing" can cause. That is, if faculty fear that a position will be "frozen" or "stolen," then this will lead faculty to fill a position as quickly as possible, which could compromise quality. We believe firmly that faculty should feel secure that a position will be available until a high-quality candidate is identified.

The Economics Program requests six FTE over the next three years. The first three new faculty recruitments will focus principally on the priority field areas described above, and will produce the associated cross-campus synergies. These recruitments would represent our short-term objectives. The other three FTE will enable us to build strength in microeconomic theory and econometrics in an effort to move toward a graduate program.

IV.2 Strategic Plan for Political Science at UC Merced

Executive Summary

UC Merced's Political Science Group is building a strong research program. The Political Science Major has become one of the most popular majors on campus and with additional faculty a strong, distinctive Ph.D. program could be developed. Currently, there are six Political Science faculty lines (four faculty on campus, a new faculty member who will arrive this summer, and an ongoing search for an assistant professor). To further Political Science's research profile, capitalize on the momentum of recent hires, service the growing major, and develop a Ph.D. program, Political Science should be allocated one or two new faculty lines per year for the next five years. For the 2009-10 Academic Year, Political Science requests two assistant professor positions in the fields of political behavior and/or political institutions.

In considering this request, we believe that Political Science has a number of competitive advantages. First, the Political Science major continues to grow (it is currently the third largest major in SSHA) and undergraduate enrollment in Political Science classes is high. Second, Political Science is a particularly inter/multi-disciplinary field that is particularly well positioned to thrive and excel in UC Merced's unique environment. Third, while new hires in Political Science will need space, they will not have the same level of space needs as new faculty in the physical or psychological sciences. Fifth, the Political Science program will be a key contributor to studying "The Dynamics of Social and Economic Progress," one of the five research themes listed as central to UC Merced's Strategic Academic Plan.

Vision

Political Science at UC Merced is positioned to be at the forefront of the discipline in the coming years. Although we acknowledge the ambitious nature of this goal, Political Science is ideally situated to absorb the myriad ideas, theories, and methods intrinsic to interdisciplinary environments. In contrast to many other disciplines, Political Science has no core approach. It is a borrowing discipline. Indeed, cutting-edge, high-impact research in Political Science often grows from an idea or approach from another discipline, primarily Economics and Psychology/Cognitive Science. In an interdisciplinary environment, a Political Science program with ample resources is poised to bring new ideas and approaches to the discipline, thus cultivating a reputation for innovative and ground-breaking research.

A second current advantage enjoyed by our program is an absence of the epistemological divide that hampers many, if not nearly all, political science programs. We share a commitment to rigorous (primarily quantitative) social scientific research. Moving forward we will continue this approach for understanding and evaluating casual political phenomena. Many existing political science programs suffer from a lack of coherence and a great deal of conflict regarding the definition of political science and appropriate foci for research. The commonality of our focus will help accelerate the development of a very strong program.

If we are able to continue to hire well and fully take advantage of UC Merced's interdisciplinary opportunities, we believe we can develop one of the best Political Science programs in the West. There are few very strong Political Science departments or programs on the West Coast. Aside from a handful of standout programs such as UC Berkeley, UC San Diego, UCLA, Stanford, and Caltech, there is a significant step down in quality. With resources and shrewd planning, we should be able to develop into a highly competitive program. *Indeed, based on a survey of publications in the top three general interest*

journals in political science, the current UC Merced political science group has the highest rate of scholarly productivity in the entire UC system.[18]

Although Political Science should thrive in an interdisciplinary environment, it also contributes to other disciplines by providing novel and interesting research questions, alternative approaches grown from within and outside Political Science, and opportunities for collaborative research.

Political Science aims to be a large major at UC Merced, training students in traditional Political Science courses while blending elements of other disciplines relevant to the study of politics. It also aims to train graduate students in subfield specialties where coursework in other disciplines will lead to innovate research programs.

Mission

Political Science seeks to make innovative, substantial contributions to the discipline of Political Science through the generation and dissemination of outstanding scholarly research. It aims to train undergraduate and graduate students how to understand political phenomena using both theoretical and empirical approaches to the study of politics. In conducting research and training students, Political Science aims to draw on the intellectually rich environment of an interdisciplinary school.

Goals and Strategies

Political Science needs to do the following:

- Continue developing areas of research excellence
- Develop a graduate program
- Reinforce bridges to other disciplines
- Hire outstanding faculty with broad theoretical/methodological interests in political institutions and behavior across three of the traditional subfields (American politics, comparative politics, and international relations)

Research Opportunities and Funding

[18] The top three general interest journals are *American Political Science Review*, *American Journal of Political Science*, and *Journal of Politics*. To measure scholarly productivity, we divided the number of articles published in these journals by faculty in a given political science department by the number of total post-PhD years for the faculty. If we only include faculty who earned their PhD in 1998 or later, the UC Merced group ranks second, behind UC San Diego.

As a program not likely to achieve a faculty the size of UC Berkeley in the near future, it is crucial to develop areas of excellence while still providing undergraduates a broad curriculum. To achieve this goal, Political Science seeks to develop an emphasis on political behavior and institutions, two key general areas within the discipline. Within each of these areas, we will likely focus on hiring scholars with broad theoretical or methodological interests that bridge other disciplines.

In the area of political behavior, we seek to hire scholars doing research informed by general theories of judgment and decision making. In particular, voting behavior and public opinion research increasingly draws on theories found in cognitive Psychology and tests them using experimental methods. Scholars using these theories and approaches are doing innovative research in political behavior and we seek to be a discipline leader in this area. We anticipate that scholars in this area will likely form associations with Cognitive Science, Psychology, and Sociology faculty.

In the area of political institutions, we plan to hire scholars with research programs focusing on the selection and ultimate effect of the "rules of the game" governing the political processes. Given the relatively small size of the Political Science group for the foreseeable future, we seek scholars who are general institutionalists, as opposed to area specialists. For example, although we desire to hire faculty who research the politics of specific regions (e.g., European politics), the focus must be sufficiently broad to be of interest to political scientists working in other subfields. Thus, an ideal hire for Political Science in Comparative Politics would focus on broader questions pertaining to legislatures or political parties within a given country or region. Scholars with broad theoretical interests are also more likely to publish in well-regarded, mainstream Political Science journals and be able to flourish in an interdisciplinary environment. Such scholars will likely form linkages with the Economics and Sociology faculty.

Teaching opportunities, enrollment

The Political Science Major has become the third largest major in SSHA. The size of the major is not all that surprising given that Political Science is a popular major both nationwide and within the UC system. Over the last three decades in the U.S., more students have graduated with a degree in Political Science than in the related fields of History, Economics, or Sociology (American Political Science Association).[19] Political Science is also a sought after degree throughout the UC system. For example, Political Science is the second most popular major at both UC Berkeley and UCLA.[20] These data emphasize the high level of student demand for Political Science, both nationally and in the state of California.

[19] http://www.apsanet.org/section_589.cfm
[20] See UC Berkeley's "Assigned Majors by Academic Program" (http://opa.berkeley.edu/AnalysesAndReports/MajorsAndDegreesByAcadProgram.htm)

Multidisciplinary opportunities

Since Political Science often borrows ideas, theories, and approaches from other disciplines, it is poised to take advantage of interdisciplinary opportunities. In particular, contemporary political scientists often borrow from the fields of Economics and cognitive Psychology. As such, Political Science envisions hiring faculty that would be interested in developing programs integrating Political Science with these disciplines. Recently, Political Science and Cognitive Science faculty have begun collaborative research efforts. We hope to further develop this relationship. In addition, we would like to foster similar relationships with Economics, Psychology, and Sociology.

Resources

Faculty by area, projections (5 years): Currently, there are four Political Science faculty on campus (Hansford, Monroe, Nicholson, and Trounstine) who can teach a number of the existing Political Science courses, including Introduction to American Politics (POLI 1), Analysis of Political Data (POLI 10), Congress (POLI 100), The Presidency (POLI 101) Judicial Politics (POLI 102), Interest Groups and Political Parties (POLI 105), Urban Politics (POLI 106), Direct Democracy (POLI 109), Governmental Power and the Constitution (POLI 110), Liberty, Equality, and the Constitution (POLI 111), Voting, Campaigns, and Elections (POLI 120), and Public Opinion (POLI 125). Haifeng Huang, a recent hire (joining the faculty in July 2010), will be adding Theoretical Models of Politics (POLI 170) and Chinese Politics to the list of courses regularly taught.

To meet the demands of the growing major and develop a graduate track within SCS, Political Science needs more faculty. Political Science must be able to offer a variety of courses—and not develop a reputation for limited offerings—if it is to continue on its trajectory of becoming a large major. New faculty members in all subfields are required to give students a realistic opportunity for completing the major. Specifically, the introductory courses and required courses—not to mention graduate seminars—will quickly deplete the availability of faculty to teach upper division courses.[21] In addition, consonant with the core research mission of the University of California the Political Science group plans to develop a Ph.D. program. Even while leveraging resources in related fields, the Political Science faculty is only just teetering on sufficient size to begin to offer such a program.

Political Science should be allocated one to two positions per year over the next five years. Many, but not all, of these lines could be at the junior level

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and UCLA's "Undergraduate Profile, Fall 2005" (http://www.aim.ucla.edu/home/Undergraduate_Profile_Fall_2005_viewing.pdf).

[21] It should be noted that by requiring Political Science majors to take two upper division courses outside of Political Science, the major utilizes existing instructional strengths and resources.

since both Hansford and Nicholson are associate professors and Monroe and Trounstine are advanced assistant professors who should earn tenure soon (see *Faculty development* below). ***For the 2010-11 Academic Year, Political Science requests two assistant professor positions in the fields of political behavior or political institutions.***

Until these faculty members are hired, Political Science will continue to need a full-time lecturer to cover several courses. We view this as a short-term solution, though. To provide a quality major, develop a graduate program, and continue to build a strong research program we need to rely on ladder-rank faculty. As explained above, we will continue to focus on hiring faculty with broad theoretical interests in political institutions and political behavior.

Spaces, offices, labs: Our primary concern is office and lab space. All new faculty hires will obviously need office space. Should we be successful in hiring a political scientist doing experimental research, s/he would require laboratory space as well. Nicholson may also need a lab in the coming years. Depending on future hires, however, Political Science may propose a Political Science laboratory (or small set of labs) shared by Political Science faculty doing experimental research. Lack of space for Political Science faculty doing experimental work will harm efforts to recruit and retain faculty. Lab space will also be needed for the development of the graduate program. *We anticipate, however, that Political Science will not have the same space requirements as the physical or psychological sciences, which makes it easier to receive faculty lines during the current space shortage.*

Graduate program: We plan to bring in our first cohort of 5-6 PhD students (initially under the Social and Cognitive Sciences program) in the fall of 2011. It is critical that we be able to offer funding, specifically TAships, to these students in order to build our program.

Finances

Political Science does not have any extramural grants at this time. However, this is not all that surprising given that faculty in Political Science typically do not have extramural grants. Over the course of the coming year Hansford, Nicholson, and Trounstine plan to individually apply for National Science Foundation grants.

Specific Five-Year Plan

Research Profile

By 2015, Political Science aspires to achieve a reputation as a strong research program with top-notch faculty conducting cutting-edge research and training Ph.D. students for placement in research universities. Faculty (and, ultimately, graduate student) research will continue to regularly appear in the top political

science journals and book presses. While external funding possibilities in Political Science are quite limited, members of the faculty will have successfully competed for grant money.

Faculty Development

By 2015, there should be 13-15 Political Science faculty. Hansford and Nicholson should be Full Professors. Monroe and Trounstine should be Associate Professors. Other junior faculty should be well on their way towards earning tenure.

New faculty hires will work on behavior and/or institutions in three of the recognized subfields of Political Science: American politics, comparative politics, and international relations. We do not plan to hire faculty in the subfield of normative political theory (i.e., political philosophy). By focusing our hiring on just behavior and institutions in these three subfields we should be able to more quickly build internationally-recognized strengths in these areas. We will also strive to hire faculty who approach questions or problems from either a general (i.e., portable) theoretical or empirical manner. This type of scholar will most benefit from and contribute to the type of program being built in Political Science and the social sciences more generally.

Political Science is dedicated to hiring a diverse faculty. We added our first female faculty member (Trounstine) last summer. Our first Asian faculty member (Haifeng Huang) will arrive this summer. While the potential pool of minority applicants is quite small (e.g., the 2002 Political Science Ph.D. class was 4% African American, 3% Asian American, and 4% Latino),[22] we will continue our efforts to increase the diversity of our applicant pools.

Undergraduate Education

By 2015, the Political Science major should be one of the largest, if not the largest undergraduate major on campus. Our graduates should compete particularly well when applying to law schools and graduate programs.

Graduate Education

By 2015, there should be a stand-alone Ph.D. program in Political Science that is designed to provide graduate students with a relatively unique training that prepares them to make important, cutting-edge research contributions. In cooperation with other disciplines, this program will train students in political economy/institutions and political cognition. In the meantime, we will have admitted and begun training multiple cohorts of Ph.D. students under the Social and Cognitive Sciences Ph.D.

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[22] Lopez, Linda. 2003. "Placement Report: Political Science Ph.D.s and ABDs on the Job Market in 2001-2002." *PS: Political Science & Politics* 36(4):835-841.

IV.3 Sociology Strategic Plan 2010

Current Staff Resources in Sociology

We currently have three ladder rank faculty, a fourth arriving next fall, and are in the process of making an offer to an Assistant Professor candidate who specializes in gender and education, contributing to our focus on social inequality. In spring of 2010 we have one lecturer teaching three courses.

In the following section we outline some of our accomplishments from 2009. Then, after describing our goals and objectives, we provide an assessment of the personnel resources we will need to achieve our goals. The document concludes with an appendix containing our mission statement.

2009 Accomplishments

We successfully obtained University approval of our sociology major. It is currently awaiting WASC approval (Goal 1).

We contributed to the intellectual community at UCM in several ways. Sociology faculty participated in several extra-curricular events on campus and brought some inter-disciplinary speakers to campus during our mini-conference in the fall. We also brought in job candidates whose work cuts across area and would contribute to multiple programs and initiatives on campus. (Goal 1.2)

Student demand for our courses is high. We have the highest number of student minors in the college, and even without a major to declare, SSHA advising staff estimate that in fall ’09 we had 28 majors. Our courses always fill or come close to filling. (Goal 1.3)

We established our program learning outcomes and began assessment of sociology courses. (Goal 1.4)

Our faculty had a number of noteworthy scholarly accomplishments this year. We successfully hired a tenured Associate Professor who is well known for his work on Latin American social movements. One sociology faculty member (Van Dyke) is currently chair of a section of the American Sociological Association, and she recently published an article in sociology’s top journal, the American Sociological Review. Another (Beattie) recently obtained a book contract for a reader on the sociology of education. (Goal 2.1)

Goals and Objectives

Goal 1 (short term): Begin an undergraduate major in sociology.

We obtained approval for our undergraduate major from the university in spring 2009. In spring 2010 our goal is to obtain approval from WASC, and begin enrolling students in the major.

Objective 1: Involve faculty in core aspects of the undergraduate program.
Faculty will teach the required introductory, theory, research methods and statistics courses when possible since they are the cornerstone of the discipline and therefore of the major. Faculty experience and expertise will ensure that these core courses are rigorous and of high quality, and that students gain the foundation they need for success in the major. Student-faculty interaction in the core courses will guarantee that all students have lower division courses with faculty, and will help us recruit and retain students in the major.

Objective 2: Facilitate"communities of inquiry."
Sociology will be an active inter-disciplinary participant in undergraduate and graduate education. Because of the broad range of topics studied by sociologists, the discipline has a unique ability to speak to the constituent members of SSHA, as well as aid in developing multi-disciplinary programs. Sociology can immediately assist with the development of the Management Program, graduate program in Latino, Latin American and Iberian Studies, and Women's Studies. Sociology is also well suited to strong participation in other inter-disciplinary programs.

Objective 3: Draw students to UCM by addressing topics of interest.
Given UC Merced's unique location in the San Joaquin Valley, and Sociology's traditional emphasis on issues of inequality and power dynamics (particularly regarding class, race/ethnicity and gender), UCM Sociology has the potential to be not only a strong academic unit within SSHA, but a bridge to the other schools on campus and the larger community as well. In light of the socio-economic and demographic changes gripping the Central Valley in particular, and the State of California as a whole, Sociology has great potential to attract students at both the Undergraduate and Graduate levels. The program will be of interest to those interested in studying issues such as racial and ethnic dynamics within the rapidly changing California demographic landscape, how collective action and social movements rise and fall in concert with demographic change, the dynamics of neighborhood and community change given high levels of economic inequality, and the changing educational system. Due to their training and interests, Sociology graduates are likely to help further UC Merced's goals of providing research and public service to the region and beyond which will enhance the profile of both the university and the sociology program.

Objective 4: Continue program learning outcomes assessment.
We began assessment of our curriculum last year, with an evaluation of the undergraduate minor. We initiated assessment of the major (pending approval) in Fall of '09. Results of the assessment will be used to improve instruction and enhance program objectives.

Objective 5: Provide experiential learning opportunities for undergraduates.
A longer-term aim of our undergraduate program is to develop hands-on learning opportunities for our students. The program will provide opportunities for hands-on student research, and, eventually internships and service learning incorporated into the classroom. Sociology faculty have been involving undergraduate students in our research, and we plan on continuing to do so. In addition, we plan on offering upper division research methods courses for students that will require that they carry out their own research project. We hope to see evidence of success in student research training with students participating in research conferences and applying to graduate school. We would also like to incorporate service learning into the classroom within the next five years. Service learning will enhance our students' education by providing them with the opportunity to learn through direct experience, while also contributing to the local community.

Objective 6: Start an undergraduate sociology club.
Within a couple of years of approval of the sociology major, we would like to start an undergraduate sociology club. This club would provide students with opportunities to further their education outside of the classroom, with potential meetings organized around discussion of careers in sociology, applying to graduate school, applying sociology to the real world via analysis of film, and meetings with invited guests, typically well known sociologists from other institutions.

<u>Goal 2 (5-10 years): Establish a graduate program</u>.

Objective 1: Scholarly excellence in sociology at UC Merced.
Our plan for developing sociology at UCM involves building strength in a limited number of areas so that we can have several well staffed, rigorous areas of specialty fairly quickly. In this way, we will be able to offer high quality graduate training within five years. Sociology plans on growing along two axes. First, rather than attempting to cover the breadth of topics that sociologists study, we plan on emphasizing three traditional sociological issues: politics, inequality, and organizations and institutions. Thus far we have three faculty members who specialize in social movements, and therefore, we are well positioned to begin graduate training in this area. If we are successful in hiring Laura Hamilton this spring, we will be strong in gender and education. In the near term, we would like to further our strength in inequality and organizations by hiring a race and ethnicity or immigration scholar, and a health inequality scholar.

While building strong substantive areas, a secondary goal is to provide training in a range of research methodologies. We would like to have well rounded faculty expertise in a range of current data collection and analytic methodologies, including network analysis, geographic/spatial analyses, hierarchical modeling, new ethnomethodologies, and mixed (quantitative/qualitative) techniques.

Sociology is a discipline with both quantitative and qualitative methodological foci. A successful department will be one that addresses many of these key features of sociology.

Objective 2: Assist in the growth of other UCM graduate programs.
Due to the wide range of topics sociology studies, we have the potential to provide training relevant to a range of UCM graduate programs. Our plan for growth includes faculty hires that would contribute to UCM's Management Program, the interdisciplinary Health Disparities Center and minor in public health, and programs under discussion including Women's Studies and Ethnic and Racial Studies. Sociology also has the potential to contribute to other UCM programs, including Political Science, Economics, and Anthropology, among others.

Goal 3 (Long term): Join the other University of California Sociology Departments in attaining a national ranking in the discipline.

Sociology at UCM's long term goal is to develop into an elite, small Sociology department. Unlike UCLA and Berkeley, which have some of the largest departments in the country, we envision UCM developing similar to Stanford, with a few key areas of study, rigorous academic programs, a focus on developing analytical skills at the cutting edge methodologically, and with connections to the various multi-disciplinary programs throughout the university. The ultimate goal for this department is to be a top 50 department within 20 years.

Personnel Resources Needed to Achieve Goals

We anticipate rapid growth of our major. Student demand for our courses is high, and we have the highest number of minors in SSHA. Across the UC system, Sociology is close to Political Science in terms of number of undergraduate majors, and on some campuses, is nearly tied with Psychology. Thus, we predict that the major will rapidly become one of the most popular majors in SSHA. Therefore, additional faculty and graduate students will be required to staff the major over the next several years.

Faculty. Our strategy for hiring is based on establishing scholarly excellence and preparing to offer graduate training. We are requesting five faculty lines for the next three years, which will bring us up to 10 faculty. We propose a two-pronged approach for hiring. We want to recruit faculty in order to build our three substantive focus areas, and we also want to hire faculty with the skills we need to offer graduate training. In terms of substantive foci, in the next three years we would like to hire 2 sociologists who study social inequality focusing on race, ethnicity, immigration or gender. We also would like to hire 2 faculty to further strengthen our emphasis in inequality and organizations and who would contribute to initiatives on campus. We would like to hire a health sociologist,

and someone who studies either labor markets, education, or the family. Finally, we have identified a need for sociologists interested in teaching our planned Graduate Statistics and Graduate Theory courses. These scholars could have any substantive focus that fits with our three areas of emphasis. In the next three hiring cycles (beginning in AY 10/11) the hiring pattern would be:

10/11 — 2 lines
11/12 — 2 lines
12/13 — 2 lines

Each of these hires would contribute not only to sociology on campus, but to a number of other programs. New faculty would contribute to the public health program and Health Disparities Center, the emerging inter-disciplinary interest in race and ethnicity, and potentially other programs on campus.

Graduate students. In order to successfully provide the coursework required for our undergraduate major, we must have trained and qualified graduate students (or lecturers) available to TA our classes. This is an especially pressing need for our required Research Methods course (SOC 015) and Sociological Statistics course (SOC 010). Because our discipline has not started a graduate program, we rely on psychology, cognitive science and world cultures graduate students as TAs. However, as we experienced this year, there is a serious shortage of TAs available to staff our research methods and statistics courses. Initially for fall ’09, a literature student with no research training was assigned to TA our Research Methods course. Professor Van Dyke cancelled her spring statistics course because a full time qualified TA was not available. We cannot offer our undergraduate major without qualified staffing for these courses, and until we start a graduate program we must either have TAs from other disciplines or lecturers.

We request an increase in funding for sociology TAs to cover our required and lower division classes in fall ’10. Because we are not ready to begin offering graduate training and because there is a shortage of graduate students trained in research methods and statistics in SSHA, we propose that some funding for TAs be given to us to hire a lecturer or two from outside UCM. We could easily recruit an ABD graduate student or recent PhD from UC Davis or Berkeley to teach for us.

In fall 2010 our proposed lower division courses will require 6 ½ time TAs, and we anticipate needing a similar number in spring 2011. We will need one research qualified TA to cover research methods in the fall, and one to cover our statistics labs in the spring. We expect that the number of TAs we need will increase by 1 or 2 in the following year. We anticipate needing to offer additional sections of the research methods and statistics courses within the next 3 years as our major grows, and therefore, we will require 2 ½ time TAs who are trained in research methods and statistics each semester beginning in fall 2011.

IV.4 Strategic Plan for Management

The Management program at UCM services approximately 184 majors – it is the third-largest major – and is in high demand despite the absence of any faculty dedicated to the program. With an institutional commitment to the program, Management could become an important draw for new students to the campus, grow significantly in size and quality, and contribute to UCM's intellectual diversity and distinction. At present, only lecturer resources are available to support some courses in the program, and SSM faculty in SSHA (several Economics faculty and a cognitive scientist) provide programmatic support in the form of core course teaching, student supervision and program management. If the Management program is to continue, let alone expand and build into a successful enterprise on campus, new faculty hires are absolutely essential in the immediate future. SSM is enthusiastic about opportunities for expansion, but also wary of prospects for continued institutional starvation of this program. In this strategic plan, we present a way forward that gradually builds a distinguished faculty base for this program, while providing research synergies to the campus. We seek to hire faculty whose priority is management research and teaching, but we see considerable opportunity for interdisciplinary connections across the social sciences.

<u>On the Nature of Management Hiring</u>

All successful Management programs are built on the core disciplines that underpin Management training and research. Core fields are defined by existing Management disciplines with established bodies of teaching and scholarship in Schools of Management around the world. Five themes reflect these core fields: Finance; Marketing; Economics, Policy and Strategy (EPS); Organizational Motivation and Behavior (OMB); and Decision Science. The substance of each field is described below. These core fields also reflect the UCM student demands for management training, and the promises made by UCM to these students for management training.

In faculty hires in Management at UCM, we will seek excellence in the aforementioned core fields, enthusiasm for advancement of the Management program, and contribution to unique avenues of distinction for the campus. With this in mind, we envision a number of possible strategic focuses that would be particularly attractive in new Management faculty and help blaze the trail to fame and distinction for UCM's program:

1) Retail and Service Management
2) Health and Health Care Management
3) Global Management and Strategy
4) Energy Policy and Management
5) Environmental, Agricultural, Natural Resource and Biotechnology Management

6) Behavioral Economics, Finance, and/or Marketing

These strategic focus areas are also identified in view of desirable cross-campus synergies with inter-disciplinary institutes and research faculty, particularly in the Health Sciences, Energy, and the Environment (the SNRI). We expect new Management faculty to be involved in a number of these initiatives.

Although we will emphasize building a coherent program, future management faculty are likely to be drawn from a variety of disciplines in terms of their PhD training, reflecting the interdisciplinary nature of management research and education. To give a concrete example, when hiring a scholar in marketing, we will recruit across a broad set of disciplines and the successful recruit could be someone with primary training in marketing, psychology, cognitive science, sociology, economics, or systems engineering. Again, our goal is to recruit the finest scholars who will be dedicated to building excellence in management education and research.

Strategic Plan for Hiring

2010-11

Three UCM faculty lines are approved at present for Management. These are in the Provost's Pool, but have yet to be released for recruitment. Under our plan, these three lines would be opened for recruitment in 2010-11. The lines would all be open rank and open to all core Management fields delineated in this plan. SSM will hire into these lines with a view to excellence first and, second, to programmatic needs and strategic vision.

2011-2016

In each of the following five years, two additional Management faculty lines will be opened for recruitment, with the objective to bring faculty numbers and strength in line with anticipated program growth and institution building. With appropriate staffing, we envision the management undergraduate program growing to 500 students within the next decade, and the development of graduate programs in the suite of Management-related fields.

Strategic Plan for Course Development and Coverage, and Further Development of Teaching and Research Programs in Management

Most Management upper-division classes are staffed by lecturers. Absent new faculty hires, we will continue to staff current course offerings with lecturers in the short term, but will be unable to expand the array of classes offered. In this event, SSM, SSHA and UCM will need to reevaluate the viability of the Management program on campus and likely seek ways to close the program in an orderly fashion.

However, if the hiring plan is followed, there will be growth in course offerings in Accounting, Finance, Marketing, Real Estate, Health Management, International Economics and Global Management, Industrial Organization, Organizational Behavior, Behavioral Economics/Finance/Marketing, and other areas currently underserved in the present Management curriculum. In addition, there will be gradual development of Ph.D. programs and, assuming the interest of new faculty, Executive Education. Finally, with a critical mass of ladder-rank Management faculty, we enthusiastically anticipate the formation of an institute for management research that could be supported in part by endowment resources and draw in interested faculty from a variety of disciplines across the campus.

Core Management Fields at UCM

Finance

Finance addresses the ways in which individuals, business entities and other organizations allocate financial resources over time, with particular attention given to the art of decision making under conditions of uncertainty. Among central focuses of the Finance program will be

-the generation and analysis of financial information;
-methods to raise and allocate investment funds, including asset pricing, capital budgeting, investment strategy, and international asset management;
-the structure and regulation of financial institutions.

Marketing

Marketing is the process whereby demands for products, services and ideas are anticipated, managed and satisfied. The marketer does this by first analyzing the marketplace behavior of competitors and consumers and then designing product, promotion, pricing and distribution strategies that will be accepted in the marketplace. Economic, social, cultural and even political organizations increasingly recognize the importance of the marketing function in modern management. The Marketing program will focus on understanding, explaining and predicting consumer behavior and the effectiveness of various marketing strategies, and developing theoretical frameworks with which consumer choice can be better understood and more efficient and effective strategies can be designed.

Economics, Policy and Strategy

The EPS program will focus on the interaction of economic incentives, firm strategy, public policy and political economy, institutional design, and technology

management, including applications to antitrust, telecommunications, energy and the environment, airlines, health, banking, human resources, game theory, international trade, and strategy, both private and public. Key examples include

-International Economics: The effects of international trade and trade restrictions on prices and welfare; the determination of exchange rates and relative prices across countries; the economics of pollution havens, eco-dumping, international labor and environmental agreements, and international economic development.
-Industrial Organization: Strategy, pricing, and performance in imperfectly competitive markets, including the nature and effects of contracts, vertical and horizontal organization of production and retailing, and antitrust.
-Risk and Insurance: The intersection of Finance and Economics, including decision making under uncertainty, market failures in insurance, pricing risk, public decision making under risk, diversifiable vs. undiversifiable risk, and ethical issues in cross-generational choices under risk.
-Health Economics and Management: Economics of health care management and delivery from consumer decision making to doctor incentives, hospital management, innovation and marketing of pharmaceuticals and vaccines, and alternative health delivery systems.

Organizational Motivation and Behavior

Organizational behavior covers topics that include cross-cultural management, power and influence, negotiation, team and interpersonal processes, individual judgment and decision making, innovation, trust, organizational commitment, incentives, and leadership. Organization theory addresses contemporary theories about organizations (i.e., community and population ecology, institutional theory, networks, organizational learning and decision making) and applies them to understand new organizational forms, growth, adaptation, design, performance, survival, and evolution. At the individual level, the newly emerging field of behavioral economics investigates the cognitive, social, and emotion factors affecting buyers and sellers, how their judgments deviate from rational choices, and the consequent effect on the marketplace and allocation of resources. The OMB program will use rigorous experimental, empirical and theoretical tools to study these subjects.

Decision Science

The Decision Science field studies the use of computing technology, statistical methods and decision algorithms to manage information, complex organizations, product design, production, distribution and delivery. Subjects include Statistical Methods, Data Analysis and Decision Making, Operations Research, and Management Information Systems.

Appendix
Sociology Mission Statement

Using a "sociological imagination" involves acknowledging the structures and patterns that shape daily experiences, understanding the mutual influence of individual choice and social structures, examining social phenomena from various perspectives, and thinking critically about existing social arrangements. Sociologists use a variety of theories and rigorous research methods to understand the social world. Substantively, sociology at University of California, Merced uses these tools to focus on the role that social inequality, politics, and organizations play in shaping individual and collective social experiences.

In teaching, the Sociology program at UC Merced is committed to helping students develop the insights of a sociological imagination that will lead to a systematic understanding of society. In particular, we hope that students will obtain the skills they need to be critical consumers and careful analysts of social science research. We seek to enhance students' ability to communicate effectively both orally and in writing. We also expect that our students will develop a keen insight into the causes and consequences of social inequality. Through the study of sociology, students will therefore gain many concrete skills that are helpful for a broad range of rewarding careers or future graduate studies.

Through our research, we generate scientific understanding of important local, national, and international social problems. To help explain and solve both theoretical and practical issues confronting society, we seek interdisciplinary partnerships from across our campus and elsewhere. Our intention is to draw from our own and related disciplines to create cutting-edge knowledge about social life. We value scholarship that contributes to important debates within our discipline as well as to more far-reaching discussions that cross disciplinary boundaries or are taking place outside the academy.

In our service to the university, the discipline, the community and beyond, we seek to use our scientific understanding of the social world to help enrich public policies and public discourse.

We seek to make our program a lively intellectual environment that fosters innovative thinking among faculty and students alike. Finally, we strive to be collegial and respectful in our interactions with those around us.

Strategic Plan for the Social and Cognitive Sciences Graduate Group

From: Michael Spivey, Social and Cognitive Sciences Graduate Group Chair
To: Mark Aldenderfer, Dean of Social Sciences, Humanities, and Arts

Introduction

The Social and Cognitive Sciences Graduate Group was initiated about five years ago with the intention that it would function as a "temporary incubator" for more specifically-focused CCGA-approved stand-alone graduate programs that were expected to emerge from it. (CCGA stands for the UC-system-wide Coordinating Committee on Graduate Affairs, which reviews proposals for graduate programs.) During this time period, the SCS grad group has housed graduate students in a variety of disciplines that roughly fall under the broad rubric of Social and Cognitive Sciences. Approximately 45% of these students are best characterized as Cognitive Science-related PhD students (with emphases on computation and perception), roughly 45% of them are best characterized as Psychology-related PhD students (with emphases on health and development), and the remaining 10% comprise a sparse collection of Economics-, Political Science-, and Sociology-related PhD students. Given this history and this make-up, it is a non-trivial task to formulate a coherent strategic plan for this diversely-constructed "incubator" graduate group. Developing a strategic plan for the next few years of the Social and Cognitive Science graduate group is further complicated by the fact that it is currently in the process of bifurcating largely into two stand-alone graduate programs: Cognitive and Information Sciences and Psychological Sciences.

Results of "Incubation" Process and Timeline

Before describing the new FTE hires that would best meet the needs of this temporary incubator graduate group, allow me to describe the timeline of this impending bifurcation process. Both the Cognitive and Information Sciences CCGA proposal and the Psychological Sciences CCGA proposal are currently under review at this time. The scenarios below describe possible sequences of events for this bifurcation process. In each scenario, it is assumed that the two CCGA proposals will *eventually* acquire approval (perhaps after multiple revisions and FTE growth). Therefore, it is to be expected that at some point, the small number (about 10% and shrinking, as they graduate) of SCS PhD students who would not be transferring to either of those stand-alone programs (students who are crucial to the TAing needs of majors like Sociology, Economics, and Political Science) should be able to have a new graduate group chair who will reshape the SCS graduate group into a disciplinary program with a more specific and coherent focus. And in time, that group too could grow into its own CCGA-approved stand-alone graduate program (perhaps not unlike CalTech's Social Science PhD program).

Scenario 1: If both proposals are approved by CCGA, notification of approval should take place in fall of 2010. During spring of 2011, there may still be some additional approval stages imposed by the WASC accreditation process (Western Association of Schools and Colleges). Therefore, even if both proposals go through their approval processes swimmingly, these two stand-alone graduate groups may not truly be independent entities until approximately the summer of 2011. Still, with regard to new FTE hires, this scenario has both grad groups up-and-running (and transferring their respective SCS graduate students into them) before the arrival of new faculty that were interviewed and

hired in spring of 2011. Thus, the strategic hires proposed by the respective strategic plans of the Cognitive and Information Sciences bylaw unit and the Psychological Science bylaw unit will apply to those two stand-alone graduate groups.

Scenarios 2a and 2b: If one of these two grad group proposals is approved by CCGA and WASC several months before the other one is, then the approved group will be allowed to form its new stand-alone grad program while the not-yet-approved group will continue to constitute the bulk of the SCS grad group for the 2011-2012 academic year. The hiring priorities of the relevant bylaw unit that remains closely affiliated with SCS (either Psychological Sciences or Cognitive and Information Sciences) will then apply as the appropriate hiring priorities for the SCS grad group. (If it is the Cognitive and Information Sciences grad group that gets approved earlier, then I will step down from grad group chair of SCS and recommend to you someone from the Psychological Sciences group.)

Strategic Hiring

As noted in the scenarios above, some of the following SCS hiring priorities will be moot by the time new faculty are arriving in the fall of 2011, because one or both of the primary components of SCS will have branched off as their own grad programs. Nonetheless, it is worth outlining here what those hiring priorities, in those different scenarios, would look like.

Scenario 1: If both the Cognitive and Information Sciences grad group and the Psychological Sciences grad group acquire full approval around summer of 2011, then the SCS grad group will immediately adopt the same hiring priorities as those already proposed by the SSHA bylaw unit comprised of Management, Economics, Sociology, and Political Science.

Scenario 2a: If the Cognitive and Information Sciences grad group acquires approval several months before the Psychological Sciences grad group does, then for the 2011-2012 academic year, the SCS grad program's hiring priorities will mirror those of the Psychological Sciences bylaw unit (with emphases on Developmental Psychology, Health Psychology, and Quantitative Psychology). By the 2012-2013 academic year, one should expect that the Psychological Sciences grad group proposal will acquire its approval, and Scenario 1 above will be in place.

Scenario 2b: If the Psychological Sciences grad group acquires approval several months before the Cognitive and Information Sciences grad group does, then for the 2011-2012 academic year, the SCS grad program's hiring priorities will mirror those of the Cognitive and Information Sciences bylaw unit (with emphases on Cognitive Science and Technology, Cognitive Neuroscience, Computational Linguistics, and Philosophy of Mind). By the 2012-2013 academic year, one should expect that the Cognitive and Information Sciences grad group proposal would acquire its approval, and Scenario 1 above would be in place.

MEMO

FROM: Ignacio López-Calvo, World Cultures Graduate Group Chair
TO: Mark Aldenderfer and Sam Traina
RE: World Cultures Graduate Group Strategic Plan

This memo is a one-year strategic hiring plan for the World Cultures Graduate Group. It is based upon the positions proposed in the three-year Humanities and World Cultures plan. That plan focused primarily on the needs of undergraduate majors. For this reason, we have decided to consider the list of hires submitted for the HWC plan and re-prioritize them with the graduate group in mind. The following rank-ordering is based upon these principles.

The most important strategic goal for graduate group hires is to hire colleagues who create synergies with current faculty and students. The highest priority new hires are those who can serve in committees for current graduate students' dissertations and qualifying exams along with current faculty. The World Cultures Graduate Group Strategic Plan priority listing is the following:

1. **(Unranked) Chicano History**

This urgent priority position is not ranked because it is a replacement for a current FTE.

2. **Transatlantic Colonial Latin American/Golden Age**

Based on the research areas of current graduate students and the emerging strengths of the graduate group, the highest priority for the World Cultures Graduate Group is to reinforce our current expertise in Hispanic Studies. Colonial Latin American literature is critical for many of our graduate students and is our highest ranked request.

3. **International World Heritage**

World Heritage is a signature UC Merced program that is not replicated at other campuses. Our one World Heritage faculty member is currently chairing a large number of committees, and other students are working on digital humanities and/or public culture with other graduate group faculty. An additional hire in this field will serve these students and build upon an emerging area of strength in our program.

4. **Nineteenth Century US West/Environmental History**

Many of our graduate students work on American History and Literature and on Environmental History and Literature. This proposed hire serves those students and builds areas of strength in both American Studies and Environmental Studies.

5. **GASP Latin American Art History and Theory**

Along with the proposed Colonial Latin America/Golden Age position, this hire will help to create a multidisciplinary core of Hispanic Studies students and faculty.

6. **Colonial US History**

Along with the Nineteenth Century US History position, this hire is essential to an American Studies focus. Along with our existing faculty expertise on the Early Modern Atlantic World and the Mayan empire, as well as the proposed Colonial Latin America position, it reinforces an innovative transnational and interdisciplinary focus on the colonization of the Americas.

All these faculty lines are crucial for the improvement of our current graduate group as they will complement the work of our current faculty and will help both current and prospective graduate students. We trust that you will try to get the necessary FTEs for all these hires.

Thank you in advance

Appendices

Appendix 1a, b, c: Positions requested in tabular form

Appendix 2: Majors, programs, and graduate groups

Appendix 3: SSHA future space needs (office and research)

Appendix 1a SSHA Table of Requested FTE, Year 1 of 3, 2010-11
EVC Target: 7 Number of positions requested: 11 priority 1

Colonial American

Priority	Name	Level	Primary Major	Secondary Major	Primary Graduate Group	Est. Startup Costs	Space	Other considerations
1	Developmental Psychology	Associate/full	Psychology		Psychology (in review)	100K	Office + new lab in SSM	Enrollment coping/graduate overlap
1	Quantitative psychology	Assistant	Psychology		Social and Cognitive Sciences	80K	Office new lab in SSM	Enrollment coping/ graduate overlap
1	Cognitive science and technology	Assistant or associate	Cognitive Science		CIS (in review)	125K	Office + new lab in SSM	Program building/graduate overlap
1	Public economics	Assistant	Econ		Social and Cognitive Science		Office (SSM)	Participation in management major
1	Heritage management and conservation	Associate	World Heritage		World Cultures	80K	Office + new lab in SSM	Build capacity for future; World Heritage has one ladder faculty
1	Quantitative methods	open	Sociology		Social and Cognitive Sciences	50K	Office (SSM)	Program building

Appendix 1a SSHA Table of Requested FTE, Year 1 of 3, 2010-11
EVC Target: 7 Number of positions requested: 11 priority 1

1	English Renaissance	Assistant	English/literature		World Cultures	50K	Office (COB)	Program building
1	Political behavior	Assistant	Political Science		Social and Cognitive Science	80K	Office+ new lab in SSM	Program building
1	Literature/Spanish lingusitics	Assistant	Spanish		World Cultures	50K	Office (COB)	Program building; Needed for minor in Span, as well as major
1	Colonial American Histotry	Full	History		World Cultures	50K	Office (COB)	Program building
1	Biological anthropology	Assistan	Anthropology		QSB	100k	Office + 800 sq ft lab (SSM)	Program/major development

Appendix 1b SSHA Table of Requested FTE, Year 2 of 3, 2011-12
EVC target: 7; Number of positions requested: 9 priority 1

Priority	Name	Level	Primary Major (current or planned)	Secondary Major	Primary Graduate Group	Est. Startup Costs	Space	Other considerations
1	Music studies; Asian music	open	Arts (GASP)		World Cultures	50K	Office (SSM)	Program building
1	Cognitive neurosciences	Assistant	Cognitive Science		CIS (in review)	200K	Office + new lab in SSM	CIS is in the process of developing a graduate group
1	Health economics	open	Economics		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Modern Latin America/Mexico 20th C	Assistant	History		World Cultures	50K	Office (COB)	Program building

Appendix 1b SSHA Table of Requested FTE, Year 2 of 3, 2011-12
EVC target: 7; Number of positions requested: 9 priority 1

1	Romantic Victorian Literature	Full	Literature		World Cultures	50K	Office (COB)	Program building
1	Comparative politics	Assistant	Political Science		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Developmental Psychology	Associate or full	Psychology		Psychology (in review)	100K	Office + lab in SSM	Psychology is in the process of developing a graduate group
1	Health psychology	Associate or full	Psychology		Psychology (in review)	100K	Office + lab in SSM	Psychology is in the process of developing a graduate group
1	Race Ethnicity Immigration	Open	Sociology		Social and Cognitive Sciences	60K	Office (SSM)	Program building

Appendix 1c SSHA Table of Requested FTE, Year 3 of 3, 2012-13
EVC Target: 7; Number of positions requested: 9 priority 1

1	Visual Culture/Transnational pre-20th C	Open	Arts (GASP)	History	World Cultures	45K	Office (COB)	Program building
1	Sustainable architecture	Assistant	Arts (MAP)		World Cultures	60K	Office (SSM)	Program building
1	Industrial organization	open	Economics		Social and Cognitive Sciences	60K	Office (SSM)	Program building
1	Post-Colonial Lit in English	open	Eng/Creative Writing		World Cultures	50K	Office (COB)	Program building
1	Philosophy of mind	Assistant	Philosophy	Cog Sci	CIS (in review)	50K	Office (SSM)	Program building
1	Political institutions	Assistant	Political Science		Social and Cognitive Sciences	60K	Office (SSM)	Program building

Appendix 1c SSHA Table of Requested FTE, Year 3 of 3, 2012-13
EVC Target: 7; Number of positions requested: 9 priority 1

1	Health psychology	Associate/full	Psychology		Psychology (in review)	100K	Office+ new lab in SSM	Program building
1	Quantitative psychology	Assistant	Psychology		Psychology (in review)	80K	Office+ new lab in SSM	Program building
1	Health sociology	open	Sociology		Social and Cognitive Sciences	60K	Office (SSM)	Program building

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Anthropology	F08	18	852	496	880	660		Robin deLugan	None	**Biological anthropologist 2010-11**
								Kathleen Hull		
								Holley Moyes		
								Linda-Ann Rehbun		
Arts	n/a	n/a	1,340	188	1,337	328		Dunya Ramicova	None	**Sustainable architecture 2012-13**
Cognitive Science	BA F06; BS F07	77	1,076	1,076	1,093	1,093		Chris Kello	None	**Cognitive science and technology 2010-11**
								Teenie Matlock		**Cognitive neuroscience 2011-12**
								David Noelle (50%)		
								Michael Spivey		
								Evan Heit		
Economics	F07	45	1,395	923	1,208	1,208		Robert Innes	None	**Public economics 2010-11**
								Shawn Kantor		**Health economics 2011-12**
								Todd Neumann		**Industrial organization 2012-13**
								Alex Whalley		
								Katie Winder		
FLAN	n/a	n/a	1,516	228	1,508	216		Virginia Adan-Lifante	None	**Literature/Spanish lingustics 2010-11**
GASP	n/a	n/a	664	492	248	248		Keven Fellezs	None	**Music studies/Asian music 2011-12**
								ShiPu Wang		**Visual culture, pre-20th C 2012-13**
Geography	n/a	n/a	0	0	4	4		Yihsu Chen (50%)	None	
								Anthonly Westerling (50%)		
History	F07	72	1076	620	1068	584		Susan Amussen		**Colonial American history 2010-11**
								Sean Malloy		**Modern Latin America/Mexcio 2011-12**
								Ruth Mostern		
								Sholeh Quinn		
								Greg Herken (ret. 6/30/10)		

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013
Literature	F07	70	779	415	776	456		Gregg Camfield	None	**English Renaissance 2010-11**
								Jan Goggans		**Literature/Spanish lingustics 2010-11**
								Ignacio Lopez-Calvo		**Romantic/Victorian literature 2011-12**
								Manuel Martin-Rodriguez		**Post-colonial literature 2012-13**
								Cristian Ricci		
Management	BA F04/BS07	170	1032	0	1032	0		None	None	**Three FTE in Provost's pool**
Philosophy	n/a	n/a	581	52	608	141		Peter Vanderschraft	None	**Philosophy of Mind 2012-13**
								Jeff Yoshimi		
Political Science	F07	145	1580	1169	1531	756		Thomas Hansford	One (completed)	**Political behavior 2010-11**
								Nathan Monroe		**Comparative politics 2011-12**
								Stephen Nicholson		**Political institutions 2012-13**
								Jessica Trounstine		
								Haifeng Huang (7/1/10)		
								Courtenay Ryals Conrad (7/1/10)		
Psychology	F06	340	1580	1169	5624	2922		Michele Chouinard	Two (in progress)	**Developmental psychology 2010-11**
								Yarrow Dunham		**Quantitative psychology 2010-11**
								Michael Hoyt		**Developmental psychology 2011-12**
								William Shadish		**Quantitative psychology 2011-12**
								Anna Song		**Health psychology 2012-13**
								Jack Vevea		**Health psychology 2012-13**
								Jan Wallander		
								Jr. Developmental Psych		
								Sr. Health psychologist		
								Sr. Public Health?		
Sociology	F10	n/a	1738	426	1244	568		Irenee Beattie	One (completed)	**Quantitative methods 2010-11**
								Nella Van Dyke		**Race/ethnicity/migration 2011-12**
								Simon Weffer		**Health sociology 2012-13**
								Paul Almeida (7/1/10)		
								Laura Hamilton (7/1/10)		
World Heritage	n/a	n/a	128	128	128	0		Maurizio Forte	None	**Heritage management/conservation 2010-11**

SSHA 2010-13

Majors, Programs, and Graduate Groups: Current Faculty and Proposed SSHA Hires

Name	Established or Planned Start Date	Number of Majors Spring 10	Student Credit Hours Fall 09	Student Credit hours by senate members Fall 09	Student Credit Hours Spring 10	Student Credit hours by senate members (spring 09)	Students in Graduate groups	Number of Current Faculty (and names)	Number of current Searches	Requested FTEs (and Names) PROPOSED 2011 - 2013	
World Cultures Graduate Group	2004						21			Transatlantic Colonial Latin American History/Golden Age	
										International World Heritage	
										19th C US West/Environmental History	
										Latin American Art History	
										US Colonial history	
Social and Cognitive Sciences Graduate Group	2004						27			**Developmental psychology 2010-11**	
										Quantitative psychology 2010-11	
										Developmental psychology 2011-12	
										Quantitative psychology 2011-12	
										Health psychology 2012-13	
										Health psychology 2012-13	
										Cognitive science and technology 2010-11	
										Cognitive neuroscience 2011-12	
Explanaiton of enteies in this section	FTE requests in bold correspnd either exactly or closely the the FTE requests by the majors and programs.										

Appendix 3: **SSHA Future Space Needs (Office & Research)**

Future SSHA Faculty

	Faculty	Discipline	Office location	# Offices Needed	Lab Space location		Research space (sq ft)	
2010-2011					Dry	Damp	Dry	Damp
	Developmental psych	Psych	SSM	1	1 (SSM)		600	
	Quantitative psych	Psych	SSM	1	1 (SSM)		450	
	Cog sci/technology	Cog Sci	SSM	1	1 (SSM)		750	
	Public economics	Econ	SSM	1				
	Heritage management	WH	SSM	1	1 (SSM or COB)		600	
	quantitative methods	Soc	SSM	1				
	English renaissance	Lit	COB	1				
	Political behavior	Poli Sci	SSM	1	1 (SSM)		400	
	Spanish lit/ling	Lit/FLAN	COB	1				
	Colonial American Hist	History	COB	1				
	Biological anthropology	Anth	SSM	1		1 (SSM)		800
2011-12					Dry	Damp	Dry	Damp
	Music studies	Arts (GASP)	COB	1				
	Cognitive neuroscience	Cog Sci	SSM	1	1 (SSM)		750	
	Health economics	Econ	SSM	1				
	Modern Latin America	Hist	COB	1				
	Romantic/Victorian lit	Lit	COB	1				
	International relations	Poli Sci	SSM	1				
	Developmental psych	Psych	SSM	1	1 (SSM)		600	
	Health psychology	Psych	SSM	1	1 (SSM)		600	
	Race/ethnicity/immigratio	Soc	SSM	1				
2012-13					Dry	Damp	Dry	Damp
	Visual culture	Arts (GASP)	COB	1				
	Sustainable architecture	Arts (MAP)	SSM	1	1 (SSM)		400	
	Industrial organization	Econ	SSM	1				
	Post-colonial lit	Lit	COB	1				
	Philosophy of mind	Philosophy/Cogs	SSM	1				
	American politics	Poli Sci	SSM	1				
	Health psychology	Psych	SSM	1	1 (SSM)		600	
	Quantitative psych	Psych	SSM	1	1 (SSM)		450	
	Health sociology	Soc	SSM	1				
Total new offices needed				21 in SSM; 8 in COB				
TOTAL new research space needed				**12**	11	1		

Student Credit Hours Taught During Fall 2008, Excluding MATH 005 and CHEM 001[1]

Academic Program Area	All Instructors: Credit Hours Taught in Courses Offered in Program Area	All Instructors: Hours Taught by Instructors Associated with this Program Area	Senate Members[2]: Hours Taught by Faculty in Courses Offered in Program Area	Senate Members[2]: Hours Taught by Faculty Associated with this Program Area	Non-Members[2]: Hours Taught by Instructors in Courses Offered in Program Area	Non-Members[2]: Hours Taught by Instructors Associated with this Program Area
College 1						
CORE	1,295	-	37	-	1,258	-
Total	1,295	-	37	-	1,258	-
Engineering						
BEST	102	-	96	-	6	-
BIOE	211	345	157	291	54	54
CSE	1,304	1,320	446	462	858	858
EE	-	228	-	228	-	-
ENGR	920	171	776	-	144	171
ENVE	333	705	301	673	32	32
ES	75	-	72	-	3	-
ME	80	214	1	162	79	52
MEAM	18	-	18	-	-	-
MSE	75	96	75	96	-	-
Total	3,118	3,079	1,942	1,912	1,176	1,167
Natural Sciences						
BIS	3,768	3,497	1,888	1,588	1,880	1,909
CHEM [3]	2,496	2,494	850	848	1,646	1,646
ESS	222	786	201	736	21	50
MATH [4]	3,607	3,487	416	415	3,191	3,072
NSED	227	227	-	-	227	227
PHYS	1,753	1,911	801	824	952	1,087
QSB	260	-	217	-	43	-
Total [3,4]	12,333	12,402	4,373	4,411	7,960	7,991
SSHA						
ANTH	662	667	446	451	216	216
ARTS	870	1,266	282	610	588	656
CHN	129	129	-	-	129	129
COGS	1,064	834	812	834	252	-
ECON	1,293	1,453	1,009	1,169	284	284
FRE	112	112	-	-	112	112
GASP	396	-	328	-	68	-
GEOG	-	3	-	3	-	-
HIST	978	1,065	438	525	540	540
JPN	192	192	-	-	192	192
LIT	447	598	363	434	84	164
MGMT	1,060	992	160	-	900	992
PHIL	672	672	192	192	480	480
POLI	1,199	1,196	535	532	664	664
PSY	4,018	4,176	1,282	1,280	2,736	2,896
SCS	1	-	1	-	-	-
SOC	836	837	548	549	288	288
SPAN	736	737	308	309	428	428
USTU	25	-	25	-	-	-
WCH	96	-	96	-	-	-
WH	132	80	52	-	80	80
WRI	4,731	5,900	48	61	4,683	5,839
Total	19,649	20,908	6,925	6,948	12,724	13,960
TOTAL [3,4]	36,395	36,388	13,277	13,270	23,118	23,118

[1] Prepared by Institutional Planning and Analysis on December 12, 2008.

[2] Senate members whose primary duties are administrative are included in the non-members column.

[3] Excludes CHEM 001 [4] Excludes MATH 005

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Mark Matsumoto
Interim Dean of Engineering

UNIVERSITY OF CALIFORNIA, MERCED
5200 Lake Road
MERCED, CALIFORNIA 95343
(209) 228-4021

To: Gregg Camfield, Chair
WASC Steering Committee

From: Mark Matsumoto, Interim Dean

Date: June 9, 2010

RE: School of Engineering (SoE) instructional budget and faculty FTE allocation processes

As per your request of April 30, 2010, please find below descriptions of the instructional budget and faculty FTE allocation processes.

Instructional Budget

The School of Engineering (SoE) instructional budget cycle occurs in three steps: 1) the Budget Office sends the instructional budget request to the School, 2) the SoE develops the instructional needs and submits its request to the Budget Office, and 3) the SoE receives the budget appropriation from the Budget Office.

Instructional budget request from the Budget Office

Each year, typically in early March, the SoE receives a memo from the Budget Office requesting the instructional funding needs budget request along with a template to be used to submit in conjunction with the instructional budget request (see 2010-11 Instructional Budget Final.xls).

School of Engineering develops the instructional needs

The two key faculty committees within the SoE are the Resources Committee and the Curriculum Committee, and the key staff members are German Gavilan (Assistant Dean), Shannon Adamson (Academic Support Manager), Mike Dunlap and Ed Silva (Instructional Labs Managers), and Christina Christensen (Director of Administrative Operations).

In preparation for the instructional budget, the following documents are used during the SoE instructional budget cycle.

1. Course Request Forms (CRFs): Defines contact/non contact hours and instructional needs for each class (see UGC_CRF_example.pdf).
2. Instructional Workloads Policy: Implemented by Academic Personnel and Bargaining Units, the result is the Instructional Workload Credit (IWC) for each class/lab. The Bargaining unit provided the instructional workload guidelines to Academic Personnel. Academic Personnel provided the guidelines to the Schools to use in developing an Instructional Workload Policy specific to their School. (see Instructional Workload Table (IWC))
3. Student enrollment projections: (see Enrollment Projections.pdf) The objective is to identify classes needed by students and their enrollments based on the current campus enrollment projections and the engineering majors plans of study. SoE staff have developed a spreadsheet that uses current campus projections enrollments and school's strategic plan majors projections to generate majors enrollments. This information is combined with majors curriculum (from catalog), classes contact/non contact hours (from CRFs), and advisors and Academic Support Manager input to generate the expected classes needed to guarantee student progress and their projected enrollment demand.
4. Current SoE faculty workload policy: Approved by the School faculty (see School of Engineering Faculty Workload Policy.pdf)
5. School of Engineering Three Year Teaching Plans: (see 3Yr-TeachingPlan-CSE.xls, 3Yr-TeachingPlan-EnvE.xls, 3Yr-TeachingPlan-MSE-Updated_21010.xls, 3Yr-TeachingPlan-ME.xls, TeachingPlan-BIOE_AY1011.xls): The Curriculum Committee maintains a standing three-year teaching plan based on information provided by each major. This information is used by the Curriculum Committee to assign faculty members to classes identified in (3) following guidelines described in (4).
6. Instructional Assistants (TAs): (APM manual + TA Workload) (Academic Personnel + Bargaining Units) TA FTE projections are set considering the TA Workload for each course, guidelines set by the Bargaining unit and projected enrollments for the course. With respect to TA budget requests, the SoE receives a base allocation from the campus based on student instructional workload FTE. In
7. Previous years school instructional expenses: Maintained by the Dean's office
8. Fees: (see SoE_AY_2010_11_Course Material Fee Proposal)

The Dean's office staff use information from (2), (3), and (5) to estimate of the number of instructors (determined as IWC needs) needed to cover classes not assigned to ladder rank faculty. Additionally, information from (3) and (6) is used to identify classes needing TAs and the overall number of TA FTE required.

The Dean's office staff contact faculty members assigned to classes to get a list of needs (equipment, lab supplies, field trips, software, guest speakers etc) for their classes. For classes not assigned to ladder rank faculty member, the request goes to the major hosting the class.

The Budget Office template is filled with all information collected, then submitted to the Budget Office. Summer budget requests are not included on Budget Office template.

Budget Office Appropriation of Instructional Funds

Deadlines for responses from the campus Budget Office to the SoE instructional budget request have not been well defined deadlines in the past. The lack of a timely response leads to late appropriations, which makes it difficult to appoint Teaching Assistants and Instructors and planning the coming academic year with any

certainty or timeliness. At times, the School has had to make appointments to ensure that classes can be offered only later to find that a request has not been fulfilled, which leads to a domino budget effect within the School. Long delays before allocations are made (6 months into the school year) and with only 50% of the requested amounts have created serious difficulties for the School of Engineering.

Because of the significant lack of instructional lab space, specialized classes (e.g. Capstone, Eng170L) have been offered at the Castle facility, but no additional funding for transportation (transportation services was working on solutions this year) to Castle and/or renovation of the facilities there has been forthcoming. Faculty members have resorted to the using their research labs to teach these classes, which is highly disruptive of their research programs.

Faculty FTE Allocation

Faculty FTE needs within the SoE are determined via a strategic planning process that involves each of the engineering majors (undergraduate) and graduate programs, and coordinated by the Resources Committee. Once a draft strategic plan is developed, it is reviewed by the SoE faculty for comments/suggested changes. A final plan (see 2010 SoE Strategic Plan.pdf and 2010 SoE Strategic Plan Appendixes) is prepared and voted upon by the faculty for approval, and then forwarded to the Executive Vice Chancellor and Provost (EVCP) and Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA). Faculty FTE allocation decisions are then made by the EVCP.

In formulating the strategic plan, the SoE Resources Committee obtained 1) input from ladder-rank faculty members during formal bi-weekly faculty meetings, 2) information from relevant research centers and graduate groups, and 3) document exchange-review cycles.

The developed strategic plan is based on the SoE faculty commitment to building a world-class research university for the creation of new knowledge and the development of new technologies. The key success factors to achieve this goal are to: (1) hire the highest quality faculty (measured by their impact publications, awards, fellowships, service on editorial boards, etc.), (2) attract high quality graduate and undergraduate students, and (3) receive exceptional external funding.

In developing the priorities for faculty FTE within the strategic plan, primary consideration is given to research needs and development of a critical mass of faculty to create dynamic, highly-productive research emphases. These research emphases are generally aligned with the program goals of the four engineering graduate groups (Environmental Systems (ES), Biological Engineering and Small-Scale Technologies (BEST), Electrical Engineering and Computer Science (EECS), and Mechanical Engineering and Applied Mechanics (MEAM)). Because the targeted SoE research emphases are interdisciplinary, there can be a diversity of backgrounds that prospective faculty candidates may have. Thus, a secondary but important consideration in the prioritization of faculty FTE allocation is also potential contribution to the instructional program of one or more of the undergraduate majors.

Faculty FTE allocations when they occur are done in a timely manner generally, with placement of ads and receipt of applications occurring during the Fall semester. However, the review, interview, and appointment offer process within the SoE has been variable, depending on the search committee. As a result, some of the offers have occurred very late in the academic year. Often top candidates have received other offers from other universities prior to ours. This late trend, coupled with the highly competitive nature of recruiting top candidates in the engineering disciplines (bioengineering is particularly competitive) has led to unsuccessful searches and a rollover of a search to the next academic year.

Because of the small size of faculties associated with the engineering research/graduate/undergraduate programs, any new faculty appointment provides significant impact and meets identified needs.

For the most part, faculty FTE planning and allocation has been satisfactory although the rate of growth has disappointed faculty. The SoE at UC Merced has one of the highest undergraduate student/faculty ratios in the UC system and much higher than most engineering schools at major research universities.

For the near term future, the limiting resource that will limit faculty growth is research and office space. Without additional space, it will be difficult if not impossible to add new faculty to the SoE.

University of California, Merced
School of Engineering
Five-Year Strategic Plan (SP2015)

1. Introduction and Overarching Goals

The UC Merced School of Engineering (SoE) five-year Strategic Plan (SP2015) is outlined herein. The forwarded plan is based on an overarching strategy, which is summarized in Figure 1.

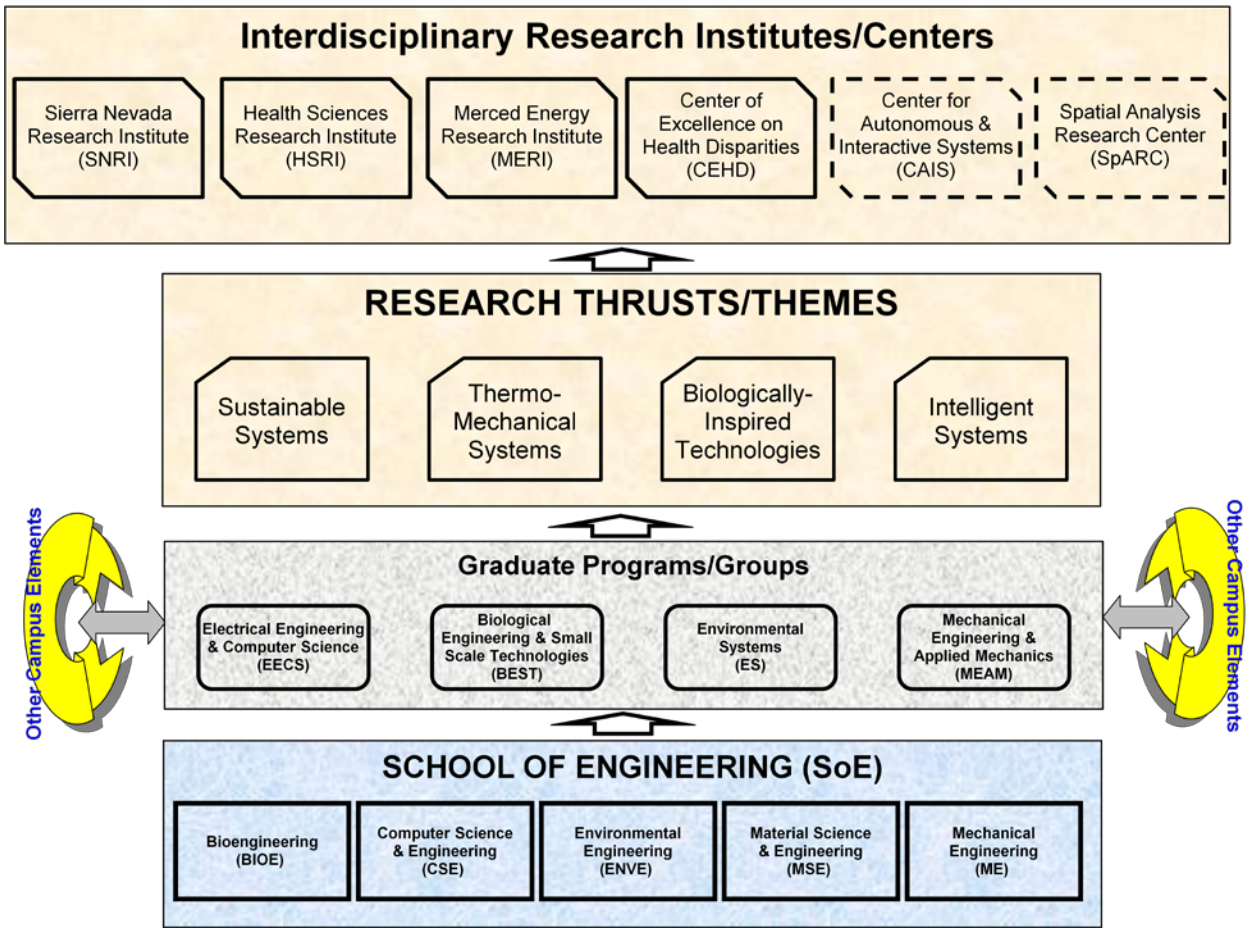

Figure 1. Guiding Strategy for the School of Engineering Strategic Plan.

The SoE faculty is organized in disciplinary groups, which align with their educational and research-related backgrounds as well as the current undergraduate SoE majors. The SoE faculty, along with faculty members from other schools, support four graduate groups/programs that are currently overseen by the SoE. Principal research and graduate program thrusts are organized in four broad interdisciplinary areas: 1) Sustainable Systems, 2) Thermo-Mechanical Systems, 3) Biologically-Inspired Technologies, and 4) Intelligent Systems. These emphases align the existing campus interdisciplinary institutes or centers, and new centers being proposed in the near future. The overarching strategy of the SoE faculty is consistent with the campus' 2009 Strategic Academic Vision.

This plan was formed by the SoE Resources Committee by synthesizing 1) input obtained during formal faculty meetings (bi-weekly), 2) information obtained from relevant research institutes and graduate groups, and 3) document exchange-review cycles that occurred from December 13, 2009 through February 15, 2010.

The SoE remains the smallest of the three Schools with a faculty numbering 31, or 26 regular full-time equivalents (FTE) when accounting for split and administrative appointments. This number constitutes about 26% of the ladder-rank faculty at UC Merced. Of the 31 faculty members, 14 are tenured and 17 are tenure-track. This faculty oversees 5 undergraduate majors and is affiliated with 4 graduate groups.

First and foremost, SP2015 reaffirms the SoE faculty commitment to building a world-class research university for the creation of new knowledge and the development of new technologies. The key success factors to achieve this goal are to: (1) hire the highest quality faculty (measured by their impact publications, awards, fellowships, service on editorial boards, etc.), (2) attract high quality graduate and undergraduate students, and (3) receive exceptional external funding.

However, we recognize the currently severe constraints on growth, especially with respect to faculty research space, startup funding, and the ongoing economic downturn in California. The status of the SoE and its assessable short-term goals for research and teaching are summarized in the following sections.

2. Proposed Milestone Goals

2.1. Research Goals

The SoE faculty continues to compete effectively for extramural support. Thus far during the 2009-2010 AY SoE faculty have been responsible for $0.8M to $2.3M per month of extramural funding, roughly 50 to 90% of the total campus award funding in a given month (Figure 2).

The SoE intends to improve upon this impressive effort in terms of both extramural funding and graduate student enrollment, both of which are a function of faculty size. Thus, additional FTEs are proposed in research areas that are either highly complementary to existing research strengths and increase multi-

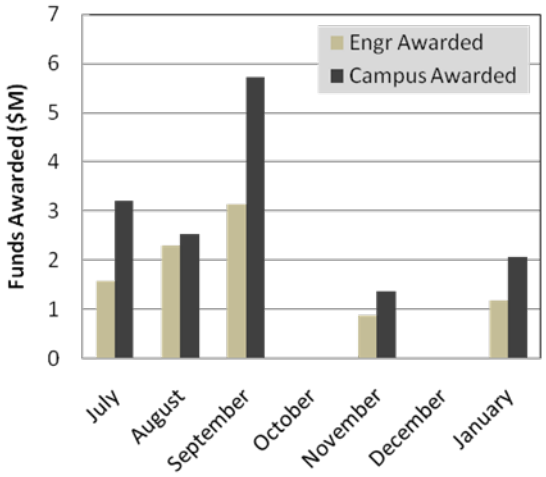

Figure 2 - Monthly contract and grant awards to SoE versus UCM Campus (data source: UCM Sponsored Research monthly activity reports).

disciplinary research opportunities. Although SoE investigators are rapidly becoming space-limited, they remain highly productive in terms of sponsored research. In the current academic year, SoE faculty have already exceeded $9M in awards, an amount which may be somewhat inflated by the availability of economic recovery funds in FY 2009-2010. However, it is realistic to expect an average of approximately $250,000 per year per SoE faculty member in absence of recovery funds from current and anticipated investigators. This average is similar to the current one and may be conservative as junior faculty mature and become more successful in acquiring grants. In addition, establishment of new interdisciplinary research centers (see Goal 2) is also expected to increase funding levels. However, it is important to note that space limitations in the near term may temper these affects.

SoE-Goal 1. **SoE investigators will maximize return on available facilities in the near term (SE2, Castle, and the academic surge building) by successfully competing for sponsored research awards amounting to more than $40M (direct + indirect cost) over the next 5 years.**

Interdisciplinary research and educational programs are central to the overall development of the UC Merced campus. During this planning horizon, the EECS faculty group intends to establish two new interdisciplinary centers, the *Center for Autonomous and Interactive Systems (CAIS)* and *Spatial Analysis Research Center (SpARC)*. Both of these centers are directed towards the Intelligent Systems thrust and the result of the maturing and growth of the CSE faculty, and collaborations with key researchers in our sister schools.

SoE-Goal 2. **SoE investigators will establish two new interdisciplinary research centers aimed at increasing research strengths and funding in the intelligent systems research thrust area.**

2.2. Graduate Enrollment Goals

Commensurate with the achieved research funding, the SoE faculty is also responsible for a significant fraction of the graduate student population, as about 76 of the 224 graduate students are affiliated with engineering faculty (34%). This represents an 11% graduate/total student fraction, compared to the other campus units (5.3%).

A projection goal for future PhD student productivity by the SoE faculty is shown in Figure 3. This projection assumes that the SoE faculty will grow at a rate of 4 regular FTE/year (full and partial FTEs), that each faculty member supervises an average of 3 PhD students, and that each junior and senior faculty member will graduate 0.20 and 0.40 PhD/year, respectively. These production rates are low relative to UC system wide productivity, which ranges from amout 0.8 to 1.0 PhD/faculty/yr, and may therefore be conservative. However, most of the graduate programs at UCM are at the developing stage and the typical rate of progress toward degree is not yet well-documented. Base on these estimates,

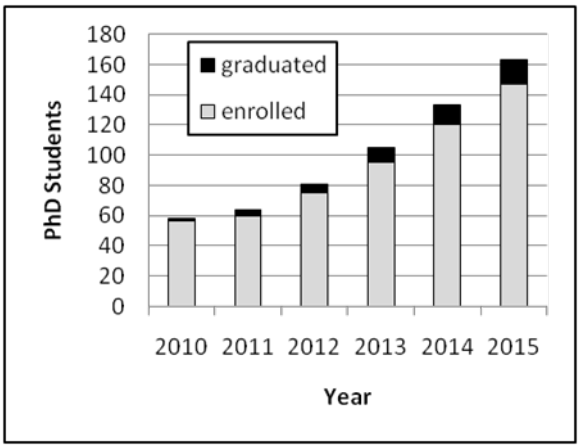

Figure 3. Projected PhD student enrollment by SoE investigators from AY 2009-10 (actual enrollment) to AY 2014-15.

the SoE faculty support the following School goal:

> ***SoE-Goal 3.*** **SoE investigators will be mentoring more than 160 PhD students and these students will complete 15 or more doctoral degrees during AY 2014-15.**

2.3. Undergraduate Educational Goals

Engineering majors remain popular at UCM, with several of the largest majors on campus being Mechanical Engineering (ME, 4th largest), Computer Science Engineering (CSE, 5th), and Bioengineering (BioE, 7th). We anticipate that these majors will continue to show strong enrollments. We also envision plans for increasing enrollments in other majors. For example, an expanded emphasis in Environmental Engineering (EnvE) on sustainably infrastructure is expected to create more interest in this major. Also, our Material Science & Engineering (MSE) faculty is building ties to the Bioengineering and Mechanical Engineering (bio- and energy materials) programs to strengthen their enrollments. Through prudent enhancement of these majors, the overall undergraduate enrollment goal is as follows:

> ***SoE-Goal 4.*** **SoE undergraduate majors will maintain its current fraction of undergraduate enrollment (approximately 18%), achieving a total enrollment of 950-1050 by AY 2014-15.**

Our main short-term undergraduate educational focus in the SoE is to (1) stabilize the curriculum in a sustainable manner so as to render short-term accreditation (ABET) is feasible, and (2) positioning ourselves for enrollment growth through modification of existing majors. One new major is being planned in the near term, the B.S. Engineering degree. However, as currently planned, this new major will have few resource implications because it will be designed to reside within the other majors. The motivation for this is that the ABET accreditation process is more feasible for this basic engineering major, and we anticipate that we can apply for accreditation approximately one year after the major is approved. Other majors for which accreditation is important (EnvE, ME), will follow later as they become able to expand their respective curricula. This leads to our second short-term SoE goal:

> ***SoE-Goal 5.*** **SoE will develop the B.S. Engineering degree program without encumbering new resources, and achieve ABET accreditation for this program by 2013, regardless of future faculty recruitment. Given successful faculty recruitment at the rates discussed herein, ME and EnvE will become ABET-accredited by 2015.**

Although no new majors are planned in the near term (beyond the B.S. Engineering mentioned above), we do recognize the need for an Electrical Engineering (EE) component in our curriculum. Initially, we plan to recruit faculty into the EECS group and charge them with creating an "emphasis area" within the existing CSE major. In fact, as the EE emphasis becomes more evident, we may decide to modify this major's name. When we have a sufficient faculty to support it, we can then develop the separate EE major.

To support the ambitious research and educational goals outlined above, additional FTEs in the form of regular faculty and lecturers will be needed. Given the near term resource constraints, recruitment must be highly strategic. The FTE recruitment plan proposed by the SoE is front-loaded over the next three years to insure against failed searches; it corresponds to an overall recruitment effort of 15 regular ladder faculty members, 5 cross-school positions, and 5 lecturers over a five-year period. It also assumes that all SoE administrative appointments are adequately compensated with respect to school teaching allocations. Projecting these assumptions over the next five years, accounting for regular promotions, leads to the projection shown in Figure 4. The SoE faculty will be composed of 55 regular faculty and lecturers (31 tenured (senior) faculty, 18 tenure-track (junior) faculty, and 6 full-time lecturers).

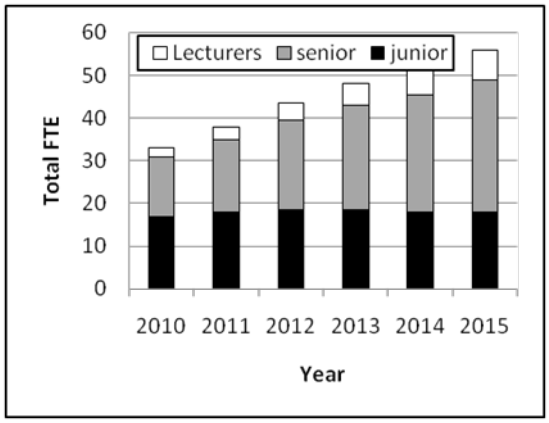

Figure 4. Projected SoE faculty number and distribution over the next 5 years.

In support of the aforementioned School goals, SoE proposes a steady hiring plan that respects short-term resource constraints. First, to immediately enhance program stability and existing research strengths in concomitance with the campus' Strategic Academic Vision, the SoE proposes 12 regular FTEs and 5 lecturers with potential security of employment (LPSoE)—see Table 1. Each of these positions is discussed further in program-specific context in Section 4 of this plan. The SoE faculty recognizes that this goal extends them beyond the three positions allocated for 2010-11. Each of these positions will require relatively modest startup and space as searches will focus on computational investigators. Furthermore, critical needs in all of these groups imply that "over-searching" is prudent as insurance against failed searches.

In addition to SoE FTE recruitment, and in order to enhance SoE synergy with other academic and research units, particularly the UCM management program, we propose the cross-unit hires summarized in Table 2.

Table 1. Summary of FTE Requests by the School of Engineering for the next three AYs.

Position	Graduate Research Program(s)[1]	Undergraduate Program(s)[2]
AY 2010-2011		
SoE-1. Computer Systems	EECS primary; MEAM, ES secondary	CSE
SoE-2. Energy Storage Technologies	MEAM primary; BEST, ES secondary	ME
SoE-3. Energy Materials	BEST primary; MEAM, ES secondary	BioE/MSE/ME
SoE-4. Physiological Modeling	BEST primary; MEAM secondary	BioE/MSE/ME
SoE-5. Stochastic Modeling	MEAM primary; ES secondary	ME/EnvE
SoE-LPSoE-1. EECS Lect.[3]	NA	CSE
SoE-LPSoE-2. Fundamentals Lect.	NA	ENGR
SoE-LPSoE-3. EECS Lect.	NA	CSE

[1] Recommended search committee to include primary (chair) and secondary graduate group or institute representations.
[2] Undergraduate teaching assignments will be in areas of greatest need at the time of the hire.
[3] A candidate for SoE-LPSoE 1 is currently under consideration.

	AY 2011-2012	
SoE-6. Computer Science Theory **SoE-7. Air Pollution Modeling** **SoE-8. Mechatronics** **SoE-9. Ecological Engineering**	EECS primary ES primary, MEAM secondary MEAM primary, EECS secondary ES primary, BEST secondary	CSE ME/EnvE ME/CSE EnvE
SoE-LPSoE-4. Lab/Design Lect. **SoE-LPSoE-5. Fundamentals Lect.**	NA NA	ENGR ENGR
	AY 2012-2013	
SoE 10. Intelligent & Adaptive Control **SoE 11. Environmental Biotechnology** **SoE 12. Computational Materials** **SoE 13. Biosensor Development** **SoE 14. Medical Imaging**	EECS primary, MEAM secondary ES primary, BEST secondary BEST primary, MEAM secondary BEST primary, EECS secondary BEST primary, EECS secondary	CSE/ME BioE/EnvE MSE/BioE/MEAM BioE/CSE/EnvE BioE/CSE

Table 2. Proposed cross-unit positions for the upcoming three AYs.

Position	Graduate Research Program(s)	Undergraduate Program(s)
	AY 2010-2011	
Cross 1. Information Management **Cross 2. Natural Resource Management** **Cross 3. Sustainable Building**	EECS, SNRI, UCMERI, QSB, Mgmt ES, SNRI, UCMERI, Mgmt ES, MEAM, BEST, Mgmt	CSE/Mgmt EnvE/ESS/Mgmt MSE/ME/EnvE
	AY 2011-2012	
Cross 4. Virtual Environments **Cross 5. Technology Management** **Cross 6. Media Arts & Technology**	EECS, SCS EECS, BEST, QSB EECS, CIS, World Cultures	CSE/Cog Science Engr/Mgmt CSE, Arts

3. Summary of Goals

A visualization of the milestone goals outlined in this Strategic Plan is presented in Figure 5. It is evident in reviewing this milestone chart, that the primary goal that must be achieved by the School of Engineering is growing the faculty. Unfortunately, the lack of research/office/instructional in the near term severely restricts faculty growth. Thus, the highest priority, both in the near-term and long-term, for the School of Engineering as well as the campus in general, must be to obtain additional research and instructional space to grow the faculty and the emerging student population.

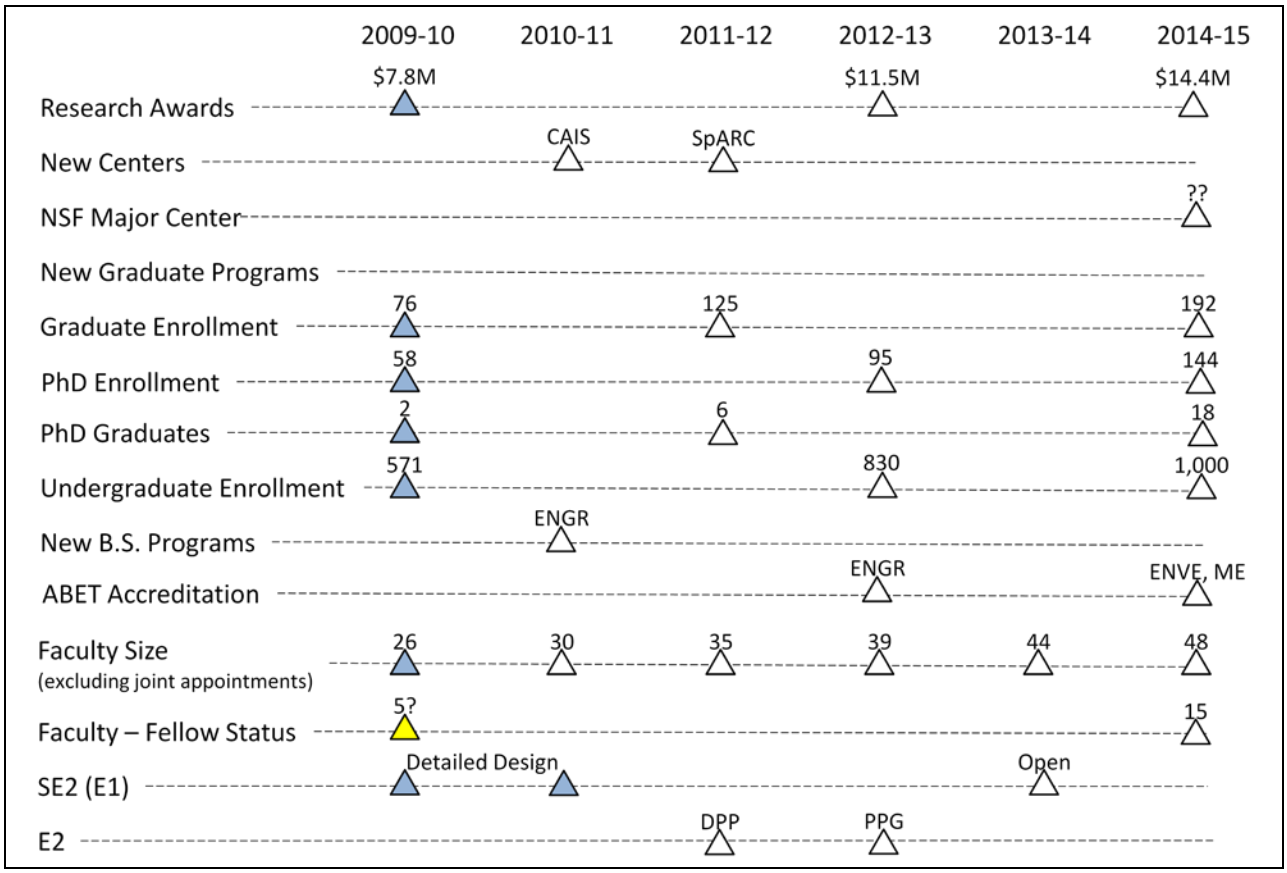

Figure 5. Milestone Goal Timeline for the School of Engineering

Appendix: Program-Specific Vision, Goals, and Rationale for FTE Requests

Electrical Engineering and Computer Science (EECS)

EECS Overview - The EECS faculty offer a popular undergraduate major in Computer Science & Engineering (CSE), as well as graduate degrees under the EECS and ***Cognitive & Information Science (CIS)*** program. EECS faculty members have diverse research interests with areas of investigation in artificial intelligence, computational neuroscience, computer animation and graphics, computer vision, machine learning, speech processing, robotics, and distributed networked systems.

These research themes frequently share a focus on ***intelligent systems***, and this focus has been consciously adopted by the group to build research excellence in a specific intellectual area. The EECS faculty regularly collaborates with colleagues in other fields across the UCM campus, contributing to interdisciplinary work in computational biology, environmental systems, and cognitive science. Indeed, the group has a strong bond to the CIS program, with several funded research projects spanning this cross-campus gap. The EECS program is critical to the success of UCM, playing a central role in implementing the campus' strategic focus on "Cognitive Science and Intelligent Systems", as highlighted in its *Strategic Academic Vision* document.

EECS Teaching Programs – The undergraduate CSE major is designed to provide students with both breadth and depth in the exciting and rapidly expanding fields of: *Computer Science* - the study of computation, including algorithms and data structures, and *Computer Engineering* - including hardware, software and network architecture. CSE is the 4th largest major on campus with an enrollment of 161 in AY 2009-2010). Given awareness of and demand for this major, undergraduate enrollment is expected to continue to grow as long as space and faculty are added to the program. From this perspective, it will soon become important to examine the tradeoff between increase in enrollment and selectivity for this program.

EECS Goals

EECS Research Goals - The EECS group has identified two main research goals, which it will pursue over the course of **t**he next five years:

- **Achieve High Levels of Research Productivity -** The EECS group seeks means to enable their faculty to achieve levels of research productivity comparable to researchers at other leading research universities. To assess progress toward this goal, counts of peer-reviewed journal publications and peer-reviewed conference publications.
- **Receive International Recognition as a Leader in "Intelligent Systems" -** Anecdotal accounts have already been reported of members of the broader academic computer science community recognizing UCM's strength in "intelligent systems". Our goal is to be recognized as an international leader in this field.

These goals may be refined over the course of the next five years, particularly with regard to how progress is evaluated. In an effort to both increase research productivity and receive international attention, the EECS group has adopted two more immediate goals. First is establishing the *Center for Autonomous and Interactive Systems (CAIS)*. This UCM Centralized Research Unit (CRU) has recently been proposed by EECS faculty members Stefano Carpin and Marcelo Kallmann. The center will coordinate shared resources and facilitate interdisciplinary research activities involving intelligent

systems. The EECS faculty expects to establish CAIS formally as a UCM CRU before the end of the 2010–2011 academic year. Second, EECS faculty member Shawn Newsam is actively developing the *Spatial Analysis Research Center (SpARC)* as a CRU. SpARC is a highly interdisciplinary focus that encompasses faculty from SSHA, NS, and other engineering faculty (Environmental).

EECS Teaching Goals - One of the leading goals of the EECS program is the **establishment of a CCGA approved EECS graduate program** and corresponding graduate group. There are a number of obstacles that must be overcome to accomplish this goal, including:

- The number of EECS research faculty must be increased to achieve a critical mass. At minimum, the group is expected to need 11–12 faculty members. If the current open senior position search is successful, and one new faculty position is created for EECS in each of the next three years, this minimal number can be reached by the end of the 2012–2013 AY.
- The number of senior EECS research faculty must be increased. Currently, the EECS faculty includes only one tenured member, and that individual has a heavy administrative burden (i.e., he is the Chancellor of UCM). Between the filling of a currently open senior position and the expectation of a number of successful promotions in the years to come, it is expected that at least a third of the EECS faculty will be senior by the end of the 2012–2013 AY.
- A curriculum of core graduate courses must be designed and regularly taught. These courses must span the fundamental topics central to a graduate education in EECS. The shaping of this curriculum is already underway. The recruitment of additional tenure-track faculty will be needed to ensure that these courses are offered on a regular basis, however. If planned requests for new EECS faculty positions are met, and if hiring for these positions is successful, a graduate curriculum of this kind could be ready by the 2012–2013 AY.
- A comprehensive CCGA proposal must be prepared. Given the additional faculty resources that will be requested, it is expected that the EECS faculty will have adequate time to prepare this proposal over the 2012–2013 AY.

In summary, successfully preparing a viable CCGA proposal by the end of the 2012–2013 academic year is a reasonable goal, but meeting this goal will require the allocation of additional faculty positions to EECS, at least one junior tenure-track position per year, as described later in this document.

The EECS **undergraduate CSE degree program** is currently established and has already produced graduates. With continued support for 2–3 EECS lecturers, and the creation of at least one additional tenure-track position, there are adequate labor resources to offer the current complete CSE curriculum. The EECS faculty has identified a number of important ways to improve the current curriculum, however, and these improvements will be needed to produce an undergraduate CSE program of international stature. The EECS faculty has identified the following goals with respect to undergraduate education:

- To modify the CSE curriculum, and augment the set of courses regularly offered, so as to produce an undergraduate training experience that is comparable in quality to those offered at our sister campuses.
- To continue to plan for a degree program in *Electrical Engineering (EE)*, beginning with an EE emphasis area with the CSE degree program, and (given adequate resources) to begin to implement this emphasis area

The quality of an undergraduate program is difficult to measure objectively. One might be tempted to use common university rankings, such as those provided by *U.S. News & World Report*, to evaluate such a program, but these rankings are often misleading. An alternative is to seek formal accreditation through an educational accreditation agency, such as ABET. The accreditation process is resource-demanding, however, and many leading computer science programs in the world do not seek accreditation. Thus, while ABET accreditation may eventually be sought, particularly if an electrical engineering major is

introduced, there are *no* plans to seek such accreditation during the upcoming five years. Lacking such an accreditation process, the EECS faculty could engage in a self-study activity, including the solicitation of input from distinguished faculty at our sister campuses, to formally evaluate progress toward a quality CSE degree program.

Priorities - The achievement of many of these goals depends upon the successful recruitment of new tenure track faculty members. The goals will be met naturally as newly hired faculty members do the jobs that they were hired to do. Still, situations may arise in which these goals are competing for resources or are otherwise at odds with each other. In preparation for these contentious situations, the EECS faculty has prioritized these goals as follows:

1.1.1.1. The establishment of a CCGA approved EECS graduate program.
1.1.1.2. Meeting our research goals.
1.1.1.3. Improving the curriculum for the CSE major, and complete the planning for an EE major.

EECS Current Academic Resources - The EECS group currently consists of 7.5 tenure-track faculty members and 2 lecturers. Of the tenure-track faculty, only one is tenured, and that individual has substantial administrative responsibilities (i.e., he is Chancellor of UCM). One member of the EECS faculty has a split appointment with SSHA, providing 0.5 FTE to EECS. Lecturers play a critical role in providing lower division computer programming classes, including classes for CSE majors (CSE 30/31), classes for all engineering majors (CSE 20/21), and even a class for students in other schools (CSE 5).

EECS Current Academic Resources – The current EECS group consists of 6.5 assistant professors. One faculty position and one LPSoE are being searched during AY 2009-10 in EECS. The EECS program currently occupies offices (converted to dry lab space) and 1 dry lab suite in Science and Engineering I.

EECS Envisioned Program by 2020 – We envision that the EECS program will comprise 13-15 ladder faculty members and 3-4 lecturers by 2020. The number of undergraduate (CSE, and potentially EE majors) will be around 300. We expect to have 50-60 graduate students in EECS program.

EECS Resource Requirements 2010 – 2015 – More facilities are needed for the EECS program to maintain its standard in teaching quality and research excellence as enrollments grow, and to develop an undergraduate EE program. Appropriate space allocation (dry lab) will be necessary for the recruiting of additional faculty members.

EECS Academic Resources Request (FTEs)

A five year plan has been fabricated for the hiring of new EECS faculty. That plan involves the following positions:

- **Computer Systems (SoE-1)**. During the 2010–2011 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Systems**. The successful candidate for this position will conduct research related to the design and analysis of complex computer systems. Potential research areas include, but are not limited to: computer architecture, distributed sensing and monitoring, mobile computing, networking, operating systems, privacy and security, & ubiquitous computing. This position is critical for establishing international respect as a leading computer science program, as any strong computer science program will be expected to include a solid foundation in systems. Furthermore, this new faculty member is needed if a reasonable range of foundational graduate program core classes are to be offered on a regular basis. Such courses will be needed to produce a viable CCGA proposal. In addition to supporting EECS program needs, this position will likely produce fruitful cross-campus collaborations, though the nature of these collaborations is difficult to predict, given the ubiquity of complex computer systems in virtually every contemporary field of

inquiry. While laboratory space needs can vary widely among computer systems researchers, candidates who focus on software solutions are expected to require relatively small labs.

- **CSE Lecturer Team (SoE-LPSoE-1, SoE-LPSoE-3).** Lecturers are needed to cover lower division EECS classes, serving CSE majors, all engineering majors, and students from other schools. It may not be necessary to allocate any new positions to fill this need, as at least 2 Lecturers are currently employed in support of the EECS program. Indeed, a Lecturer with Potential Security of Employment (LPSoE) position was previously created, and we are currently attempting to fill that position. Should the current efforts fail, the EECS group recommends that such a position be re-advertised and filled promptly, supplying an individual who can manage all of the lower division CSE courses while teaching several of them. An additional 1 to 2 Lecturers will be needed to cover the remaining lower division courses. These positions should be made relatively permanent (i.e., LPSoE) in AY 2010-11 and 2011-12, at the latest, as we are extremely vulnerable in this area given the large number of students required to take these courses and the difficulties associated with rapidly identifying temporary lecturers in this area.

- **Computer Science Theory (SoE-6)**. During the AY 2011–2012, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Computer Science Theory**. The successful candidate for this position will conduct research in the mathematical foundations of computation. Potential research areas include, but are not limited to: computational complexity, computational game theory, computational geometry, computational learning theory, cryptography, networking theory, numeric optimization, & numerical analysis. This position is critical for establishing international respect as a leading computer science program, as our current faculty lacks a theoretician. This hire will also be expected to contribute to the EECS graduate program core curriculum, providing students with a graduate level survey of computer science theory. Contributions are also expected to the CSE undergraduate degree program, strengthening this program by providing automata theory, complexity theory, and other foundational courses.

- **Intelligent & Adaptive Control (SoE 10)**. During the 2012–2013 academic year, the EECS group proposes the creation of a new faculty position at the Assistant Professor level focusing on **Intelligent & Adaptive Control**. The successful candidate for this position will conduct research on the design and analysis of control systems, making use of methods from artificial intelligence, control theory, cybernetics, machine learning, and/or robotics. Potential application areas include, but are not limited to: active sensing, environmental control, intelligent transportation systems, mechatronics, power management, & robotics. This position is important for building the EECS program's reputation in "intelligent systems". This hire will also be expected to contribute to the set of EECS graduate courses, speeding preparations for a CCGA proposal submission. Note that this position also will contribute to the campus-wide focus on "Cognitive Science and Intelligent Systems", as highlighted in the *Strategic Academic Vision* of the University of California, Merced. Finally, since the field of control theory traditionally spans computer science, electrical engineering, and mechanical engineering, there is good reason to expect this position to additionally support the mechanical engineering programs in the School of Engineering.

- **Senior EECS FTEs.** During the 2013–2014 and 2014–2015 academic years, the EECS group proposes returning to efforts to recruit senior faculty members in EECS. Considering the difficulty that UCM has had in attracting senior EECS faculty, it is considered unwise to unnecessarily restrict the research focus of this position. Instead, any strong senior EECS researcher who can demonstrate synergy with established EECS faculty would be considered.

Strengths commensurate with developing the EE emphasis area within the CSE program, and eventually the EE degree program, would be particularly attractive at this point.

EECS Interdisciplinary and Cross-School FTE Requests

In addition to positions focusing on EECS priorities, the EECS group suggests a number of interdisciplinary, potentially cross-school, positions, including:

- **Information Management (Cross 1).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Information Management**. This position would involve research into database systems, decision support systems, automated information retrieval, and/or other technologies that are critical to modern Management Information Systems (MIS). The successful candidate would bring highly relevant technological expertise to UCM's evolving business management program, while offering core computer science knowledge to CSE majors. The creation of this position could substantially increase the employment prospects of UCM graduates, as database design and related skills continue to be in extremely high demand. Also, opportunities for industrial funding of research are expected to be (relatively) abundant in this domain.
- **Virtual Environments (Cross 4).** The EECS group proposes the creation of a new interdisciplinary faculty position at the Assistant Professor level focusing on **Virtual Environments**. The successful candidate for this position would conduct research on tools and applications for virtual reality systems, constructing digital "worlds" and facilitating seamless and fruitful interactions between these virtual spaces and human users. Application areas include, but are not limited to: computer game design, educational and training software, digital heritage, and social networking. This interdisciplinary domain lies at the intersection of fields like computer graphics and animation, human-computer interaction, human perception and motor control, human communication (including both natural language and gestural communication), and the humanities. This position would build on existing collaborations between faculty in EECS, faculty in Cognitive & Information Science, and other faculty in the School of Social Sciences, Humanities, and Arts (SSHA). With the help of this additional faculty position, these cross-campus research collaborations could quickly evolve into high-profile, innovative, and unique interdisciplinary programs, providing students with various backgrounds hands-on training in this rapidly growing field. With regard to EECS programs, this position could contribute to a "computer games" track in the CSE major, which would be expected to swell the ranks of undergraduates pursuing that degree.
- **Media Arts & Technology (Cross 6)**. The EECS group proposes the creation of a new interdisciplinary faculty position at the Associate Professor level focusing on **Media Arts & Technology**. The successful candidate for this position would develop and/or use innovative technologies in the service of artistic expression. The basis for such a program already exists in EECS, with two faculty members conducting research in related areas (3D modeling, computer graphics, computer animation, image-processing, digital libraries, multimedia). This position could seed programs in media arts and technology — programs that could easily become very popular at both the undergraduate and graduate levels. UCM's proximity to the San Francisco Bay Area, which has a tradition of art and technology interaction, would provide an additional stimulus for such programs. The space requirements for this position are expected to include modest dry lab space for a research studio and space for a motion-capture system, which could be shared among several of the faculty.

EECS Space and Special Equipment Requests

The EECS short- and long-term space needs will be fulfilled by existing dry lab space in Science & Engineering 1 and proposed dry/computational space in Science & Engineering 2. No special equipment is needed at this time.

Bioengineering

Bioengineering Overview - Bioengineering is a highly interdisciplinary field in which the techniques, devices, materials and resourcefulness of engineers are used to address problems in biology and healthcare; and lessons from biology are used to inspire design and inform progress in engineering. During the past 40 years, this synergy between biology and engineering has led to a wide range of implantable materials, diagnostic devices, sensors and molecular characterization techniques, and it has produced tools that greatly expedited the sequencing of the human genome. Along with these practical innovations has come a rapidly increasing need for personnel with the necessary hybrid skills to capitalize on them; undergraduate bioengineering programs have proliferated alongside the continued growth of bioengineering research.

The current bioengineering faculty members are affiliated with the **BEST** and **QSB** graduate programs. The faculty constitutes a strong research core which, with a few additions, can develop into a nationally competitive research cluster. The current faculty members have a wide range of expertise in physiological engineering, tissue engineering, regenerative medicine, biophysics and etc. The BioE faculty is committed to expand the research scope in the major to complement the research area of the current faculty.

The undergraduate major in **Bioengineering (BioE)** is designed to provide students with both breadth and depth in two exciting and rapidly expanding fields: tissue engineering and nano-bioengineering. The nano-bioengineering track reflects the strong synergy that exists between the "nano" and "bio" themes in engineering and science. The name also highlights an initial focus on things molecular, supramolecular, cellular and material, which will allow the program to draw efficiently on the talents of the biologists, chemists, physicists and other UC Merced faculty in basic engineering and science programs.

BioE Teaching Programs – Currently BioE program has only three faculty members. It is extremely difficult to deliver a major and a graduate program (BEST) with such few people. A consolidation effort has been made to prioritize the class offering in BioE. The plan will reduce the total required credits and incorporate electives from other areas (e.g., Mechanical and Materials Science Engineering) to maintain their undergraduate major while continuing to develop their graduate research program.

BioE Goals

BioE Research Goals – The research goal for BioE program is to maintain high level of federal and national funding as well as to publish peer-reviewed research articles in reputational journals.

BioE Teaching Goals – Bioengineering is a field including expertise in areas such as drug delivery, tissue engineering, medical imaging, physiological modeling, molecular engineering, biomechanics, bioinstrumentation and medical device developments. With sufficient faculty available, more diverse courses can be offered to undergraduate and graduate students in order to provide a comprehensive and broad bioengineering education experience. The teaching goals will be the program learning outcomes of the BIOE major reflect seven of UC Merced's eight guiding principles of general education.

BioE Current Academic Resources – One full professor and two assistant professors. BioE program currently has wet lab around 1.5 suites in SE1 building.

BioE Envisioned Program by 2020 – We envision BioE Program will have 7 to 9 faculty members. The number of undergraduate program will be around 150 to 200. We expect to have 20 to 25 graduate students in the BEST program.

BioE Resource Requirements 2010 – 2015 – More faculty members (3 more) are needed for BioE program to maintain its standard in teaching quality and research excellence. Appropriate space allocation (both wet and dry lab) will be beneficial for the recruiting of these additional faculty members.

BioE Academic (FTEs) Requests

To deliver the BIOE undergraduate program, 26 program specific credits have to be offered. These credits do not include engineering fundamentals courses, service learning, freshman seminars, or graduate courses. They also do not allow for multiple offerings of any course in an academic year.

BIOE has currently only 3 existing faculty positions that cannot realistically deliver 26 BIOE related credits (lecture and laboratory courses) in the foreseeable future. Using a model in which a faculty member would typically offer one fundamental/core course, one specialist/upper division course or one graduate course in a year (plus a freshman seminar and/or mentor a service learning team), it is clear that BIOE does not have the minimum number of faculty FTEs to deliver the major. In addition, BIOE is part of BEST (Biological Engineering and Small-scale Technology) graduate group and has to cover two required graduate courses and sufficient advanced elective classes (3-5) for BEST students.

Given the current limitation due to the economical recession, a minimum of three FTE are urgently needed as identified by the faculty in BIOE (listed in the priority order):

- **Physiological Modeling (SoE-4) -** We have been experiencing unprecedented advances into the complex nature of biological systems in recent years. Current advances in biology, genomics, proteomics, cellular level modeling methods, simulation capabilities, new technologies for imaging and measuring biological phenomena and molecular level interfacial characterization tools present the engineering community with unique opportunities to advance the understanding of these biological or even ecological systems to deliver desired functions. Currently the lack of involvement of engineering has hindered the complete understanding of the complex biological systems. Furthermore, there is a need to understand how the desired or additional functionality can eventually be accomplished and integrated over larger scales and complexities from cellular, organism to ecosystem level. Systematic modeling incorporating various engineering concepts such as optimization, database management, control and network formation based on large body of experimental results would lead to complete understanding of the non-linear nature of biological systems. Being an interdisciplinary field between engineering and biology, BioE has a strategic advantage in engineering to address this unique challenge and opportunity.

  Current the faculty members in bioengineering at UCM are experimentally oriented researchers. Modeling expertise at multiple levels is needed to tackle more complex biological projects. This requested multiple-scale modeling position will be at junior (assistant professor) level. This faculty member is expected to collaborate with the current faculty members to link various research areas to study specific biological/physiological problems from system point of view. This position will develop quantitative modeling and simulation methods that faithfully represent the complexity of biological/ physiological systems based on experimental data and deal creatively with the hierarchical and nonlinear nature of living systems. This position will integrative knowledge from various research fields to serve a focal point for faculty members from NS, ME and BIOE to collaborate on projects that cannot be addressed from the view point of a single discipline.

- **Recombinant Sensor Development (SoE 13) –** Recombinant protein sensor development has made tremendous progress in recent years. Various protein sensors that report wide range of physiological and biochemical information inside cells have been created. These protein sensors exhibit many different spectral characteristics depending on the need of the application. The area of recombinant sensor development is, by nature, cross disciplinary in that it employs cell culture methods combined with appropriate organic chemistry, biophysics, molecular biology, genetic

engineering, non-linear optics as well as nano-bioengineering. Moreover, this sensors can be genetically engineered in animals or gene delivered by electroporation or adenoviral transfection.

The Recombinant Sensor Development position could also compliment and synergize with the research of a number of faculty in the areas of Biophysics, Physiological Engineering, Stem Cells, Vascular Tissue Engineering, Nanotechnology, and Microfluidics/Microchip design. We expect that this faculty hire would contribute to our growing graduate program in BEST and Quantitative and Systems Biology Depending the particular area of research, this faculty position could possibly contribute to helping build a Stem Cell Clean Room Facility at UCM. We propose this position to be appointed at senior level (Associate or above).

- **Medical Imaging (SoE 14) -** Recent developments in optical/imaging techniques (such as ultrasound, MRI, PET, CT or IR imaging) clearly indicate the enormous potential of Medical Imaging in clinical applications. The imaging sciences are in the midst of a profound revolution that stems from new and fundamental advances in imaging, tissue engineering, biophysics, physiology and molecular and cellular biology. This is due in large part to the new technology and quantitative approaches developed in the disciplines of chemistry, physics and engineering. Due to its highly multidisciplinary nature, Medical Imaging technology presents a unique opportunity for Engineering at UCM. Our unique campus environment is an ideal location to cultivate Medical Imaging technology. This research area will apply tools in optics, physical chemistry, physics, computer sciences, electronics, nanotechnology and analytical chemistry for medical applications. The development of such technology enables many bioengineering research and clinical applications. Currently, there is no faculty with medical imaging background in BioE program. This proposed new hire will expand the research capacity and course diversity in our program. Medical Imaging research area represents an outstanding opportunity to involve faculty members in natural sciences, optical physics, bioengineering, materials science and engineering, mechanical and electrical engineering/computer sciences in a cross-disciplinary project.

  This position would compliment and synergize with the research of a number of faculty in many areas of research. Therefore, this position compliments the growing needs for graduate programs such as BEST or Quantitative and Systems Biology. It is proposed that this position will be designated at the rank of full professor.

BEST Interdisciplinary and Cross-School FTE Requests - none

BEST Space and Special Equipment Requests – none

Environmental Engineering

EnvE Overview - The San Joaquin Valley has experienced substantial population growth and with it the scarcity of water and deterioration of air quality. Today, the San Joaquin Valley harbors the most polluted air in the United States causing adverse health effects particularly among children and the elderly. Most lakes are gone, rivers have dried up and water diverted from the Sierra Mountains has been channeled into a vast agricultural irrigation system and drinking water supply for the nearby and distant urbanized centers. With climate warming, less and less rain is expected to fall in the mountains, already causing great distress in the Valley. Consequently, there is a great need to research stressors of environmental systems in the Sierra Nevada/San Joaquin Valley and to develop engineering as well as social and policy solutions to restore and maintain the beauty and natural resources of this part of California. Today, California faces challenges of how to sustain and restore natural systems as these stressors – climate change and drought, air pollution, intense agricultural production and population growth – put ever-increasing demands on both the San Joaquin Valley and Sierra Nevada ecosystems.

Environmental engineers and hydrologists within the Environmental Systems graduate program are distinguished from other environmental professionals through their focus on problem solving, design and implementation of technological or management systems. Environmental engineers search for creative and economical ways to use resources efficiently, limit the release of residuals into the environment, develop sensitive techniques to track pollutants once released and find effective methods to remediate spoiled resources. They serve as the vital link between scientific discovery, technological development and the societal need for protecting human health and ecological integrity. In the coming decades, environmental engineers will increasingly be called upon to address broader issues of environmental sustainability by minimizing the release of residuals through altered production processes and choice of materials; by capturing the resource value of wastes through recovery, recycling and reuse; and by managing natural resources to meet competing societal objectives.

Environmental Teaching Programs - The undergraduate major in ***Environmental Engineering (EnvE)*** prepares students for careers in both industry and government agencies concerned with managing water, energy, public health and the environment. The program also provides an excellent foundation for further study in Earth science, engineering, business, management, law and public health. The curriculum provides students with a quantitative understanding of the physical, chemical and biological principles that control air, water and habitat quality and sustainability on Earth, along with expertise in the design, development, implementation and assessment of engineering solutions to environmental problems. The program emphasizes a highly interdisciplinary approach to environmental engineering, combining a strong theoretical foundation with field studies, laboratory experiments and computations. Core courses within the major provide students with a firm foundation in the physical and life sciences and the ways that they apply to energy, hydrology, air and water quality issues.

In addition to serving its majors, the EnvE program provides a large service course for SSHA in terms of EnvE 10 The Environment in Crisis (Gen Ed science and laboratory units for non-science and engineering majors). The program also offers an upper division writing-intensive environmental policy course, EnvE 118 Global Change, which may be modified in the near future to serve as an acceptable substitute for CORE 100.

The ***Environmental Systems (ES)*** graduate program is one of the first and truly interdisciplinary graduate programs jointly with the School of Natural Science (SNS). The program offers individualized, research-based courses of study leading to the M.S. and Ph.D. degrees and is the first and only graduate program at UCM that achieved UC system approval. Through the interdisciplinary ES graduate group, ENVE is affiliated with the Sierra Nevada Research Institute (SNRI), the powerhouse for ecological and environmental research geared towards sustainability of the Sierra Nevada and San Joaquin Valley.

EnvE Research Programs - Environmental engineering graduate research is an integral and complementary part of the interdisciplinary environmental systems program at UC Merced administrated jointly by faculty from the School of Engineering and School of Natural Science. The role of environmental engineering is to connect and translate research into workable environmental engineering solution. Environmental engineering has three main focus areas:

Hydrology - Hydrology focuses on the sources, balance and use of water in both natural and managed environments, including precipitation, mountain snowpack, river runoff, vegetation, water use and groundwater. Both the physical and chemical aspects of the water cycle are included. Water resources are experiencing unprecedented stresses, owing shifts in temperature and precipitation patterns associated with climate change, as well as shifts in land use and land cover in response to growing populations.

Water quality - The water quality area focuses on engineering solutions to water and waste issues, including measurement technology, water quality assessments, treatment systems and remediation of contaminated waters. Physical, chemical and biological aspects are included.

Air Pollution - This focus area investigates solutions to air quality in a regional setting. Air pollution focuses on issues arising from primary emissions within different regions of the United States. Recent

areas of research included: Pittsburgh, Baltimore, and the San Joaquin Valley and its precursor airflow corridors. A key focus is on particulate matter released from primary direct emission point and fugitive sources as well as the atmospheric chemical gas-to-particle conversion added by photochemistry.

S**ustainable Energy -** Current research focuses solutions to energy problems, both regionally and globally. Solar energy research includes the development of medium-temperature solar thermal collectors and a project to initiate the development of a novel cost-effective concentrating photovoltaic system.

Environmental Policy - Policy effect of climate change on wildfires and effect of emission trading systems due to interaction between environmental policies and industry activities.

Environmental Geographical Information System - Application of geospatial techniques in solving large-scale ecological and geographical problems, with emphasis on the effects of invasive species, climate change, and human disturbance on terrestrial ecosystems.

EnvE Goals

1. Grow Research by Focused Investment in Faculty Hires in Key Areas - Similarly to all academic programs at a growing new university that has been hit by this economical depression, the environmental engineering program growth is delayed, resulting in reduced research synergism in key areas that have to overcome in order multiply the impact of the current research endeavors.

2. Obtain ABET accreditation for EnvE Undergraduate Program by 2015 - The growth of our undergraduate program as well as the quality of students is substantially reduced because the program is not ABET-accredited. To achieve the level of breath and depth needed for our environmental program to pass the accreditation hurdle as well as to serve our ES graduate program and conduct world class research, additional faculty are urgently needed that will fill key gaps in expertise and research. As soon as the environmental engineering program is accredited, more and better prepared students will join our program that would otherwise not come given the professional implications of having an undergraduate engineering degree from a not accredited institution.

3. Enhance interdisciplinary and cross-disciplinary research initiatives - The graduate program, ES, environmental engineering faculty are associated with is truly cutting across disciplines, including SNS and SSH. The ES program is highly link with research and academic activities under the umbrella of SNRI. Already several EnvE faculty are partners in the UC Merced Energy Research Institute (MERI). The Health Science Research Institute (HSRI) was founded in 2009 and is expected to involve faculty members across many disciplines, including EnvE. O thers are associated with the UC Merced Spatial Analysis and Research Center. As the university grows in faculty numbers, diversity, capabilities, and space, more cross-disciplinary research initiatives will natural follow. Here, the metric of success will be measured by (a) faculty linkage and number of interdisciplinary research that otherwise could not have been obtained, and (b) total competitive research funding of these centers and initiatives.

4. Maintain high-level of research productivity - Scholarly productivity is a key outcome measure together with national and international reputations of our faculty researchers. To fuel further high level of research productivity, potential research links that are currently not available due to the missing expertise have to be filled with strategic faculty hires.

5. Develop Civil and Sustainability Engineering - The world is changing quickly. Already, with the global challenges of climate change, population growth, and diminishing resources, the need emerges to face these challenges and develop new sustainable technology, housing, materials, transportation systems, and energy systems. To face these challenges, civil engineers with a deep conviction towards sustainability have to be educated, providing the SoE at UCM with a great potential of building an undergraduate program in civil/sustainability engineering. To have a viable Civil engineering undergraduate program, at least three focus areas are needed. Here at UC Merced, we already have environmental engineering and hydrology. What is needed to complete a viable undergraduate program is hires in the areas of sustainable structures, building materials, and transportation systems.

ENVE Outcome Metrics

3.1. Research Assessment

- Funding increase
- Funded and unfunded graduate research projects
- Graduate degree production increase
- Number of publications in peer reviewed journals and journal impact factor

3.2. Education Assessment

- Substantial enrollment increase (comparably staffed Civil & Environmental Engineering programs nationwide are roughly double the size of the current Environmental Engineering program).
- The EnvE program assessment plan includes continual course and program level assessment vehicles culminating in a periodic self-evaluation and review by the Accreditation Board for Engineering and Technology (ABET).
- Number of undergraduate students participating in research.
- Number of doctorial students and graduation rates.
- Number of woman, minority and U.S. citizen graduate applicants.

EnvE Current Academic Resources – Six full professor (2 of which have full administrative appointments), one associate professor, and four assistant professors (2 of which have 0.5 appointments in SoE), for a total count of 7 FTE. This group occupies wet and dry lab research space in SE 1.

EnvE Resource Requirements 2010 – 2015 – In the short term, two more faculty members (ecological engineering, air pollution modeling) would greatly assist the EnvE program as it moves toward ABET accreditation and would also better position the EnvE and Environmental System group to compete for interdicisplinary research projects. Several other faculty lines shared with the management program efforts would also help to initiate the sustainability effort discussed below. Appropriate space allocation (both we and dry lab) will be beneficial for the recruiting of these additional faculty members.

EnvE Envisioned Program by 2020 – We envision that EnvE program (by then, the Civil & Sustainability Engineering) will have 10-12 faculty members (including split appointments). The number of undergraduate program will be around 150-200. We expect to have 60-80 graduate students in the ES program.

ENVE Resources Requirements 2010 – 2015 – Critical academic resource requests are based on (1) need to obtain critical faculty numbers to achieve ABET accreditation, (2) continued build up of research capacity in existing research areas, and (3) responding to global challenges, sustainability engineering faculty is needed to respond to novel research needs and societal demands.

ENVE Academic Resources (FTEs) Request - For the next 5 plus years, environmental engineering group has two areas of need: (1) filling gaps that currently limit the teaching and research, and (2) expand into sustainable engineering/civil engineering. Given the limited space and resources available for the next years due to the recession, the priority has been placed on filling gaps in our existing research and teaching programs and delay the buildup of sustainable engineering until 2015. The top four priorities of FTE positions for 2010-13 are as follows:

- **Ecological Engineering or Ecohydrology (SoE-9) -** We recommend an assistant or associate level search for a faculty member who uses engineering principles to design **sustainable systems that integrate human activities with the natural environment**, with particular emphasis on the linkage between hydrologic and ecological systems. Possible areas of research emphasis include interactions among hydrologic, biogeochemical, physiological, and soil processes; hydrologic

ecosystem services, integrating water quality, water cycling; spatial analysis and scaling. Use of remote sensing, field-based measurements, laboratory experiments and modeling are all of interest. As a discipline, ecohydrology addresses the bi-directional regulation of hydrologic and ecological processes, e.g., the flow regime and pollutant levels of water in wetlands regulate the species and the populations that live in the ecosystem, while ecological processes in the wetland regulate the timing and magnitude of water and nutrient fluxes through the system. Ecological engineering involves the design, construction, restoration and management of aquatic and terrestrial ecosystems that have value to both humans and the environment, using principles from engineering, ecology, economics, and natural sciences. The extensive and large-scale ecosystem restoration efforts planned in the Central Valley provide excellent opportunities for both natural laboratories, and research support through applications partnerships with local landowners and conservation entities. Similar efforts are being carried out across the Western U.S. This position would have collaborative opportunities and synergy with Campbell, Bales, Conklin, Harmon, Guo in SoE and Aguilar, Dayrat, Keepers, O'Day, Traina in SoNS.

- **Air Pollution Modeling, Management and Control (SoE-7) -** We recommend an assistant or associate professor position, preferably someone with both a management and technology focus in the area of air quality engineering. A background in mechanical engineering is desirable. This position could focus on engineering design of systems, technology for air pollution control, or modeling and impacts of air pollution. California's Central Valley offers an excellent natural laboratory for research to devise air pollution control systems. Organic and inorganic particulates, persistent organic pollutants, and precursor gases for ozone formation are produced during routine agricultural practices and weekday commutes. These pollutants are lofted into the atmosphere to interact with other chemicals or microbes and are eventually deposited in the respiratory systems of humans and animals, as well as on plant leaves. The resulting effects on human and ecosystem health are devastating. A significant air pollution-related research effort aimed at the understanding and mitigating the escalating air quality problems in the Central Valley, Sierra Nevada, and elsewhere has already been initiated in the Environmental Systems graduate group. This new position could also be helpful in understanding the effects of air quality on climate and of climate policy on air quality. This position is central to our developing strength in the air pollution area, and is an excellent complement to research by Rogge, Traina, Westerling.
- **Environmental Biotechnology (SoE 11) -** We recommend an assistant or associate professor position who has extensive experience in urban and agricultural wastewater treatment, advanced treatment techniques, remediation, and expertise in toxicology. This person could also contribute to environmental bioengineering. The San Joaquin Valley is one of the fastest growing areas within the US and likewise harbors the most intensive agricultural industry in the Nation. Consequently, not only the quantity of water is an issue, but also the quality of water for households, crops growing and animal husbandry in large concentrated animal feeding operations. A great portion of the wastewater produced during agricultural activities is more or less released to the environment with little or no treatment.

ENVE Cross-School FTE Requests

- **Natural resource management** (**Cross 2**) **-** It is recommended that a tenured faculty member at the full or associate professor level be hired in this area. It is expected that this person would help lead the planning for a natural resources management track within the proposed management program and eventual School of Management. A research emphasis on water, forest, or range would complement existing faculty and help fill an important niche in the UC system. This person could also contribute to planning for a Center for Spatial Analysis that is being investigated by faculty in SoE and SSHA, contribute to developing a Geography degree at UCM, and contribute to refocusing of the Earth Systems Science degree in the School of Natural

Sciences. At the graduate level, a number of discussions have taken place around starting a program in Public Lands Management, with linkages to the NPS, USFS and other land-management agencies; and this person could also anchor that program. This position should complement Hart, who has some expertise in this area, having been on the faculty in natural resource programs for 19 years before coming to UCM; Hull, who has 20 years experience in cultural resource management, and potentially UCM's World Heritage program.

Materials Science and Engineering

Materials Science and Engineering (MSE) applies fundamental principles of physics and chemistry to designing materials with desired combinations of mechanical, optical, electrical, magnetic, electrochemical and other properties. Increasingly, innovative materials are being developed with the benefit of lessons that have been learned from nature. Examples include armor based on the structure of abalone shells and rats' teeth, optical materials that owe a debt to sea urchin spines and peacock feathers, high-performance ballistic fibers modeled on spider silk, self-cleaning surfaces copied from lotus leaves, and strong, reusable adhesives that emulate the behavior of gecko feet. Also encompassed in MSE are the methods by which particular atomic and molecular arrangements (nanostructures and microstructures) are achieved, the overall cost of the ingredients and processes used to produce particular materials, the effects of the environment on materials, the effects of materials and materials processing on the environment, and characterization of materials structure and properties. Because MSE embraces skills from physics, chemistry, mathematics and biology, it is especially appealing to anyone who enjoys interdisciplinary studies and who seeks to apply such knowledge to solving practical engineering problems.

Energy and sustainability have both been identified as leading research priorities for the School of Engineering and the UC Merced campus, while plans are underway to consolidate the SOE undergraduate curriculum to offer a more streamlined set of courses at the undergraduate level and expand course offerings at the graduate level. Strategic planning for MSE is focused on 1) building critical materials expertise into the energy and sustainability research themes of UC Merced, and on 2) supporting instructional programs *across SOE* and *the campus* at the undergraduate and graduate levels.

Energy and Sustainability Materials Research - Rising industrialization of developing countries in response to economic globalization since the late 1980s and population growth have contributed greatly to an unsustainable demand for energy and raw materials for manufacturing. China, in particular, is on track to become the top manufacturing nation in the world by 2020, and by some estimates has already become the world's second largest economy after the United States. This manufacturing capacity, initially spurred by export demand, is increasingly geared towards meeting the internal demands of a rising middle class in a nation in excess of 1.3 billion people.

Among the plethora of possibilities for materials research in energy and sustainability that exist, some key areas that are synergistic with present efforts by other disciplines in SOE and across campus have been identified for development within MSE over the next 5-10 years. These include 1) energy materials, 2) sustainable manufacturing, and 3) sustainable building.

Energy Materials - Although energy materials research has many disciplines that contribute to it, the relationship between structure-properties-processing-application is a special focus of Materials Science and Engineering that gives it a strong engineering design component that is particularly relevant to the energy industry where many new technologies have not been adopted due to cost, processing, maintenance or other engineering constraints. Tto leverage the existing strength of UC Merced in non-imaging solar optics and other energy conversion technologies involving high temperature processes, as well as in nanotechnology, we propose to focus faculty hires in the areas of high temperature materials (relevant to receiver materials for high-temperature solar concentrators and solid-oxide fuel cells), nano-enabled energy technologies, and modeling of processing pathways for the synthesis of new metastable energy materials. The first two areas are experimental in nature, but have only modest dry laboratory

space needs due to our ability to leverage existing shared resources in nanofabrication and characterization. The third area is theoretical in nature and only requires computational resources that are available through shared faculty computer clusters on campus or national computational facilities.

MSE at UC Merced already has a primary research thrust in energy materials, however at present there are only 3.4 faculty in MSE (one faculty member, Christopher Viney, has administrative responsibilities as the Vice-Provost for Undergraduate Education and as the Dean of College One). Jennifer Lu studies the synthesis of carbon nanotubes and other nanostructures and nanomaterial-based composites for photovoltaic , battery, and energy-scavenging applications. Lilian Davila models the structure of silicates to understand and predict their properties, and her results have been applied to studying diffusion in 17 silica zeolites (applicable to sequestration of nuclear waste) using computer simulations and thermochemistry data, failure mechanisms of optical lenses at the National Ignition Facility at LLNL (nuclear fusion studies), and silica nanowires (hydrogen and energy storage, biological and chemical sensing with NEMS). Christopher Viney's research fits into the broad concept of energy materials and sustainability, in that bioinspired materials guide us towards efficient, sustainable use of matter and energy through environmental benign processing routes. Valerie Leppert specializes in materials characterization in the electron microscope, which is pertinent to all fields of energy materials research.

Sustainable Manufacturing - Sustainable Manufacturing seeks long-term alternative technologies, processes, materials, chemicals, and/or products so as to reduce pollution and waste, and create sustainable solutions. Its practice requires expertise in environmental regulations, recycling, life-cycle assessment, economic analysis, green chemistry and toxicology. Sustainable Manufacturing practice is rapidly becoming a necessity for companies engaged in manufacturing and several programs have recently begun cropping up around the country to meet industrial demand for training in this emerging field. Since the field is just developing, there is an opportunity at UC Merced to create a competitive research program in Sustainable Manufacturing that leverages the Sierra Nevada Research Institute and existing research and instructional programs in Environmental Systems, Biological Engineering and Small-Scale Technologies, Mechanical Engineering and Applied Mechanics, Computer Science and Quantitative Systems Biology, as well as the nascent School of Management.

To build a sustainable manufacturing program, expertise is needed in <u>life cycle and cost-benefit analysis of materials and manufacturing processes</u>, and <u>modeling of synthesis routes (often bio- or geo-inspired) to new metastable materials that reduce the use of energy and rare metals</u>. Both areas of research are computational in nature and have modest space and resource needs that can be met by shared faculty computer clusters or national computational facilities.

Sustainable Building - Sustainable building is an emerging area of interest for resource conservation, with a growing number of government agencies offering incentives for its practice. In addition, sustainable building is one of two research areas for the FY2010 Emerging Frontiers in Research and Innovation (EFRI) research program funded by the National Science Foundation. (The EFRI program was established by the Directorate for Engineering at NSF to focus on important emerging areas of research in a timely manner.) Green building materials are an important component of sustainable building practices that offer reduced construction costs, reduced maintenance and replacement costs over the life of the building, energy conservation, improved occupant health and productivity, and lower costs due to flexibility in design for specific occupants. The research emphases described above for sustainable manufacturing and energy materials can also contribute to a sustainable building focus in MSE. For example, a faculty with expertise in material lifecycle and cost-benefit analysis can contribute analysis of the resource efficiency of proposed green materials, while expertise in energy materials can contribute to the identification and development of cost-effective methods of conserving or harvesting energy in buildings. In addition, we would like to <u>build expertise in structural materials with MSE</u> to further the development of new green building materials that reduce the use of nonrenewable resources and environmental degradation. This position can be computational in nature or requiring only modest dry laboratory space due to shared materials synthesis and characterization equipment in MSE.

MSE Support of Instructional Programs - The 3.4 faculty allocated to Materials Science and Engineering have designed an efficient curriculum with five required MSE courses for undergraduate MSE students that allows the program to still make a significant contribution to several instructional programs in engineering and across campus.

In additions to serving their major and the BEST graduate program, the MSE faculty is making extensive contributions to engineering as a whole and general education. With consolidation of the undergraduate engineering curriculum in order to offer an ABET accredited General Engineering degree with specialist tracks and further streamlining of courses for the MSE major, it is expected that contributions to programs outside of MSE and the BEST graduate program will increase. Only two courses (MSE-111 and MSE-119), each offered every two years, will exclusively serve MSE majors in the future (this represents 1/7 of the MSE teaching capacity each year). Every other course offered by MSE will satisfy requirements for engineering students in other majors or in the general engineering program. MSE-111 is needed for the BEST graduate program, because graduate students for BEST are drawn from diverse disciplines and need some training in materials processing via the graduate cross-listed course for MSE-111, BEST-211 (CRF to be submitted to GRC). MSE-119, with a focus on modeling of mechanical properties, may additionally be of interest to other majors. MSE faculty will continue to contribute to General Education.

Outcome Metrics

Resources Requirements

Academic resource requests for MSE are based on the discipline's contribution to energy and sustainability research themes at UC Merced, its contribution to instructional programs across SOE and general education, its undergraduate and graduate teaching needs, and its contribution to student recruitment and retention through the COINS undergraduate research program (described above).

MSE Academic Resources (FTE) requests

- **Energy Materials (SoE-3) -** We are requesting an FTE at the Junior/Senior level to be housed in MSE for High Temperature Energy Materials, specifically ceramic materials, as priority for Year 1. This person will contribute to research efforts in energy conversion technologies (e.g. receiver materials for solar concentrators and solid oxide fuel cells) and secondarily, to a possible future program in sustainable building. He or she can also contribute to MSE, Engineering, and General Education instructional responsibilities as detailed in MSE's 5 year strategic plan. This position (the only experimental one that MSE is requesting over the next 3 years) has modest dry laboratory space needs and start-up costs due to shared characterization facilities (DTA, DSC, AFM, XRD, TEM, SEM). The only major experimental need is likely to be for high and mid temperature furnaces for synthesis and processing that can be accommodated on laboratory benches and venting to the hood exhaust system (this equipment does not need to be placed in a hood, it only requires hook-up to the hood ventilation system). Space needs and start-up costs are detailed in the SOE FTE request table.
- **MSE-6: Computational Materials (SoE 12) -** An FTE in computational materials at the Junior/Senior level, centered on modeling of metastable materials processing is requested as a priority in Year 3. This hire would contribute to ongoing efforts in energy and sustainability through the design of new materials for energy and replacement materials for manufacturing/building sustainability. Modeling assists the development of new materials through identifying efficacious metastable pathways for materials synthesis and processing that may be inspired by nature, as well as identifying new processing techniques that can be used to improve the recyclability of materials (pressure fabrication of hard plastics vs. thermosetting that allows recycling of hard plastics, for example). There are also collaborative opportunities with cognitive science that explore the use of materials visualization for materials teaching and

learning. Since this is a computations position no experimental laboratory space is needed (only space to house computers and researchers). Start-up costs are minimal, with shared computer clusters or national computational facilities available. Specific space needs and start up costs are detailed in the SOE FTE request table.

- **Sustainable Manufacturing Management (Cross 3)-** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow the establishment of a Sustainable Manufacturing Management program (described in more detail in the 5 year strategic plan) that can leverage existing courses across multiple instructional programs. This leadership position requires a tenured faculty member at the full or associate professor level. Appropriate disciplinary backgrounds for this position include industrial engineering, engineering economics, management and/or economics, environmental engineering, or materials engineering. A research emphasis on lifecycle and/or cost-benefit analysis would complement existing faculty expertise in the Schools of Engineering and Natural Sciences. The ideal candidate would have a proven track record in connecting engineering economic analysis to research in environmental systems, toxicology, or materials engineering, as well as the social science and policy aspects of sustainable manufacturing. The space and start-up needs for this position are modest, as it is theoretical in nature. Specific needs are detailed in the SOE FTE request table.

MSE Cross-School FTE Requests

- **Technology Management (Cross 5) -** We are proposing an opportunity hire in Engineering to contribute to development of the School of Management, specifically to allow establishment of a Technology Management program that can leverage existing courses across multiple instructional programs in Engineering and Natural Sciences.

Mechanical Engineering

Overview – The Mechanical Engineering faculty at UCM are affiliated primarily with the **Mechanical Engineering and Applied Mathematics** (**MEAM**), but several ME faculty are also affiliated with the BEST, and ES graduate programs. The ME faculty are dedicated to the education of a new generation of mechanics researchers, applied mathematicians and/or researchers of ME-related areas who aim to master the fundamentals of the mechanical sciences (which include disciplines such as continuum mechanics, rheology, fluid mechanics, heat and mass transfer, energy conversion, etc.) while being exposed to the forefront of research techniques, methodologies and equipment to solve problems that are relevant to modern society (green energy, mechanical modeling and synthesis, robotics and mechatronics, control systems, etc.).

Mission Statement - The mission of the MEAM program at UC Merced is to provide a modern, comprehensive, and interdisciplinary educational experience to its students with the objective of preparing them for successful careers in the current and dynamically changing professional environment. To achieve this mission, the MEAM program strives to accomplish the following educational objectives:

Program Educational Objectives

1. To provide a solid background on the pertinent mathematical, physical, chemical and engineering concepts that make up the foundations of the broad disciplines of mechanical engineering and applied mechanics, as well as on their closely associated fields;

2. To provide our students with the knowledge to correctly apply natural laws to the creative formulation and solution of engineering problems through the use of analytical, computational and experimental techniques;
3. To expand the reach of research in mechanical engineering and applied mechanics to non-traditional areas by continually seeking to incorporate new methodologies and research findings to our graduate curriculum.

Research

Mechanical Engineering and Applied Mechanics represent two distinctive but overlapping research areas that together form some of the most fundamental pillars of the academic enterprise. While the various disciplines that compose the field of Applied Mechanics are associated with rigorous and rapidly developing branches of human thought, Mechanical Engineering is currently undergoing a fundamental transformation at several distinct levels. At the design level, computer aided engineering and fast prototyping automated tools are revolutionizing the way new products are conceptualized, evaluated and deployed into the market. At a more fundamental level, computational methods that are based on judicious use of advanced concepts in Applied Mechanics (including stochastic evolutionary methods, uncertainty analysis, artificial cognition, etc.) have expanded the portfolio of research methodologies much beyond the usual designer-based experience. Today, Mechanical Engineering is evolving into a discipline where more emphasis is placed on teaching a machine how to design, other than using the machine to optimize a pre-selected design. In other words, instead of using the engineering methodology to optimize a pre-existing concept, MEAM research is transitioning to a new paradigm where only the goals and constraints of the object are known to the designer, and a stochastic algorithm uses a variety of advanced computational methods to explore the complete space of solutions that satisfy the goals and constraints of the problem at hand.

The MEAM group at UC Merced emphasizes this new approach to Mechanical Engineering, and therefore is unique among all UC campuses in placing a much higher emphasis on advanced computational methods. Formed in August of 2007, the MEAM group is composed of eleven faculty members from various disciplines, including Mechanical Engineering, Electrical Engineering, Physics, Applied Mathematics and Computer Science and Engineering.

3.3. **Research Themes of MEAM Program -** As mentioned above, there are many exciting research opportunities within the context of the MEAM program, and we have prioritized research areas that would better complement and add value to the overall research and educational mission of UC Merced. The chosen research themes also add a unique flavor to our program not only within the UC system, but also in comparison to other programs in the nation. The MEAM program will initially focus on two major themes, which are described below.

Energy Systems (I)— Mechanical engineering is a core discipline for the development of energy conversion technologies, and the MEAM program at UC Merced is well poised to take the lead on the renewable energy initiative in our campus. Professors Winston, Sun, Coimbra, and Diaz have all established track records in research funding in the energy research area. There is very strong synergy between the MEAM graduate program and the Merced Energy Research Institute (MERI), as well as with UC CITRIS (Center for Information Technology Research in the Interest of Society) and the new CITRIS initiative C-GRACE (CITRIS Global Research Alliance for Climate and Energy). Within the Energy Systems theme, the main areas of activities of the MEAM program include: solar concentrators, solar availability mapping, renewable fuel conversion, fuel cell technology, concentrator controls, direct solar conversion, and solar power applications to environmental health monitoring. The MEAM program has several overlapping research projects with other graduate groups within the energy systems theme, including Environmental Systems (ES) and Electrical Engineering and Computer Science (EECS). The MEAM faculty has been very successful in attracting sizeable research grants in this area.

In the next five years, we would like to build a strong focus on energy research, and shall explore the research topics including solar energy, wind energy, building efficiency, building energy sensor network, and energy storage technologies.

Biologically Inspired Technologies (II) — Although one of the primary goals of this MEAM research theme is in the development of advanced computational methodology, there is important synergy with experimental methods in bio-controls, mechatronics, multi-scale material properties, and complex fluids that will enable the maturation of this area into a new paradigm of engineering design. A strong computational component on novel genotype optimization methods will allow us to explore bio-inspired solutions beyond the traditional bio-mimetic approach. However, it is the concurrent and parallel experimental development of advanced materials (and the associated understanding of complex constitutive relations) that will enable the development of a full spectrum of engineering solutions for complex problems for engineered materials (as opposed to biological materials). An important component of the MEAM strategic plan is to build critical mass in this research theme. There is a very good opportunity for future collaboration between several graduate programs at UC Merced in this area, including Biological Engineering and Small Technologies (BEST), Electrical Engineering and Computer Science (EECS), Quantitative and Systems Biology (QSB), and Applied Mathematics (AM).

The two research themes above reflect a sensible compromise between depth, breadth, impact and quality of MEAM research. Equally relevant is our effort to combine the needs of the very popular undergraduate program in Mechanical Engineering with the development of a strong research program in MEAM.

Synergistic Growth with ME Undergraduate Program - The mechanical engineering (ME) undergraduate major was launched during Fall 2006 accepting only freshman students. The plan was to start accepting transfer students only in the Fall 2008. However, a large number of current upper division students at UC Merced have approached ME faculty or the engineering student counselors to explore the possibility of transferring to the ME major before they complete their degree. By now, ME has become one of the most popular engineering majors at UC Merced. In Fall 2009, we had 176 ME students, the largest group among all the majors in Engineering, with only five faculty. ME also has currently the largest student-to-faculty ratio in the SoE by a large margin.

To evolve into a top ME program, it is absolutely necessary to develop a strong and comprehensive foundation in key areas, with a sufficient number of faculty to build a modern program with state-of-the-art research infrastructure. In addition, because ME is a key component of any modern engineering academic program in serving key and foundational needs for many engineering sub-disciplines. Delaying the hiring of ME faculty will dramatically constrain the growth of our engineering program and could significantly impair the image and reputation of the ME program and the School of Engineering as a whole.

Currently, ME provides service to other majors by teaching a number of engineering fundamentals courses that include: ENGR 57 (Dynamics), ENGR 151 (Strength of Materials), ENGR 130 (Thermodynamics), ENGR 135 (Heat Transfer), and others. This situation increases dramatically the teaching load of ME faculty.

From the outset, there was a concerted effort to provide a seamless experience to SOE undergraduate students interested in pursuing post-graduate education in the MEAM program. The MEAM program offers research opportunities for students interested in projects at the interface between Complex Analysis, Mechanics, Manufacturing, Bio-Inspired Engineering, Applied Computational Sciences, Mechatronics, Advanced Materials, Energy Conversion, and Controls. Due to the interdisciplinary nature of the topics covered in MEAM courses, a number of these courses serve graduate students from many different disciplines. This also increases the teaching load of ME/MEAM faculty. For instance, in the

past the following courses were populated by graduate students from other programs: ME 135/ES 235 (Heat Transfer), MEAM 201 (Advanced Dynamics), ME 210 (Linear Controls), and MEAM 251/ES 237 Viscous Flows.

There are currently five FTE positions filled in mechanical engineering (listed here in order of hiring): Professor Diaz, Professor Coimbra, Professor Sun, Professor Modest and Professor Ma. The expertise of the current faculty covers a relatively unbalanced portion of the overall research area in Mechanical Engineering and Applied Mechanics since 4 out of the 5 faculty hired have main expertise in Thermofluids, and only one faculty (Prof. Sun) has expertise on Solid Mechanics.

Outcome Metrics

Resources Requirements - For the next five years, a total of ten desired positions have been identified and described below in descending level of priority for both the ME and the MEAM programs):

1) Computational Engineering (I and II)
2) Energy Storage Technologies (I)
3) Mechatronics (I and II)
4) Buildings Energy Efficiency (I)
5) Nonlinear Analysis (I and II)
6) Bio-Controls (II)
7) Bio-Inspired Mechanics (II)
8) Computational Fluid Dynamics (I and II)
9) Turbulence (I and II)
10) Complex Systems (I and II)

In addition, four instructors will be needed to cover the engineering fundamentals and capstone design.

For AY 2010-2013, the program is requesting ***three lecturers*** **(SoE-LPSoE-2, SoE-LPSoE-4, SoE-LPSoE-5)**. Two will concentrate on the engineering fundamentals (ENGR) courses that serve all programs in the SOE, and the other on ME electives that may serve BIOE, ES, ME, MSE and CSE students. The final lecturer will help faculty to develop and deliver the capstone and other design-related courses.

The top three priorities of regular faculty FTE positions for 2010-13 are as follows:

- **Computational Engineering with emphasis on Stochastic Optimization (SoE-5) -** This senior/junior position is an important and strategic area of research in ME. It will cover, but will not be limited to, development of numerical schemes to treat problems in structural, thermal-fluids and energy systems. It can relate to parallel computing and high performance algorithm development applied to engineering problems. The undergraduate program in Mechanical Engineering will benefit with courses such as FEA and CAE. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.
- **Energy Storage Technologies including Turbulence Modeling (SoE-2) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, design and analysis of energy storage devices, thermal fluids, turbulence, and high temperature mechanics of materials. The undergraduate program in Mechanical Engineering will benefit with courses such as strength of materials, and the capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Material Science, Computer Science and Engineering, and Applied Mathematics.

- **Mechatronics (SoE-8) -** This senior/junior position will add an important and strategic area of research in ME to broaden and strengthen its actual capabilities. This position will cover, but will not be limited to, dynamics, control systems, and sensor network and optimization with an emphasis on applications to building energy efficiency. The undergraduate ME program will benefit with courses such as dynamics, vibration and control, and capstone design. The graduate program will benefit with courses in the particular areas of research of this FTE. Natural synergies with other programs include Computer Science and Engineering, and Applied Mathematics.

Resource Needs for MEAM and ME Programs

There is a minimum number of specialized faculty members required to deliver a comprehensive program such as Mechanical Engineering in parallel to a successful graduate program in MEAM. Although we are falling short of the projected need for FTEs, an even more pressing problem is space allocation for both instructional and research use. The ME/MEAM faculty believe that the instructional laboratory allocation to ME-lead classes is insufficient for achieving success in the accreditation process with ABET.

Core Facilities - Both the MEAM research program and the ME instructional program need adequate lab space and machine shop support to exist. The current machine shop is not supported at a level that will allow Capstone Design and MEAM research programs. This limitation will severely impact the ability of the ME program to be ABET accredited in the coming years. All ME faculty members, in collaboration with the SOE staff, have been actively involved in extracting the most out of the limited instructional lab space available to deliver the ME classes. However, even considering the best use of the instructional labs (which include rotating schedules, sharing of the labs by several different disciplines, and modular educational benches that are put aside after use) it is very clear that the currently available space will not withstand ABET scrutiny. The same is true with the machine shop support.

The MEAM needs in terms of space include extra 5,000 sf laboratory space beyond what is available now for ME faculty at the SE building, of which about 2,000 sf need to be “damp” lab space. Given our emphasis on computational methods, this need is rather modest in comparison to other graduate programs, but it is critical for us in order to attract the few experimentalists needed for reaching critical mass in both energy systems and bio-inspired technologies.

Appendix 1: **Requested FTEs, Year 1 of 3-year Plan, AY 2010-2011**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Systems	Junior/Senior	CSE	ME	EECS	MEAM/ES	$200k-300k	400-800 sq ft dry	
1	Energy Storage Technologies	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Energy Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Contribute to MERI (high T materials, energy harvesting, catalysis) - existing materials characterization resources can be leveraged to bring down the cost of the start-up package
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	SoE-LPSOE-1	EECS Lecturer[1]	EECS					office	
1	SoE-LPSOE-2	Fundamentals Lecturer	ENGR					office	
1	SoE-LPSOE-3	EECS Lecturer	EECS					office	

[1]A candidate for SoE-LPSoE 1 is currently under consideration.

Appendix 1: **Requested FTEs, Year 2 of 3-year Plan, AY 2011-2012**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Computer Science Theory	Junior/Senior	CSE	Applied Math	EECS	Applied Math	$150-250k	400 sq ft students office	
1	Air Pollution Modeling, Management, & Control	Junior/Senior	ME or ENVE	Management	ES	ME	$150-250K	400-800 sq ft	Possible use of GIS & computer cluster facility
1	Mechatronics	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Ecological Engineering	Junior/Senior	BioE	ENVE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	Possible use of GIS & computer cluster facility
1	SoE-LPSOE-4	Lab/Design Lecturer	ENGR					office	
1	SoE-LPSOE-5	Fundamentals Lecturer	ENGR					office	

Appendix 1: **Requested FTEs, Year 3 of 3-year Plan, AY 2012-2013**

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Intelligent & Adaptive Control	Junior/Senior	CSE	ME	EECS	MEAM	$100-200k	400-800 sq ft dry	
1	Environmental Biotechnology	Junior/Senior	ENVE	BioE	ES	BEST	$300-500K	600-1,000 sq ft wet/dry	
1	Computational Materials	Junior/Senior	MSE	ME	BEST	MEAM	$150K	250-500 sq ft	Computational - modeling of metastable materials processing/materials properties - ties to MERI and cognitive science (materials visualization for learning/research)
1	Physiological Modeling	Junior/Senior	BioE	ME	BEST	QSB	$150-250K	400 sq ft	
1	Computational Engineering (emph. stochastic optimization)	Junior/Senior	ME		MEAM		$150K	250-500 sq ft	
1	Recombinant Sensor Development	Senior	BioE		BEST	EECS	$250-$350K	office	
1	Medical Imaging	Senior	Bio		BEST	EECS	$250-$350K	office	

Appendix 1: Requested Cross-unit FTEs, Year 1 of 3-year Plan, AY 2010-2011

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Information Management	Junior/Senior	CSE	Management	EECS		$100-200k	400 sq ft dry	fills need for databases knowledge in CSE while providing engineering expertise to management program
1	Natural Resource Management	Junior/Senior	Management, ENVE, ES	Management, ENVE, ES	ES	SCS	$200-300K	800-1,000 sq ft	Possible use of GIS & computer cluster facility
1	Sustainable Building/ Manufacturing Management	Junior/Senior	Management	MSE/ME/ ENVE/BioE	BEST	MEAM/ES	$150K	250-500 sq ft	Economic Modeling - Primarily Computational - Lifecycle and Cost Benefit Analysis of Green Manufacturing - Contribute to development of management program and possible engineering economics or management program..

Appendix 1: Requested Cross-unit FTEs, Year 2 of 3-year Plan, AY 2011-2012

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Lab Space needs	Special needs and strategic considerations, if any
1	Virtual Environments	Junior/Senior	CSE	Cognitive Science	EECS	Cognitive Science & Information Systems	$200-300k	400-800 sq ft dry	could contribute to interdisciplinary program in computer game design
1	Technology Management	Junior/Senior	Management	MSE/ME BioE	BEST	MEAM BioE	$150K	250-500 sq ft	Management of Intellectual Property - Contribute to development of management program and possible engineering economics or management program.
1	Media Arts & Technology	Junior/Senior	EECS	CIS/World Cultures	EECS	World Cultures/ Art	$100K	250-500 sq ft	

Appendix 2: **Majors and Graduate Group**

Name	Established or Planned Start Date	Number of Majors (08-09)[1,2]	Student Credit Hours (08-09)[2]	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Environmental Engineering	Established	51	524	8.0 FTE Bales, Campbell, Chen (0.5),Conklin, Harmon, Guo, Rogge, Westerling(0.5), Wright		
Computer Science & Engineering	Established	152	1661	6.5 FTE Carpin, Carreira, Cerpa, Kallmann, Newsam, Noelle(0.5), Yang	1 LPSOE 1 EECS Senior/Junior	
Bioengineering	Established	104	951	3 FTE Chin, Escobar, McCloskey	1 Bioengineering	
Mechanical Engineering	Established	121	1257	5 FTE Coimbra, Diaz, Modest, Ma, Sun		
Material Science Engineering	Established	16	140	3.4 Davila, Leppert, Lu, Viney (40% Eng)		

[1]Undecided Engineering = 49
[2] Data Source: Institutional Planning & Analysis Office

Appendix 3: **Future Space Needs**

	Position	Primary Major	Office Location	Offices needed	Theoretical/ Experimental	Research Space Location	Research Space (sq ft)	
2010-11							**Dry**	**Wet**
SoE-1	Computer Systems	EECS	Campus	1	Theoretical	Campus	600	
SoE-2	Energy Storage Technology	ME	Campus	1	Theoretical/Experi	Campus	400	
SoE-3	Energy Materials	MSE	Campus	1	Theoretical/Experi	Campus	400	
SoE-4	Physiological Modeling	BioE	Campus	1	Theoretical	Campus	400	
SoE-5	Stochastic Modeling	ME	Campus	1	Theoretical	Campus	400	
SoE-LPSOE1	EECS Lecturer	EECS	Campus	1				
SoE-LPSOE2	Fundamentals Lecturer	ENGR	Campus	1				
SoE-LPSOE3	EECS Lecturer	EECS	Campus	1				
2011-12								
SoE-6	Computer Science Theory	EECS	Campus	1	Theoretical	Campus	400	
SoE-7	Air Pollution Modeling	ME/ENVE	Campus	1	Theoretical/Experi	Campus	600	
SoE-8	Mechatronics	ME	Campus	1	Theoretical	Campus	400	400
SoE-9	Ecological Engineering	BioE	Campus	1	Theoretical/Experi	Campus	400	
SoE-LPSOE4	Lab/Design Lecturer	ENGR	Campus	1				
SoE-LPSOE5	Fundamentals Lecturer	ENGR	Campus	1				
2012-13								
SoE-10	Intelligent & Adaptive Control	EECS	Campus	1	Theoretical	Campus	600	
SoE-11	Environmental Biotechnology	ENVE	Campus	1	Theoretical/Experi	Campus	300	700
SoE-12	Computational Materials	MSE	Campus	1	Theoretical	Campus	400	
SoE-13	Biosensor Development	BioE	Campus	1	Theoretical/Experi	Campus	-	-
SoE-14	Medical Imaging	BioE	Campus	1	Theoretical/Experi	Campus	-	-
Total Research Space needed							5,300	1,100
Total Office Space needed				19				
Space already allocated to ENGR				7			1,500	1,100
Space Need				12			3,800	0

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May 28, 2010

To: Gregg Camfield, Professor & Chair, WASC Steering Committee

From: Maria Pallavicini, Dean, School of Natural Sciences MP

Cc: Laura Martin, Faculty Development and Assessment Coordinator

Re: Assessment of Data Dissemination and Use

The following information is provided in response to your April 30, 2010 request for documentation of the School of Natural Sciences' instructional budgeting process, the faculty FTE allocation process, and enrollment management. These topics are tightly inter-twined and several of the questions posed by the committee in each of these categories over-lap.

I. SNS Instructional Budgeting Process

The SNS instructional budgeting process is driven by a number of variables including faculty FTE (current and proposed), lecturers to meet course instructional demands, classroom and instructional laboratory (wet and dry) space and availability, academic programs needed for students to make normal progress to degree and to provide both depth and breadth of instructional offerings. The annual instructional budgeting process is described below.

A. The SNS Manager of Instructional Support initiates a template of courses from the previous year. This initial template is shared with the student advisors and the Graduate Student Programs Coordinator to enable them to provide feedback on needs of student cohorts progressing through the major and graduate programs. The initial template is sent to the Faculty Undergraduate Major Leads and the Chairs of the Graduate Programs which are either directly under the SNS dean (Applied Mathematics, Chemistry and Physics, Quantitative Systems Biology) or which SNS faculty contribute to curriculum offerings (Environmental Systems). The faculty leads and chairs work with their respective curriculum committees to review and modify as needed the initial template.

B. Undergraduate discipline leads submit annual course plans to the Dean, including anticipated faculty assignments. Graduate program chairs submit course listings that they wish to offer and potential faculty assignments.

C. The dean and assistant dean review the offerings and potential teaching assignments, taking into account previous course enrolments, faculty workload, and individual faculty needs (sabbaticals, teaching relief, family leaves, etc). The SNS faculty has a policy that faculty

should teach lower division, upper division and graduate courses during a six year period. Both the disciplinary leads and the dean's office strive to meet the principles of this policy

D. Lecturers are assigned to serve as instructors for courses required for majors or campus service when faculty are not available. Lecturers typically teach at the lower division in disciplinary areas that provide service and preparation courses for the campus (such as math, chemistry and physics, and biology). The high faculty-to-student workload in biology has necessitated that lecturers occasionally teach upper division courses. This is not desirable.

E. Previous and projected enrollments are analyzed.

1) Crystal and Banner reports indicate actual enrollments from previous years and current registration numbers, which are helpful. However, due to the School's growth, previous years are not ideal predictors of future enrollments. (Attachment 1)
2) The Office of Institutional Planning and Analysis (IPA) provides projection reports, but as evidenced in AY 1011 those projections may fall short of actual enrollments. (Attachment 2)
3) The Office of Admissions provides Student Intent to Register (SIR) reports for the upcoming fall,which are used for projections. These are helpful in predicting the approximate number of incoming majors, but for accurate budgeting purposes this data is available too late in the process and changes up until the first day of classes. (Attachment 3)
4) The Office of Institutional Planning Analysis (IPA) also produces a Majors by Program document (Attachment 4). This is used to predict enrollments for continuing students.

F. The Instructional budget is built based upon discipline course plans mentioned in B and C above, previous year enrollments (Attachment 1) and projected enrollment data. (Attachments 2 and 3)

G. The budget is monitored and adjusted, as more accurate data becomes available.

1) Faculty recruitments are also monitored and assignments are adjusted depending on success of recruitments.
2) Courses may be added depending on classroom and lab class space availability and actual enrollments.

II. Specific Response to Guiding Questions for Instructional Budget

A. Factors considered in Instructional Budget development:

1) The primary considerations include courses and enrollment demand, faculty FTE and faculty workload equity.
2) Secondary considerations include space considerations, for both classrooms and class labs.
3) The cost of instructional equipment, maintenance and supplies is also taken into account.
4) Course fees are factored in at this time, to cover consumable items and field trips.

B. Data sources and usages:

Addressed in I A above

C. Personnel involved in development and monitoring of the instructional budget:
   1) Manager of Instructional Support – works in conjunction with the Dean, Assistant Dean, Lead Advisor, Graduate Student Programs Coordinator and faculty leads on course need and staffing. Populates Budget & Planning spreadsheet.
   2) Dean and Assistant Dean – approve course planning and review spreadsheet. Assistant Dean works with Director, Budget & Planning on budget assumptions and budget submission.
   3) Director Administrative Services and Budget Analyst - monitor expenditures and prepare regular reports. Reports are reviewed by Mgr. Instructional Support, Instructional Lab Coordinators and Assistant Dean.

D. Budget office process:
   1) Budget Submission Process
      - The format in which the Budget Office requests the Instructional Budget Information is sufficient. Tammy Johnson, SNS Manager of Instructional Support, created the excel document which is used for the request. (Attachment 5).
      - One difficulty at this time is that the Budget Office asks for the document without formulas so that they can consolidate the data from all of the Schools. This makes last minute changes to the document more difficult for the Schools.
      - As the courses have increased in number, the document has become very cumbersome to manage; it needs to be broken down by disciplines instead of simply by School.
      - Perhaps the Budget Office could request discipline specific totals and a narrative summary of funds requested beyond the previous year's allocation as well as any significant one-time costs requested. We could provide the total seats the School taught last year (even by discipline) and how many were projected to come up with the total dollars request. For instance, this Spring 6,880 seats will be accommodated in NS courses.

   2) Allocation
      - Thus far, the allocations have met the School's need. As we grow enrollments however, the funds will be essential in order to provide enough courses for students campus-wide. We are also concerned about future equipment maintenance.
      - The School must increase our laboratory instructional staff in order to keep up with increasing enrollments. Currently, labs are running from 8am – 10pm which will require more personnel to manage and support. The SNS instructional staff are supported on the School's Operational Budget, not the Instructional Budget. It may be reasonable to consider another model of funding for Instructional Staff to address workload equity issues across Schools.

   3) Budget Request and Allocation Timeline
      - The deadlines for submission and allocation need to occur much earlier in the year to ensure that the Schools have the funds necessary for the following year. The Registrar requests the following Fall schedule in December and posts it in March. Therefore, the budgets should be due in January, with decisions made in February.

III. Faculty FTE Planning and Allocation

A. The process by which the School of Natural Sciences developed the 2010-2013 faculty FTE resource request is described below.
   1) Discipline-specific groups were requested to put forward strategic plans and FTE requests to the Dean.
   2) The SNS Academic Resource Planning Committee (ARPC) reviewed the discipline-specific strategic plans, as well as their FTE resource requests.
      - Faculty Workload / Student Credit Hour reports were reviewed at this time (see Attachments 6 and 7, generated by IPA). These reports are more than a year old which hinders accurate planning.
      - Undergraduate by Program/ Major reports generated by IPA were also used. (see Attachment 4)
   3) The SNS ARPC narrowed the FTE requests down to 15 (per the number of FTEs anticipated to be allocated to SNS by the Provost) out of the numerous requests put forward in the discipline-specific plans.
   4) These 15 requests were forwarded to the Dean.
   5) The Dean requested FTE resources requests from the graduate groups: Chemistry and Physics, Quantitative Systems Biology (QSB), Environmental Systems (ES), Applied Mathematics.
   6) The Dean reviewed the 15 School FTE requests and their academic plans, and the graduate group plans and their FTE requests.
   7) The Dean identified teaching needs in the undergraduate and graduate groups, based on 3 year teaching plans which she had requested from the undergrad leads and the graduate group leads.
   8) The Dean reviewed research gaps and synergies described in the strategic plans.
   9) The Dean considered the following in developing the resource request:
      - Research emphasis needs, including inter-disciplinary research
      - Resource constraints (space and start-up costs)
      - Gaps and synergies described in the strategic plans
      - Critical mass for research emphases
      - Need for senior leadership
      - Faculty workload and equity by discipline (Attachment 6)
      - # of majors (Attachment 4)
      - # of enrollments, particularly for campus service courses (Attachment 1)
      - # of graduate students per graduate program and graduate group offerings (Attachments 1 and 4)
      - Teaching needs and gaps in the undergraduate and graduate programs
      - The Dean developed the School FTE resource request, which was then sent to the entire SNS faculty for a vote.

B. Response to guiding questions regarding Faculty FTE Planning and Allocation
   1) The timeline for requests is reasonable for faculty FTE planning and allocation.
   2) The decision at the Provost level on those requests needs to be made much earlier (ideally June 1) so that faculty can plan recruiting, posting of ads can be completed in a timely manner, and the recruiting process can initiate earlier in the year. This is particularly important for chemistry, physics and math recruitments.
   3) All other questions were addressed in section II A

Attachments

Attachment 1: Enrollment report: Sp09 Enrollment 012109
Attachment 2: Projection report: LREP fall headcount summary 1-11-08
Attachment 3: SIR Report: Copy of Academic Schools_20100505v2
Attachment 4: Undergraduate by Program/Major \
Attachment 5: Instructional Budget request form
Attachment 6: Faculty Workload Report with ENGR Corrections Sp 09
Attachment 7: Student Credit Hours by Course by Term

3001	BIO	001	001	Contemporary Biology	4.00	Kamal Dulai	24	23	1	96%		A
3002	BIO	001	002	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3003	BIO	001	003	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3004	BIO	001	004	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3005	BIO	001	005	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3006	BIO	001	006	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3007	BIO	001	007	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3008	BIO	001	008	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3009	BIO	001	009	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3010	BIO	001	010	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3011	BIO	001	011	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3012	BIO	001	012	Contemporary Biology	4.00	Kamal Dulai	24	24	0	100%		A
3013	BIO	005	001	Biology Today	4.00	Catherine	24	23	1	96%		A
3014	BIO	005	002	Biology Today	4.00	Catherine	24	24	0	100%		A
3015	BIO	005	003	Biology Today	4.00	Catherine	24	24	0	100%		A
3016	BIO	010	001	Genetics, Stem Cells &	4.00	Maria	25	24	1	96%		A
3017	BIO	010	002	Genetics, Stem Cells &	4.00	Keith Alley	25	16	9	64%		A
3018	BIO	060	001	Nutrition	4.00	Kamal Dulai	25	25	0	100%		A
3019	BIO	060	002	Nutrition	4.00	Kamal Dulai	25	25	0	100%		A
3020	BIO	060	003	Nutrition	4.00	Kamal Dulai	25	25	0	100%		A
3843	BIO	095	001	Lower Div Undergrad	1.00	Wei-Chun Chin	1	0	1	0%		A
3767	BIO	098	001	Hepatitis C Research	1.00	Jinah Choi	1	1	0	100%		A
3021	BIO	100	001	Molecular Machinery of Life	4.00	Pablo Garcia-	24	23	1	96%		A
3022	BIO	100	002	Molecular Machinery of Life	4.00	Pablo Garcia-	24	22	2	92%		A
3023	BIO	100	003	Molecular Machinery of Life	4.00	Pablo Garcia-	24	24	0	100%		A
3024	BIO	100	004	Molecular Machinery of Life	4.00	Pablo Garcia-	24	24	0	100%		A
3025	BIO	100	005	Molecular Machinery of Life	4.00	Pablo Garcia-	24	18	6	75%		A
3026	BIO	100	006	Molecular Machinery of Life	4.00	Pablo Garcia-	24	22	2	92%		A
3027	BIO	102	001	Biochemistry II	4.00	Andy LiWang	20	18	2	90%	B1	A
3028	BIO	102	002	Biochemistry II	4.00		0	0	0	100%	B2	C
3029	BIO	110	001	The Cell	4.00	Pablo Garcia-	24	12	12	50%		A
3030	BIO	110	002	The Cell	4.00	Pablo Garcia-	24	19	5	79%		A
3031	BIO	110	003	The Cell	4.00	Pablo Garcia-	24	11	13	46%		A
3032	BIO	110	004	The Cell	4.00		0	0	0	100%		C
3033	BIO	110	005	The Cell	4.00	Pablo Garcia-	24	22	2	92%		A
3034	BIO	110	006	The Cell	4.00		0	0	0	100%		C
3035	BIO	125	001	Emerging Public Health	4.00	Stergios	45	40	5	89%		A
3036	BIO	127	001	General Virology	4.00	Jinah Choi	24	24	0	100%		A
3037	BIO	127	002	General Virology	4.00	Jinah Choi	24	24	0	100%		A
3698	BIO	127	003	General Virology	4.00	Jinah Choi	25	22	3	88%		A
3038	BIO	140	001	Genetics	4.00	Carolin Frank	24	14	10	58%		A
3039	BIO	140	002	Genetics	4.00	Carolin Frank	24	16	8	67%		A
3040	BIO	140	003	Genetics	4.00	Carolin Frank	24	23	1	96%		A
3041	BIO	140	004	Genetics	4.00	Carolin Frank	24	23	1	96%		A
3042	BIO	141	001	Evolution	4.00	Michael	24	24	0	100%		A
3043	BIO	141	002	Evolution	4.00	Michael	24	24	0	100%		A
3044	BIO	141	003	Evolution	4.00	Michael	24	24	0	100%		A
3045	BIO	141	004	Evolution	4.00	Michael	24	19	5	79%		A
3046	BIO	147	001	Astrobiology	4.00	Wil Van	28	7	21	25%	ES	A
3047	BIO	147	002	Astrobiology	4.00	Monica Medina	28	6	22	21%	BS	A
3048	BIO	148	001	Fundamentals of Ecology	4.00	Steve Hart	24	15	9	63%		A
3049	BIO	148	002	Fundamentals of Ecology	4.00	Steve Hart	24	14	10	58%		A
3050	BIO	149F	001	Conservation Biology Lab	1.00	Andres Aguilar	24	11	13	46%		A
3051	BIO	150	001	Embryos, Genes, and	4.00	Jennifer	25	10	15	40%		A
3052	BIO	150	002	Embryos, Genes, and	4.00	Jennifer	25	19	6	76%		A
3834	BIO	151	001	Molecular Immunology	4.00	David Ojcius	10	9	1	90%		A
3053	BIO	161	001	Human Physiology	4.00	Rudy Ortiz	20	20	0	100%		A
3054	BIO	161	002	Human Physiology	4.00	Rudy Ortiz	20	17	3	85%		A
3055	BIO	161	003	Human Physiology	4.00	Rudy Ortiz	20	15	5	75%		A
3056	BIO	161	004	Human Physiology	4.00	Rudy Ortiz	20	15	5	75%		A
3057	BIO	164	001	Human Anatomy	5.00	Benoit Dayrat	15	16	(1)	107%		A
3058	BIO	164	002	Human Anatomy	5.00	Benoit Dayrat	16	16	0	100%		A
3059	BIO	164	003	Human Anatomy	5.00	Benoit Dayrat	15	15	0	100%		A
3060	BIO	164	004	Human Anatomy	5.00	Benoit Dayrat	16	16	0	100%		A
3061	BIO	170	001	Neurobiology	4.00	Michael Cleary	25	25	0	100%		A
3062	BIO	170	002	Neurobiology	4.00	Michael Cleary	25	24	1	96%		A
3063	BIO	170L	001	Neurobiology Laboratory	1.00	Michael Cleary	20	20	0	100%		A
3064	BIO	170L	002	Neurobiology Laboratory	1.00	Michael Cleary	20	19	1	95%		A
3065	BIO	182	001	Bioinformatics	5.00	David Ardell	18	18	0	100%	QB	A
3066	BIO	190	001	Research Seminar	1.00	Jason	20	19	1	95%		A
3683	BIO	195	001	Upper Div Undergrad	1.00	Monica Medina	1	1	0	100%		A
3684	BIO	195	002	Upper Div Undergrad	1.00	David Ojcius	1	1	0	100%		A
3685	BIO	195	003	Upper Div Undergrad	1.00	Carolin Frank	1	1	0	100%		A
3067	CHEM	001	001	Preparatory Chemistry	3.00	Mark Vidensek	30	30	0	100%		A
3068	CHEM	001	002	Preparatory Chemistry	3.00	Mark Vidensek	20	21	(1)	105%		A
3069	CHEM	001	003	Preparatory Chemistry	3.00	Mark Vidensek	30	24	6	80%		A
3070	CHEM	002	001	General Chemistry I	4.00	Mark Vidensek	24	15	9	63%		A
3071	CHEM	002	002	General Chemistry I	4.00	Mark Vidensek	24	15	9	63%		A
3072	CHEM	002	003	General Chemistry I	4.00	Mark Vidensek	24	13	11	54%		A
3073	CHEM	002	004	General Chemistry I	4.00	Mark Vidensek	24	24	0	100%		A
3074	CHEM	002	005	General Chemistry I	4.00	Mark Vidensek	24	24	0	100%		A
3075	CHEM	002	006	General Chemistry I	4.00		0	0	0	100%		C
3076	CHEM	002	007	General Chemistry I	4.00	Mark Vidensek	24	20	4	83%		A
3077	CHEM	002	008	General Chemistry I	4.00	Mark Vidensek	24	21	3	88%		A
3078	CHEM	002	009	General Chemistry I	4.00	Mark Vidensek	24	13	11	54%		A
3079	CHEM	002	010	General Chemistry I	4.00	Mark Vidensek	24	24	0	100%		A
3080	CHEM	002	011	General Chemistry I	4.00	Mark Vidensek	24	24	0	100%		A

3081	CHEM	002	012	General Chemistry I	4.00		0	0	0	100%		C
3082	CHEM	008	001	Prin of Organic Chem	4.00	Henry Forman	20	9	11	45%		A
3083	CHEM	008	002	Prin of Organic Chem	4.00	Henry Forman	20	15	5	75%		A
3084	CHEM	008	003	Prin of Organic Chem	4.00	Henry Forman	20	13	7	65%		A
3085	CHEM	008	004	Prin of Organic Chem	4.00	Henry Forman	20	20	0	100%		A
3086	CHEM	008	005	Prin of Organic Chem	4.00		0	0	0	100%		C
3087	CHEM	008	006	Prin of Organic Chem	4.00	Henry Forman	20	19	1	95%		A
3088	CHEM	010	001	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3089	CHEM	010	002	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3090	CHEM	010	003	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3091	CHEM	010	004	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3092	CHEM	010	005	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3687	CHEM	010	006	General Chemistry II	4.00	David Kelley	20	20	0	100%		A
3688	CHEM	010	007	General Chemistry II	4.00		0	0	0	100%		C
3093	CHEM	100	001	Organic Synth and	3.00	Meng-Lin Tsao	100	74	26	74%		A
3094	CHEM	100L	001	Organic Chemistry	1.00	Meng-Lin Tsao	20	18	2	90%		A
3095	CHEM	100L	002	Organic Chemistry	1.00	Meng-Lin Tsao	20	19	1	95%		A
3096	CHEM	100L	003	Organic Chemistry	1.00	Meng-Lin Tsao	20	10	10	50%		A
3097	CHEM	100L	004	Organic Chemistry	1.00	Meng-Lin Tsao	20	20	0	100%		A
3098	CHEM	101L	001	Advanced Synthetic	2.00		0	0	0	100%		C
3101	CHEM	113	001	Chem Thermodynamics	3.00	Tao Ye	20	8	12	40%	C1	A
3102	CHEM	114L	001	Phys Chem and Instr Analy	2.00	Anne Kelley	20	7	13	35%		A
3099	CHEM	122	001	Biochemistry II	4.00	Andy LiWang	20	3	17	15%	B1	A
3100	CHEM	122	002	Biochemistry II	4.00		0	0	0	100%	B2	C
3686	CHEM	195	001	Upper Div Undergrad	1.00	Matthew Meyer	1	1	0	100%		A
3720	CHEM	195	002	Upper Div Undergrad	1.00	Anne Kelley	1	1	0	100%		A
3831	CHEM	195	003	Upper Div Undergrad	1.00	Tao Ye	1	1	0	100%		A
3103	CHEM	201	001	Organic Organometallic	3.00	Matthew Meyer	16	4	12	25%		A
3104	CHEM	213	001	Chem Thermodynamics	4.00	Tao Ye	20	5	15	25%	C1	A
3105	CHEM	291	001	Physics and Chemistry	1.00	David Kelley	20	10	10	50%		A
3768	CHEM	295	001	Electrochemistry and	1.00	Erik Menke	1	1	0	100%		A
3771	CHEM	295	002	Graduate Research	1.00	Matthew Meyer	2	2	0	100%		A
3784	CHEM	295	003	Graduate Research	1.00	Anne Kelley	1	1	0	100%		A
3785	CHEM	295	004	Graduate Research	1.00	Tao Ye	1	1	0	100%		A
3796	CHEM	295	005	Graduate Research	1.00	David Kelley	2	2	0	100%		A
3824	CHEM	295	006	Graduate Research	1.00	Meng-Lin Tsao	1	1	0	100%		A
3786	CHEM	298	001	Directed Group Study	1.00	Tao Ye	1	1	0	100%		A
3836	CHEM	298	002	Electrochemistry	1.00	Erik Menke	1	1	0	100%		A
3842	CHEM	298	003	Directed Group Study	1.00	Jennifer Lu	1	1	0	100%		A
3642	ESS	070	001	Soil Found of Terrest	4.00	Asmeret Berhe	20	4	16	20%		A
3106	ESS	103	001	Geochemistry of Earth	3.00	Peggy ODay	20	0	20	0%	E1	A
3659	ESS	147	001	Astrobiology	4.00	Monica Medina	28	8	20	29%	ES	A
3660	ESS	147	002	Astrobiology	4.00	Monica Medina	28	1	27	4%	BS	A
3107	ESS	190	001	Undergraduate Seminar	1.00	Steve Hart	20	2	18	10%	EE	A
3108	MATH	005	001	Pre-Calculus	4.00	Kristen Bianchi	30	30	0	100%		A
3109	MATH	005	002	Pre-Calculus	4.00	Kristina Crona	30	30	0	100%		A
3110	MATH	005	003	Pre-Calculus	4.00	Kristina Crona	30	30	0	100%		A
3111	MATH	005	004	Pre-Calculus	4.00	Kristen Bianchi	30	30	0	100%		A
3112	MATH	005	005	Pre-Calculus	4.00	Daniel	30	30	0	100%		A
3113	MATH	005	006	Pre-Calculus	4.00		0	0	0	100%		C
3114	MATH	005	007	Pre-Calculus	4.00		0	0	0	100%		C
3115	MATH	005	008	Pre-Calculus	4.00	Daniel	30	30	0	100%		A
3116	MATH	005	009	Pre-Calculus	4.00		0	0	0	100%		C
3117	MATH	005	010	Pre-Calculus	4.00		0	0	0	100%		C
3118	MATH	005	011	Pre-Calculus	4.00		0	0	0	100%		C
3119	MATH	005	012	Pre-Calculus	4.00		0	0	0	100%		C
3120	MATH	015	001	Intro. Sci. Data Analysis	2.00	Derrick Kiley	26	12	14	46%		A
3121	MATH	015	002	Intro. Sci. Data Analysis	2.00		0	0	0	100%		C
3122	MATH	015	003	Intro. Sci. Data Analysis	2.00	Derrick Kiley	26	13	13	50%		A
3123	MATH	015	004	Intro. Sci. Data Analysis	2.00		0	0	0	100%		C
3124	MATH	015	005	Intro. Sci. Data Analysis	2.00	Derrick Kiley	26	15	11	58%		A
3125	MATH	015	006	Intro. Sci. Data Analysis	2.00		0	0	0	100%		C
3126	MATH	018	001	Stat Sci Data Analysis	4.00		0	0	0	100%		C
3127	MATH	018	002	Stat Sci Data Analysis	4.00	Kristen Bianchi	20	16	4	80%		A
3128	MATH	018	003	Stat Sci Data Analysis	4.00	Kristen Bianchi	20	15	5	75%		A
3129	MATH	018	004	Stat Sci Data Analysis	4.00		20	0	20	0%		C
3130	MATH	021	001	Calculus I	4.00	Yue Lei	20	17	3	85%		A
3131	MATH	021	002	Calculus I	4.00	Yue Lei	20	20	0	100%		A
3132	MATH	021	003	Calculus I	4.00	Yue Lei	20	20	0	100%		A
3133	MATH	021	004	Calculus I	4.00	Yue Lei	20	19	1	95%		A
3134	MATH	021	005	Calculus I	4.00	Kristina Crona	20	20	0	100%		A
3135	MATH	021	006	Calculus I	4.00	Kristina Crona	20	19	1	95%		A
3136	MATH	021	007	Calculus I	4.00	Kristina Crona	20	8	12	40%		A
3137	MATH	021	008	Calculus I	4.00	Kristina Crona	20	19	1	95%		A
3138	MATH	021	009	Calculus I	4.00	Michael	20	20	0	100%		A
3139	MATH	021	010	Calculus I	4.00	Michael	20	20	0	100%		A
3140	MATH	021	011	Calculus I	4.00	Michael	20	20	0	100%		A
3141	MATH	021	012	Calculus I	4.00	Michael	20	20	0	100%		A
3142	MATH	021	013	Calculus I	4.00	Yue Lei	20	5	15	25%		A
3143	MATH	021	014	Calculus I	4.00	Yue Lei	20	14	6	70%		A
3144	MATH	021	015	Calculus I	4.00	Yue Lei	20	20	0	100%		A
3145	MATH	021	016	Calculus I	4.00	Yue Lei	20	18	2	90%		A
3146	MATH	022	001	Calculus II	4.00	Arnold Kim	20	12	8	60%		A
3147	MATH	022	002	Calculus II	4.00	Arnold Kim	20	16	4	80%		A
3148	MATH	022	003	Calculus II	4.00	Arnold Kim	20	20	0	100%		A
3149	MATH	022	004	Calculus II	4.00	Arnold Kim	20	15	5	75%		A
3150	MATH	022	005	Calculus II	4.00	Alexander	20	18	2	90%		A

3151	MATH	022	006	Calculus II	4.00	Alexander	20	8	12	40%		A
3152	MATH	022	007	Calculus II	4.00	Alexander	20	16	4	80%		A
3153	MATH	022	008	Calculus II	4.00	Alexander	20	17	3	85%		A
3154	MATH	022	009	Calculus II	4.00	Alexander	20	20	0	100%		A
3155	MATH	022	010	Calculus II	4.00	Alexander	20	19	1	95%		A
3156	MATH	022	011	Calculus II	4.00	Alexander	20	10	10	50%		A
3157	MATH	022	012	Calculus II	4.00	Alexander	20	4	16	20%		A
3158	MATH	023	001	Vector Calculus	4.00	Devin Greene	20	11	9	55%		A
3159	MATH	023	002	Vector Calculus	4.00	Devin Greene	20	9	11	45%		A
3160	MATH	023	003	Vector Calculus	4.00		0	0	0	100%		C
3161	MATH	023	004	Vector Calculus	4.00	Devin Greene	20	20	0	100%		A
3162	MATH	023	005	Vector Calculus	4.00	Devin Greene	20	16	4	80%		A
3163	MATH	023	006	Vector Calculus	4.00	Devin Greene	20	17	3	85%		A
3164	MATH	023	007	Vector Calculus	4.00		0	0	0	100%		C
3165	MATH	023	008	Vector Calculus	4.00	Devin Greene	20	20	0	100%		A
3166	MATH	024	001	Lin Alg & Diff Eqs	4.00	Boaz Ilan	20	16	4	80%		A
3167	MATH	024	002	Lin Alg & Diff Eqs	4.00	Boaz Ilan	20	20	0	100%		A
3168	MATH	024	003	Lin Alg & Diff Eqs	4.00	Boaz Ilan	20	20	0	100%		A
3169	MATH	024	004	Lin Alg & Diff Eqs	4.00	Boaz Ilan	20	17	3	85%		A
3711	MATH	024	005	Lin Alg & Diff Eqs	4.00	Boaz Ilan	20	10	10	50%		A
3712	MATH	024	006	Lin Alg & Diff Eqs	4.00		0	0	0	100%		C
3170	MATH	030	001	Calculus II for BIO	4.00	Alexander	20	13	7	65%		A
3171	MATH	030	002	Calculus II for BIO	4.00	Alexander	20	9	11	45%		A
3172	MATH	030	003	Calculus II for BIO	4.00		0	0	0	100%		C
3173	MATH	032	001	Prob & Stats	4.00	Yue Lei	20	20	0	100%		A
3174	MATH	032	002	Prob & Stats	4.00	Yue Lei	20	20	0	100%		A
3175	MATH	032	003	Prob & Stats	4.00	Yue Lei	20	20	0	100%		A
3176	MATH	032	004	Prob & Stats	4.00	Yue Lei	20	20	0	100%		A
3177	MATH	091	001	Topics Applied Math.	1.00	Francois	20	8	12	40%		A
3178	MATH	122	001	Complex Variables	4.00	Francois	20	13	7	65%		A
3179	MATH	122	002	Complex Variables	4.00	Francois	20	9	11	45%		A
3180	MATH	132	001	Numerical Analysis II	4.00		0	0	0	100%		C
3181	MATH	132	002	Numerical Analysis II	4.00		0	0	0	100%		C
3182	MATH	142	001	Linear Analysis II	4.00	Mayya Tokman	20	15	5	75%		A
3183	MATH	222	001	Partial-Differential Equat II	4.00		0	0	0	100%		C
3184	MATH	223	001	Asymptotics & Perturbation	4.00	Arnold Kim	20	11	9	55%		A
3662	MATH	233	001	Scientific Computing	4.00	Mayya Tokman	15	6	9	40%		A
3185	MATH	291	001	Applied Mathematics	1.00	Michael	20	5	15	25%	Y7	A
3713	MATH	295	001	Graduate Research	1.00	Kevin Mitchell	1	1	0	100%		A
3769	MATH	295	002	Graduate Research	1.00	Michael	1	1	0	100%		A
3781	MATH	295	003	Light Propagation in	1.00	Arnold Kim	1	1	0	100%		A
3815	MATH	295	004	Graduate Research	1.00	Mayya Tokman	1	1	0	100%		A
3817	MATH	298	001	Research Applied	1.00	Raymond	1	1	0	100%		A
3186	NSED	043	001	Intro to Teaching Sci in	1.00	Susan	20	13	7	65%		A
3187	NSED	044	001	Fieldwork-Intro to Teaching	1.00	Susan	16	10	6	63%		A
3188	NSED	053	001	Intro to Teaching Math in	1.00	Susan	20	15	5	75%		A
3189	NSED	054	001	Fieldwork Intro to Teaching	1.00	Susan	16	9	7	56%		A
3190	NSED	063	001	Intro Teach Sci High School	1.00	Ramon Vega	20	8	12	40%		A
3191	NSED	064	001	Fieldwork: Intro Teach Sci	1.00	Ramon Vega	16	5	11	31%		A
3192	NSED	073	001	Intro Teach Math High	1.00	Ramon Vega	20	6	14	30%		A
3193	NSED	074	001	Fieldwork: Intro Teach Math	1.00	Ramon Vega	16	3	13	19%		A
3782	NSED	095	001	Intro Teaching Scienc and	1.00	Maria	15	15	0	100%		A
3194	NSED	098	001	Success in Natural Science	1.00	Maria	16	9	7	56%		A
3195	NSED	098	002	Success in Natural Science	1.00	Maria	16	7	9	44%		A
3196	NSED	100	001	Intro for Beginning	4.00	Mary Salisbury	30	30	0	100%		A
3197	PHYS	008	001	Introductory Physics I	4.00	Linda Hirst	24	24	0	100%		A
3198	PHYS	008	002	Introductory Physics I	4.00	Linda Hirst	24	24	0	100%		A
3199	PHYS	008	003	Introductory Physics I	4.00	Linda Hirst	24	23	1	96%		A
3200	PHYS	008	004	Introductory Physics I	4.00	Linda Hirst	24	22	2	92%		A
3201	PHYS	008	005	Introductory Physics I	4.00	Linda Hirst	24	24	0	100%		A
3202	PHYS	008	006	Introductory Physics I	4.00	Linda Hirst	24	15	9	63%		A
3203	PHYS	009	001	Introductory Physics II	4.00	Derrick Kiley	24	22	2	92%		A
3204	PHYS	009	002	Introductory Physics II	4.00	Derrick Kiley	24	20	4	83%		A
3205	PHYS	009	003	Introductory Physics II	4.00	Derrick Kiley	24	16	8	67%		A
3206	PHYS	009	004	Introductory Physics II	4.00	Derrick Kiley	24	19	5	79%		A
3207	PHYS	009	005	Introductory Physics II	4.00	Derrick Kiley	24	18	6	75%		A
3208	PHYS	009	006	Introductory Physics II	4.00	Derrick Kiley	24	23	1	96%		A
3209	PHYS	009	007	Introductory Physics II	4.00	Derrick Kiley	24	19	5	79%		A
3210	PHYS	018	001	Intro Phys I for Bio Sci	4.00	Ajay	24	7	17	29%		A
3211	PHYS	018	002	Intro Phys I for Bio Sci	4.00	Ajay	24	20	4	83%		A
3212	PHYS	019	001	Physics II -- Bio	4.00	Carrie Menke	24	24	0	100%		A
3213	PHYS	019	002	Physics II -- Bio	4.00	Carrie Menke	24	24	0	100%		A
3214	PHYS	105	001	Analytic Mechanics	4.00	Carrie Menke	20	10	10	50%		A
3215	PHYS	111	001	Electromagnetic Radiation	2.00	Sayantani	18	6	12	33%		A
3216	PHYS	122	001	Waves	2.00	Sayantani	18	15	3	83%		A
3217	PHYS	124	001	Rotational Mechanics	2.00	Kevin Mitchell	18	9	9	50%		A
3218	PHYS	126	001	Special Relativity	2.00	Kevin Mitchell	18	15	3	83%		A
3219	PHYS	160	001	Modern Physics Lab	4.00	Jay Sharping	16	12	4	75%		A
3840	PHYS	195	001	Upper Div Undergrad	1.00	Sayantani	1	1	0	100%		A
3220	PHYS	205	001	Classical Mechanics	4.00	Roland	12	10	2	83%		A
3221	PHYS	238	001	Quantum Mechanics II	4.00	Raymond	12	4	8	33%		A
3648	PHYS	293	001	Physics Colloquium	1.00	Sayantani	20	9	11	45%	Y7	A
3770	PHYS	295	001	Graduate Research	1.00	Linda Hirst	1	1	0	100%		A
3787	PHYS	295	002	Graduate Research	1.00	Sayantani	2	1	1	50%		A
3792	PHYS	295	003	Graduate Research	1.00	Jay Sharping	1	1	0	100%		A
3802	PHYS	295	004	Graduate Research	1.00	Lin Tian	1	1	0	100%		A
3832	PHYS	295	005	Graduate Research	1.00	Kevin Mitchell	1	1	0	100%		A

3838	PHYS	295	006	Photonics Research	1.00	Jay Sharping	1	1	0	100%		A
3821	PHYS	299	001	Directed Independent Study	1.00	Sayantani	1	1	0	100%		A
3658	QSB	250	001	Embryos, Genes and	3.00	Jennifer	10	6	4	60%		A
3776	QSB	282	001	Bioinfromatics	5.00	David Ardell	25	4	21	16%	QB	A
3222	QSB	290	001	Current Topics-Quant &	3.00	Marcos Garcia-	20	19	1	95%		A
3223	QSB	291	001	QSB Seminar	1.00	Kara	25	16	9	64%	B3	A
3231	QSB	292	002	QSB Group Meeting	1.00	Andres Aguilar	5	3	2	60%		A
3233	QSB	292	003	QSB Group Meeting	1.00	David Ardell	5	2	3	40%		A
3235	QSB	292	004	QSB Group Meeting	1.00	Miriam Barlow	5	0	5	0%		A
3237	QSB	292	005	QSB Group Meeting	1.00	Jinah Choi	5	2	3	40%		A
3239	QSB	292	006	QSB Group Meeting	1.00	Michael	5	4	1	80%		A
3241	QSB	292	007	QSB Group Meeting	1.00	Benoit Dayrat	5	0	5	0%		A
3243	QSB	292	008	QSB Group Meeting	1.00	Henry Forman	5	1	4	20%		A
3245	QSB	292	009	QSB Group Meeting	1.00	Andy LiWang	5	1	4	20%		A
3247	QSB	292	010	QSB Group Meeting	1.00	Monica Medina	5	4	1	80%		A
3249	QSB	292	011	QSB Group Meeting	1.00	Matthew Meyer	5	0	5	0%		A
3251	QSB	292	012	QSB Group Meeting	1.00	David Ojcius	10	7	3	70%		A
3253	QSB	292	013	QSB Group Meeting	1.00	Rudy Ortiz	5	2	3	40%		A
3255	QSB	292	014	QSB Group Meeting	1.00	Maria	5	2	3	40%		A
3257	QSB	292	015	QSB Group Meeting	1.00	Jason	5	0	5	0%		A
3259	QSB	292	016	QSB Group Meeting	1.00	Meng-Lin Tsao	5	1	4	20%		A
3261	QSB	292	017	QSB Group Meeting	1.00	Kara	5	1	4	20%		A
3263	QSB	292	018	QSB Group Meeting	1.00	Michael Cleary	5	2	3	40%		A
3265	QSB	292	019	QSB Group Meeting	1.00	Jennifer	5	3	2	60%		A
3267	QSB	292	020	QSB Group Meeting	1.00	Marcos Garcia-	5	2	3	40%		A
3449	QSB	292	021	QSB Group Meeting	1.00	Patricia	5	2	3	40%		A
3229	QSB	293	001	Stem Cell Journal Club	1.00	Kara	20	9	11	45%	Q1	A
3232	QSB	293	002	QSB Journal Club	1.00	Andres Aguilar	5	3	2	60%		A
3234	QSB	293	003	QSB Journal Club	1.00	David Ardell	5	2	3	40%		A
3236	QSB	293	004	QSB Journal Club	1.00	Miriam Barlow	5	0	5	0%		A
3238	QSB	293	005	QSB Journal Club	1.00	Jinah Choi	5	2	3	40%		A
3240	QSB	293	006	QSB Journal Club	1.00	Michael	5	4	1	80%		A
3242	QSB	293	007	QSB Journal Club	1.00	Benoit Dayrat	5	0	5	0%		A
3244	QSB	293	008	QSB Journal Club	1.00	Henry Forman	5	1	4	20%		A
3246	QSB	293	009	QSB Journal Club	1.00	Andy LiWang	5	1	4	20%		A
3248	QSB	293	010	QSB Journal Club	1.00	Monica Medina	5	4	1	80%		A
3250	QSB	293	011	QSB Journal Club	1.00	Matthew Meyer	5	0	5	0%		A
3252	QSB	293	012	QSB Journal Club	1.00	David Ojcius	10	7	3	70%		A
3254	QSB	293	013	QSB Journal Club	1.00	Rudy Ortiz	5	2	3	40%		A
3256	QSB	293	014	QSB Journal Club	1.00	Maria	5	1	4	20%		A
3258	QSB	293	015	QSB Journal Club	1.00	Jason	5	1	4	20%		A
3260	QSB	293	016	QSB Journal Club	1.00	Meng-Lin Tsao	5	1	4	20%		A
3262	QSB	293	017	QSB Journal Club	1.00	Kara	5	0	5	0%		A
3264	QSB	293	018	QSB Journal Club	1.00	Michael Cleary	5	1	4	20%		A
3266	QSB	293	019	QSB Journal Club	1.00	Jennifer	5	0	5	0%		A
3268	QSB	293	020	QSB Journal Club	1.00	Marcos Garcia-	5	0	5	0%		A
3450	QSB	293	021	QSB Journal Club	1.00	Patricia	5	2	3	40%		A
3706	QSB	295	001	Graduate Research	1.00	Monica Medina	5	4	1	80%		A
3710	QSB	295	002	Embryonic Stem Cell Fate	1.00	Maria	3	3	0	100%		A
3729	QSB	295	003	Graduate Research	1.00	Michael	3	3	0	100%		A
3730	QSB	295	004	Graduate Research	1.00	Andres Aguilar	3	3	0	100%		A
3735	QSB	295	005	Graduate Research	1.00	David Ojcius	5	5	0	100%		A
3737	QSB	295	006	Graduate Research-	1.00	David Ojcius	2	2	0	100%		A
3742	QSB	295	007	Graduate Research	1.00	Rudy Ortiz	2	2	0	100%		A
3749	QSB	295	008	Graduate Resch-Circadian	1.00	Andy LiWang	1	1	0	100%		A
3765	QSB	295	009	Graduate Research	1.00	Kara	2	2	0	100%		A
3775	QSB	295	010	Graduate Research	1.00	Jennifer	2	2	0	100%		A
3788	QSB	295	011	Graduate Research	1.00	Michael Cleary	2	2	0	100%		A
3793	QSB	295	012	Graduate Research	1.00	Meng-Lin Tsao	1	1	0	100%		A
3794	QSB	295	013	Graduate Research	1.00	Henry Forman	1	1	0	100%		A
3798	QSB	295	014	Regulation of MRP3	1.00	Henry Forman	1	1	0	100%		A
3808	QSB	295	015	Graduate Research	1.00	Jinah Choi	1	1	0	100%		A
3820	QSB	295	016	Graduate Research	1.00	Marcos Garcia-	2	2	0	100%		A
3823	QSB	295	017	Graduate Research	1.00	David Ardell	1	1	0	100%		A
3819	QSB	298	001	Special Topics	1.00	Rudy Ortiz	4	2	2	50%		A
3707	QSB	299	001	Integrating Development,	1.00	Monica Medina	1	1	0	100%		A
3763	QSB	299	002	Jellyfish Systematics	1.00	Michael	1	1	0	100%		A
3807	QSB	299	003	Free Radicals in Bio and	1.00	Jinah Choi	1	1	0	100%		A

UC Merced Fall Enrollment Projections Summary for LREP

	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018	Fall 2019	Fall 2020
New Enrollment	Model: 8 Yrs Retention Plus Spring Entrants included in Transfers														
Freshmen	398	669	813	1,043	1,022	1,137	1,170	1,336	1,360	1,490	1,524	1,583	1,731	1,908	2,039
Transfer*	127	151	211	250	318	405	435	462	575	760	806	803	803	815	853
Total New Undergrad	**525**	**820**	**1,024**	**1,293**	**1,340**	**1,542**	**1,605**	**1,798**	**1,935**	**2,250**	**2,330**	**2,386**	**2,534**	**2,723**	**2,892**
Master's	8	8	11	18	20	27	32	38	45	51	62	72	81	92	103
Doctoral	35	44	53	82	104	130	156	184	218	249	291	338	398	425	480
Total New Grad	**43**	**52**	**64**	**99**	**124**	**157**	**188**	**222**	**263**	**300**	**353**	**410**	**479**	**517**	**583**
Total New Students	**568**	**872**	**1,088**	**1,392**	**1,464**	**1,699**	**1,793**	**2,020**	**2,198**	**2,550**	**2,683**	**2,796**	**3,013**	**3,240**	**3,475**
Total Enrollment															
Undergraduate LD	1015	1181	1362	1710	1888	1986	2126	2319	2495	2646	2791	2879	3076	3397	3680
Undergraduate UD	195	569	1101	1299	1724	2190	2514	2740	3051	3534	3958	4236	4443	4592	4853
Total Undergraduate	**1,210**	**1,750**	**2,463**	**3,009**	**3,612**	**4,176**	**4,639**	**5,059**	**5,546**	**6,180**	**6,748**	**7,115**	**7,519**	**7,988**	**8,534**
Total Graduate	**76**	**121**	**165**	**237**	**322**	**422**	**532**	**653**	**790**	**934**	**1,096**	**1,281**	**1,494**	**1,700**	**1,922**
Total Fall Enrollment	**1,286**	**1,871**	**2,629**	**3,247**	**3,934**	**4,598**	**5,172**	**5,712**	**6,336**	**7,114**	**7,845**	**8,396**	**9,013**	**9,688**	**10,456**

*Includes prior spring new transfers

Jan. 11, 2008

University of California, Merced, Preliminary Applicants, Admits & SIRS by Level, School, Major and Year, As of Wednesday, May 05, 2010

DRAFT I

Entering Level: Both Freshmen and Transfer Students

Referral: Column not display; Regular Students, Referral Students & Early Referral Students.

Date/Time of Report: Wednesday, May 05, 2010 at 1:56:43 PM PDT

			Applicants										Admits										SIRs Complete									
			Fall 2007	Fall 2008			Fall 2009			Fall 2010			Fall 2007	Fall 2008			Fall 2009			Fall 2010			Fall 2007	Fall 2008			Fall 2009			Fall 2010		
Entering Level	School	Major	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10
Freshman	Engineering	Bioengineering	239	272	33	13.80%	306	34	12.50%	323	17	5.60%	211	249	38	18.00%	277	28	11.20%	283	6	2.20%	12	45	33	275.00%	36	-9	-20.00%	45	9	25.00%
Freshman	Engineering	Computer Science & Engineering	515	570	55	10.70%	596	26	4.60%	655	59	9.90%	426	468	42	9.90%	518	50	10.70%	533	15	2.90%	33	69	36	109.10%	68	-1	-1.40%	83	15	22.10%
Freshman	Engineering	Environmental Engineering	115	149	34	29.60%	234	85	57.00%	220	-14	-6.00%	96	135	39	40.60%	214	79	58.50%	186	-28	-13.10%	12	19	7	58.30%	24	5	26.30%	19	-5	-20.80%
Freshman	Engineering	Materials Sci & Engineering	34	53	19	55.90%	32	-21	-39.60%	49	17	53.10%	29	50	21	72.40%	29	-21	-42.00%	41	12	41.40%	1	4	3	300.00%	2	-2	-50.00%	7	5	250.00%
Freshman	Engineering	Mechanical Engineering	324	429	105	32.40%	729	300	69.90%	522	-207	-28.40%	275	353	78	28.40%	653	300	85.00%	409	-244	-37.40%	22	49	27	122.70%	57	8	16.30%	81	24	42.10%
Freshman	Engineering	Undeclared Engineering	214	521	307	143.50%	896	375	72.00%	314	-582	-65.00%	175	498	323	184.60%	865	367	73.70%	271	-594	-68.70%	13	15	2	15.40%	37	22	146.70%	35	-2	-5.40%
Freshman	**Engineering**	***total***	**1441**	**1994**	**553**	**38.40%**	**2793**	**799**	**40.10%**	**2083**	**-710**	**-25.40%**	**1212**	**1753**	**541**	**44.60%**	**2556**	**803**	**45.80%**	**1723**	**-833**	**-32.60%**	**93**	**201**	**108**	**116.10%**	**224**	**23**	**11.40%**	**270**	**46**	**20.50%**
Freshman	Natural Sciences	Applied Mathematical Sciences	206	161	-45	-21.80%	269	108	67.10%	194	-75	-27.90%	176	134	-42	-23.90%	242	108	80.60%	164	-78	-32.20%	12	14	2	16.70%	24	10	71.40%	18	-6	-25.00%
Freshman	Natural Sciences	Biological Sciences	1508	1741	233	15.50%	2913	1172	67.30%	2236	-677	-23.20%	1299	1481	182	14.00%	2695	1214	82.00%	1883	-812	-30.10%	151	179	28	18.50%	285	106	59.20%	350	65	22.80%
Freshman	Natural Sciences	Chemical Sciences	265	291	26	9.80%	479	188	64.60%	455	-24	-5.00%	233	255	22	9.40%	428	173	67.80%	379	-49	-11.40%	19	29	10	52.60%	54	25	86.20%	74	20	37.00%
Freshman	Natural Sciences	Earth Systems Science	52	67	15	28.80%	186	119	177.60%	59	-127	-68.30%	41	52	11	26.80%	173	121	232.70%	47	-126	-72.80%	5	4	-1	-20.00%	12	8	200.00%	5	-7	-58.30%
Freshman	Natural Sciences	Physics	101	98	-3	-3.00%	129	31	31.60%	103	-26	-20.20%	81	80	-1	-1.20%	109	29	36.30%	85	-24	-22.00%	9	11	2	22.20%	12	1	9.10%	16	4	33.30%
Freshman	Natural Sciences	Undeclared Natural Sciences	200	210	10	5.00%	303	93	44.30%	259	-44	-14.50%	180	186	6	3.30%	267	81	43.50%	225	-42	-15.70%	15	24	9	60.00%	29	5	20.80%	33	4	13.80%
Freshman	**Natural Sciences**	***total***	**2332**	**2568**	**236**	**10.10%**	**4279**	**1711**	**66.60%**	**3306**	**-973**	**-22.70%**	**2010**	**2188**	**178**	**8.90%**	**3914**	**1726**	**78.90%**	**2783**	**-1131**	**-28.90%**	**211**	**261**	**50**	**23.70%**	**416**	**155**	**59.40%**	**496**	**80**	**19.20%**
Freshman	SSHA	Sociology	0	0	0	0%	0	0	0%	190	190	0%	0	0	0	0%	0	0	0%	135	135	0%	0	0	0	0%	0	0	0%	11	11	0%
Freshman	**SSHA**	***total***	**0**	**0**	**0**	**0%**	**0**	**0**	**0%**	**190**	**190**	**0%**	**0**	**0**	**0**	**0%**	**0**	**0**	**0%**	**135**	**135**	**0%**	**0**	**0**	**0**	**0%**	**0**	**0**	**0%**	**11**	**11**	**0%**
Freshman	SSHA	Anthropology	0	0	0	0%	138	138	0%	124	-14	-10.10%	0	0	0	0%	114	114	0%	87	-27	-23.70%	0	0	0	0%	10	10	0%	13	3	30.00%
Freshman	SSHA	Cognitive Science	30	39	9	30.00%	81	42	107.70%	60	-21	-25.90%	22	35	13	59.10%	79	44	125.70%	48	-31	-39.20%	2	6	4	200.00%	17	11	183.30%	12	-5	-29.40%
Freshman	SSHA	Economics	2	315	313	15650.00%	387	72	22.90%	313	-74	-19.10%	2	256	254	12700.00%	328	72	28.10%	245	-83	-25.30%	2	16	14	700.00%	20	4	25.00%	22	2	10.00%
Freshman	SSHA	History	3	210	207	6900.00%	317	107	51.00%	217	-100	-31.50%	3	152	149	4966.70%	263	111	73.00%	158	-105	-39.90%	0	16	16	0%	23	7	43.80%	23	0	0.00%
Freshman	SSHA	Literatures And Cultures	0	218	218	0%	428	210	96.30%	217	-211	-49.30%	0	182	182	0%	386	204	112.10%	161	-225	-58.30%	0	24	24	0%	20	-4	-16.70%	23	3	15.00%
Freshman	SSHA	Management	430	464	34	7.90%	1006	542	116.80%	495	-511	-50.80%	340	361	21	6.20%	925	564	156.20%	371	-554	-59.90%	36	41	5	13.90%	38	-3	-7.30%	31	-7	-18.40%
Freshman	SSHA	Political Science	14	420	406	2900.00%	746	326	77.60%	470	-276	-37.00%	8	344	336	4200.00%	646	302	87.80%	370	-276	-42.70%	4	45	41	1025.00%	59	14	31.10%	53	-6	-10.20%
Freshman	SSHA	Psychology	804	871	67	8.30%	1302	431	49.50%	1214	-88	-6.80%	612	677	65	10.60%	1091	414	61.20%	888	-203	-18.60%	62	99	37	59.70%	119	20	20.20%	136	17	14.30%
Freshman	SSHA	Social And Cognitive Science	235	0	-235	-100.00%	0	0	0%	0	0	0%	185	0	-185	-100.00%	0	0	0%	0	0	0%	11	0	-11	-100.00%	0	0	0%	0	0	0%
Freshman	SSHA	Undeclared Soc Sci, Human, Art	437	492	55	12.60%	1305	813	165.20%	460	-845	-64.80%	347	398	51	14.70%	1194	796	200.00%	383	-811	-67.90%	25	29	4	16.00%	36	7	24.10%	38	2	5.60%
Freshman	SSHA	World Cultures & History	335	0	-335	-100.00%	0	0	0%	0	0	0%	266	0	-266	-100.00%	0	0	0%	0	0	0%	19	0	-19	-100.00%	0	0	0%	0	0	0%
Freshman	**SSHA**	***total***	**2290**	**3029**	**739**	**32.30%**	**5710**	**2681**	**88.50%**	**3570**	**-2140**	**-37.50%**	**1785**	**2405**	**620**	**34.70%**	**5026**	**2621**	**109.00%**	**2711**	**-2315**	**-46.10%**	**161**	**276**	**115**	**71.40%**	**342**	**66**	**23.90%**	**351**	**9**	**2.60%**
Freshman	Undeclared	Undeclared	8975	11362	2387	26.60%	7646	-3716	-32.70%	13747	6101	79.80%	8463	10834	2371	28.00%	7139	-3695	-34.10%	13145	6006	84.10%	241	306	65	27.00%	349	43	14.10%	497	148	42.40%
Freshman	Undeclared	*total*	8975	11362	2387	26.60%	7646	-3716	-32.70%	13747	6101	79.80%	8463	10834	2371	28.00%	7139	-3695	-34.10%	13145	6006	84.10%	241	306	65	27.00%	349	43	14.10%	497	148	42.40%
Freshman	**total**		15038	18953	3915	26.00%	20428	1475	7.80%	22896	2468	12.10%	13470	17180	3710	27.50%	18635	1455	8.50%	20497	1862	10.00%	706	1044	338	47.90%	1331	287	27.50%	1625	294	22.10%

			Applicants										Admits										SIRs Complete									
			Fall 2007	Fall 2008			Fall 2009			Fall 2010			Fall 2007	Fall 2008			Fall 2009			Fall 2010			Fall 2007	Fall 2008			Fall 2009			Fall 2010		
Entering Level	School	Major	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10	#	#	# DIFF '07-'08	% DIFF '07-'08	#	# DIFF '08-'09	% DIFF '08-'09	#	# DIFF '09-'10	% DIFF '09-'10
Please note: The transfer SIR numbers are insignificant as of this date for Fall 2010.																																
Transfer	Engineering	Bioengineering	38	36	-2	-5.30%	36	0	0.00%	41	5	13.90%	27	24	-3	-11.10%	24	0	0.00%	27	3	12.50%	4	1	-3	-75.00%	3	2	200.00%	2	-1	-33.30%
Transfer	Engineering	Computer Science & Engineering	58	62	4	6.90%	50	-12	-19.40%	85	35	70.00%	41	39	-2	-4.90%	22	-17	-43.60%	44	22	100.00%	0	3	3	0%	1	-2	-66.70%	3	2	200.00%
Transfer	Engineering	Environmental Engineering	22	21	-1	-4.50%	22	1	4.80%	27	5	22.70%	14	16	2	14.30%	14	-2	-12.50%	16	2	14.30%	3	3	0	0.00%	2	-1	-33.30%	1	-1	-50.00%
Transfer	Engineering	Materials Sci & Engineering	0	6	6	0%	7	1	16.70%	14	7	100.00%	0	3	3	0%	3	0	0.00%	9	6	200.00%	0	1	1	0%	1	0	0.00%	1	0	0.00%
Transfer	Engineering	Mechanical Engineering	32	43	11	34.40%	51	8	18.60%	78	27	52.90%	22	25	3	13.60%	30	5	20.00%	50	20	66.70%	1	2	1	100.00%	2	0	0.00%	5	3	150.00%
Transfer	Engineering	Undeclared Engineering	10	7	-3	-30.00%	5	-2	-28.60%	12	7	140.00%	4	3	-1	-25.00%	1	-2	-66.70%	4	3	300.00%	0	0	0	0%	0	0	0%	0	0	0%
Transfer	**Engineering**	***total***	**160**	**175**	**15**	**9.40%**	**171**	**-4**	**-2.30%**	**257**	**86**	**50.30%**	**108**	**110**	**2**	**1.90%**	**94**	**-16**	**-14.50%**	**150**	**56**	**59.60%**	**8**	**10**	**2**	**25.00%**	**9**	**-1**	**-10.00%**	**12**	**3**	**33.30%**
Transfer	Natural Sciences	Applied Mathematical Sciences	0	25	25	0%	29	4	16.00%	45	16	55.20%	0	15	15	0%	19	4	26.70%	29	10	52.60%	0	3	3	0%	0	-3	-100.00%	0	0	0%
Transfer	Natural Sciences	Biological Sciences	238	275	37	15.50%	231	-44	-16.00%	300	69	29.90%	171	198	27	15.80%	143	-55	-27.80%	195	52	36.40%	7	16	9	128.60%	10	-6	-37.50%	12	2	20.00%
Transfer	Natural Sciences	Chemical Sciences	0	50	50	0%	72	22	44.00%	106	34	47.20%	0	34	34	0%	47	13	38.20%	74	27	57.40%	0	2	2	0%	4	2	100.00%	3	-1	-25.00%
Transfer	Natural Sciences	Earth Systems Science	13	22	9	69.20%	16	-6	-27.30%	14	-2	-12.50%	9	8	-1	-11.10%	10	2	25.00%	8	-2	-20.00%	0	0	0	0%	1	1	0%	0	-1	-100.00%
Transfer	Natural Sciences	Physics	0	13	13	0%	12	-1	-7.70%	21	9	75.00%	0	8	8	0%	8	0	0.00%	14	6	75.00%	0	1	1	0%	3	2	200.00%	1	-2	-66.70%
Transfer	Natural Sciences	Undeclared Natural Sciences	6	8	2	33.30%	10	2	25.00%	8	-2	-20.00%	4	2	-2	-50.00%	4	2	100.00%	4	0	0.00%	0	0	0	0%	0	0	0%	0	0	0%
Transfer	**Natural Sciences**	***total***	**257**	**393**	**136**	**52.90%**	**370**	**-23**	**-5.90%**	**494**	**124**	**33.50%**	**184**	**265**	**81**	**44.00%**	**231**	**-34**	**-12.80%**	**324**	**93**	**40.30%**	**7**	**22**	**15**	**214.30%**	**18**	**-4**	**-18.20%**	**16**	**-2**	**-11.10%**
Transfer	SSHA	Anthropology	0	0	0	0%	34	34	0%	72	38	111.80%	0	0	0	0%	19	19	0%	51	32	168.40%	0	0	0	0%	2	2	0%	2	0	0.00%
Transfer	SSHA	Cognitive Science	16	26	10	62.50%	25	-1	-3.80%	24	-1	-4.00%	14	18	4	28.60%	15	-3	-16.70%	16	1	6.70%	1	0	-1	-100.00%	2	2	0%	3	1	50.00%
Transfer	SSHA	Economics	1	101	100	10000.00%	129	28	27.70%	204	75	58.10%	1	68	67	6700.00%	84	16	23.50%	146	62	73.80%	0	1	1	0%	1	0	0.00%	2	1	100.00%
Transfer	SSHA	History	2	63	61	3050.00%	57	-6	-9.50%	82	25	43.90%	2	38	36	1800.00%	35	-3	-7.90%	55	20	57.10%	1	2	1	100.00%	0	-2	-100.00%	4	4	0%
Transfer	SSHA	Literatures And Cultures	0	47	47	0%	50	3	6.40%	73	23	46.00%	0	19	19	0%	30	11	57.90%	51	21	70.00%	0	0	0	0%	3	3	0%	2	-1	-33.30%
Transfer	SSHA	Management	81	81	0	0.00%	87	6	7.40%	117	30	34.50%	51	43	-8	-15.70%	54	11	25.60%	73	19	35.20%	0	4	4	0%	4	0	0.00%	1	-3	-75.00%
Transfer	SSHA	Political Science	2	94	92	4600.00%	99	5	5.30%	143	44	44.40%	2	53	51	2550.00%	59	6	11.30%	87	28	47.50%	0	0	0	0%	3	3	0%	6	3	100.00%
Transfer	SSHA	Psychology	115	159	44	38.30%	200	41	25.80%	280	80	40.00%	79	98	19	24.10%	125	27	27.60%	173	48	38.40%	9	7	-2	-22.20%	10	3	42.90%	17	7	70.00%
Transfer	SSHA	Social And Cognitive Science	111	0	-111	-100.00%	0	0	0%	0	0	0%	76	0	-76	-100.00%	0	0	0%	0	0	0%	3	0	-3	-100.00%	0	0	0%	0	0	0%
Transfer	SSHA	Undeclared Soc Sci, Human, Art	36	40	4	11.10%	52	12	30.00%	58	6	11.50%	15	17	2	13.30%	22	5	29.40%	28	6	27.30%	0	1	1	0%	0	-1	-100.00%	0	0	0%
Transfer	SSHA	World Cultures & History	76	0	-76	-100.00%	0	0	0%	0	0	0%	45	0	-45	-100.00%	0	0	0%	0	0	0%	1	0	-1	-100.00%	0	0	0%	0	0	0%
Transfer	**SSHA**	***total***	**440**	**611**	**171**	**38.90%**	**733**	**122**	**20.00%**	**1053**	**320**	**43.70%**	**285**	**354**	**69**	**24.20%**	**443**	**89**	**25.10%**	**680**	**237**	**53.50%**	**15**	**15**	**0**	**0.00%**	**25**	**10**	**66.70%**	**37**	**12**	**48.00%**
Transfer	Undeclared	Undeclared	3	2	-1	-33.30%	1	-1	-50.00%	6	5	500.00%	0	2	2	0%	1	-1	-50.00%	4	3	300.00%	0	0	0	0%	0	0	0%	1	1	0%
Transfer	**Undeclared**	***total***	**3**	**2**	**-1**	**-33.30%**	**1**	**-1**	**-50.00%**	**6**	**5**	**500.00%**	**0**	**2**	**2**	**0%**	**1**	**-1**	**-50.00%**	**4**	**3**	**300.00%**	**0**	**0**	**0**	**0%**	**0**	**0**	**0%**	**1**	**1**	**0%**
Transfer	**Total Transfers**		860	1181	321	37.30%	1275	94	8.00%	1810	535	42.00%	577	731	154	26.70%	769	38	5.20%	1158	389	50.60%	30	47	17	56.70%	52	5	10.60%	66	14	26.90%
TOTAL	**Total**		**15898**	**20134**	**4236**	**26.60%**	**21703**	**1569**	**7.80%**	**24706**	**3003**	**13.80%**	**14047**	**17911**	**3864**	**27.50%**	**19404**	**1493**	**8.30%**	**21655**	**2251**	**11.60%**	**736**	**1091**	**355**	**48.20%**	**1383**	**292**	**26.80%**	**1691**	**308**	**22.30%**

Source: Admission Internal Data 2007-2010

Note: OBS - Obsolete Majors

This data is preliminary and not meant for external purposes.

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UNDERGRADUATE ENROLLMENT BY MAJOR/PROGRAM

Majors	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Anthropology	0	0	0	4	18
Applied Mathematics	0	6	23	38	57
Bioengineering	36	50	62	104	105
Biological Sciences	232	358	481	632	771
Chemical Sciences	0	6	24	54	104
Cognitive Sciences	0	0	31	57	87
Computer Science & Engineering	57	79	96	152	161
Earth Systems Science	7	9	18	19	28
Economics	0	0	20	50	50
Environmental Engineering	5	17	31	51	60
History	0	0	36	64	75
Literature and Cultures	0	0	23	51	73
Management	63	94	122	178	188
Materials Science & Engineering	0	2	4	16	15
Mechanical Engineering	0	26	69	121	176
Physics	0	3	15	23	37
Political Science	0	0	56	116	157
Psychology	0	36	219	328	373
Social and Cognitive Sciences	122	168	33	12	0
Undeclared	123	150	240	321	469
Undeclared Engineering	42	51	48	49	54
Undeclared Natural Sciences	42	38	36	36	46
Undeclared Social Sciences, Humanities & Arts	76	52	37	50	83
World Cultures & History	33	65	26	8	3
Undergraduate Total	**838**	**1,210**	**1,750**	**2,534**	**3,190**

Note: Fall 2005 enrollment figures do not include students admitted as Hurricane Katrina visiting students.

Note: Undeclared students with a school designation have not yet chosen an area of concentration

Data Source: IPA Enrollment Table

Prepared by Institutional Planning & Analysis

UCMERCED

UNDERGRADUATE ENROLLMENT BY MAJOR/PROGRAM

Majors	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009
Anthropology	0.0%	0.0%	0.0%	0.2%	0.6%
Applied Mathematics	0.0%	0.5%	1.3%	1.5%	1.8%
Bioengineering	4.3%	4.1%	3.5%	4.1%	3.3%
Biological Sciences	27.7%	29.6%	27.5%	24.9%	24.2%
Chemical Sciences	0.0%	0.5%	1.4%	2.1%	3.3%
Cognitive Sciences	0.0%	0.0%	1.8%	2.2%	2.7%
Computer Science & Engineering	6.8%	6.5%	5.5%	6.0%	5.0%
Earth Systems Science	0.8%	0.7%	1.0%	0.7%	0.9%
Economics	0.0%	0.0%	1.1%	2.0%	1.6%
Environmental Engineering	0.6%	1.4%	1.8%	2.0%	1.9%
History	0.0%	0.0%	2.1%	2.5%	2.4%
Literature and Cultures	0.0%	0.0%	1.3%	2.0%	2.3%
Management	7.5%	7.8%	7.0%	7.0%	5.9%
Materials Science & Engineering	0.0%	0.2%	0.2%	0.6%	0.5%
Mechanical Engineering	0.0%	2.1%	3.9%	4.8%	5.5%
Physics	0.0%	0.2%	0.9%	0.9%	1.2%
Political Science	0.0%	0.0%	3.2%	4.6%	4.9%
Psychology	0.0%	3.0%	12.5%	12.9%	11.7%
Social and Cognitive Sciences	14.6%	13.9%	1.9%	0.5%	0.0%
Undeclared	14.7%	12.4%	13.7%	12.7%	14.7%
Undeclared Engineering	5.0%	4.2%	2.7%	1.9%	1.7%
Undeclared Natural Sciences	5.0%	3.1%	2.1%	1.4%	1.4%
Undeclared Social Sciences, Humanities & Arts	9.1%	4.3%	2.1%	2.0%	2.6%
World Cultures & History	3.9%	5.4%	1.5%	0.3%	0.1%
Undergraduate Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Note: Fall 2005 enrollment figures do not include students admitted as Hurricane Katrina visiting students.

Note: Undeclared students with a school designation have not yet chosen an area of concentration

Data Source: IPA Enrollment Table

Prepared by Institutional Planning & Analysis

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UNDERGRADUATE ENROLLMENT BY MAJOR BY ETHNICITY

Fall 2009	African-American	Asian/Pacific Islander	Hispanics	Native American	White	Nonresident Alien	Unknown/ Other	Total
Anthropology	1	5	7	0	4	1	0	**18**
Applied Mathematics	4	11	23	0	14	2	3	**57**
Bioengineering	5	52	25	1	21	0	1	**105**
Biological Sciences	46	328	220	5	134	5	33	**771**
Chemical Sciences	4	46	23	1	22	3	5	**104**
Cognitive Sciences	7	22	19	2	29	3	5	**87**
Computer Science & Engineering	11	47	52	0	39	1	11	**161**
Earth Systems Science	1	4	5	0	18	0	0	**28**
Economics	2	19	10	0	12	5	2	**50**
Environmental Engineering	2	20	10	0	26	1	1	**60**
History	5	19	27	1	22	0	1	**75**
Literature and Cultures	5	6	43	0	15	1	3	**73**
Management	15	69	67	1	28	1	7	**188**
Materials Science & Engineering	0	4	7	1	2	1	0	**15**
Mechanical Engineering	10	43	52	0	60	1	10	**176**
Physics	1	12	7	0	15	0	2	**37**
Political Science	20	24	65	2	36	2	8	**157**
Psychology	33	93	170	2	64	1	10	**373**
World Cultures & History	0	2	0	0	1	0	0	**3**
Undeclared	39	166	143	3	96	4	18	**469**
Undeclared Engineering	6	17	11	0	17	1	2	**54**
Undeclared Natural Sciences	3	20	11	1	10	0	1	**46**
Undeclared Social Sciences	9	21	31	2	14	1	5	**83**
Undergraduate Total	**229**	**1,050**	**1,028**	**22**	**699**	**34**	**128**	**3,190**

Note: Undeclared students with a school designation have not yet chosen an area of concentration
Data Source: IPA Enrollment Table
Prepared by Institutional Planning & Analysis

UCMERCED

UNDERGRADUATE ENROLLMENT % BY MAJOR BY ETHNICITY

Fall 2009	African-American	Asian/Pacific Islander	Hispanics	Native American	White	Nonresident Alien	Unknown/ Other	Total
Anthropology	5.6%	27.8%	38.9%	0.0%	22.2%	5.6%	0.0%	**100.0%**
Applied Mathematics	7.0%	19.3%	40.4%	0.0%	24.6%	3.5%	5.3%	**100.0%**
Bioengineering	4.8%	49.5%	23.8%	1.0%	20.0%	0.0%	1.0%	**100.0%**
Biological Sciences	6.0%	42.5%	28.5%	0.6%	17.4%	0.6%	4.3%	**100.0%**
Chemical Sciences	3.8%	44.2%	22.1%	1.0%	21.2%	2.9%	4.8%	**100.0%**
Cognitive Sciences	8.0%	25.3%	21.8%	2.3%	33.3%	3.4%	5.7%	**100.0%**
Computer Science & Engineering	6.8%	29.2%	32.3%	0.0%	24.2%	0.6%	6.8%	**100.0%**
Earth Systems Science	3.6%	14.3%	17.9%	0.0%	64.3%	0.0%	0.0%	**100.0%**
Economics	4.0%	38.0%	20.0%	0.0%	24.0%	10.0%	4.0%	**100.0%**
Environmental Engineering	3.3%	33.3%	16.7%	0.0%	43.3%	1.7%	1.7%	**100.0%**
History	6.7%	25.3%	36.0%	1.3%	29.3%	0.0%	1.3%	**100.0%**
Literature and Cultures	6.8%	8.2%	58.9%	0.0%	20.5%	1.4%	4.1%	**100.0%**
Management	8.0%	36.7%	35.6%	0.5%	14.9%	0.5%	3.7%	**100.0%**
Materials Science & Engineering	0.0%	26.7%	46.7%	6.7%	13.3%	6.7%	0.0%	**100.0%**
Mechanical Engineering	5.7%	24.4%	29.5%	0.0%	34.1%	0.6%	5.7%	**100.0%**
Physics	2.7%	32.4%	18.9%	0.0%	40.5%	0.0%	5.4%	**100.0%**
Political Science	12.7%	15.3%	41.4%	1.3%	22.9%	1.3%	5.1%	**100.0%**
Psychology	8.8%	24.9%	45.6%	0.5%	17.2%	0.3%	2.7%	**100.0%**
World Cultures & History	0.0%	66.7%	0.0%	0.0%	33.3%	0.0%	0.0%	**100.0%**
Undeclared	8.3%	35.4%	30.5%	0.6%	20.5%	0.9%	3.8%	**100.0%**
Undeclared Engineering	11.1%	31.5%	20.4%	0.0%	31.5%	1.9%	3.7%	**100.0%**
Undeclared Natural Sciences	6.5%	43.5%	23.9%	2.2%	21.7%	0.0%	2.2%	**100.0%**
Undeclared Social Sciences	10.8%	25.3%	37.3%	2.4%	16.9%	1.2%	6.0%	**100.0%**

Note: Undeclared students with a school designation have not yet chosen an area of concentration
Data Source: IPA Enrollment Table
Prepared by Institutional Planning & Analysis

UCMERCED

UNDERGRADUATE ENROLLMENT BY MAJOR BY GENDER

Fall 2009	Female	Male	Decline to State	Total
Anthropology	13	5	0	**18**
Applied Mathematics	15	42	0	**57**
Bioengineering	26	79	0	**105**
Biological Sciences	452	316	3	**771**
Chemical Sciences	54	50	0	**104**
Cognitive Sciences	41	46	0	**87**
Computer Science & Engineering	16	143	2	**161**
Earth Systems Science	16	12	0	**28**
Economics	20	30	0	**50**
Environmental Engineering	18	42	0	**60**
History	33	42	0	**75**
Literature and Cultures	48	25	0	**73**
Management	104	83	1	**188**
Materials Science & Engineering	3	12	0	**15**
Mechanical Engineering	15	160	1	**176**
Physics	6	31	0	**37**
Political Science	71	86	0	**157**
Psychology	278	95	0	**373**
World Cultures & History	2	1	0	**3**
Undeclared	229	238	2	**469**
Undeclared Engineering	10	44	0	**54**
Undeclared Natural Sciences	23	23	0	**46**
Undeclared Social Sciences	61	19	3	**83**
Undergraduate Total	**1554**	**1624**	**12**	**3,190**

Note: Undeclared students with a school designation have not yet chosen an area of concentration
Data Source: IPA Enrollment Table
Prepared by Institutional Planning & Analysis

UCMERCED

UNDERGRADUATE ENROLLMENT % BY MAJOR BY GENDER

Fall 2009	Female	Male	Decline to State	Total
Anthropology	72.2%	27.8%	0.0%	**100.0%**
Applied Mathematics	26.3%	73.7%	0.0%	**100.0%**
Bioengineering	24.8%	75.2%	0.0%	**100.0%**
Biological Sciences	58.6%	41.0%	0.4%	**100.0%**
Chemical Sciences	51.9%	48.1%	0.0%	**100.0%**
Cognitive Sciences	47.1%	52.9%	0.0%	**100.0%**
Computer Science & Engineering	9.9%	88.8%	1.2%	**100.0%**
Earth Systems Science	57.1%	42.9%	0.0%	**100.0%**
Economics	40.0%	60.0%	0.0%	**100.0%**
Environmental Engineering	30.0%	70.0%	0.0%	**100.0%**
History	44.0%	56.0%	0.0%	**100.0%**
Literature and Cultures	65.8%	34.2%	0.0%	**100.0%**
Management	55.3%	44.1%	0.5%	**100.0%**
Materials Science & Engineering	20.0%	80.0%	0.0%	**100.0%**
Mechanical Engineering	8.5%	90.9%	0.6%	**100.0%**
Physics	16.2%	83.8%	0.0%	**100.0%**
Political Science	45.2%	54.8%	0.0%	**100.0%**
Psychology	74.5%	25.5%	0.0%	**100.0%**
World Cultures & History	66.7%	33.3%	0.0%	**100.0%**
Undeclared	48.8%	50.7%	0.4%	**100.0%**
Undeclared Engineering	18.5%	81.5%	0.0%	**100.0%**
Undeclared Natural Sciences	50.0%	50.0%	0.0%	**100.0%**
Undeclared Social Sciences	73.5%	22.9%	3.6%	**100.0%**

Note: Undeclared students with a school designation have not yet chosen an area of concentration
Data Source: IPA Enrollment Table
Prepared by Institutional Planning & Analysis

UNDERGRADUATE			Fall 2009 Budget Projection																Fall Net Req
Discipline	Crs #	Course Title	Instructor	Proj. Enrollmt	IWC for Course	Lecturer %Time	Lecturer Annual Salary	Sub-Total Lecturer Cost	TA FTE	SubTotal TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Copier Services Costs	Speakers Series Costs	Fall Total	Crs Fee	Fee Income	Net Request
		Life Sciences Dispensary									6000	22000		0		28000.00		0	28000.00
BIO	1	Contemp Bio	Staff (Dulai)	175	1	0.167	7831.632	9319.642	0.563	28125		350		1225		39019.64		0	39019.64
BIO	1	Contemp Bio	Staff (Dulai)	175	1	0.167	7831.632	9319.642	0.563	28125		350		1225		39019.64		0	39019.64
BIO	1L	Contemp Bio Lab	Staff (Dulai)	264	0		0	0	1.500	75000		7920		1848		84768.00	20	5280	79488.00
BIO	2	Intro. to Molecular Bio	Staff	140	1	0.167	7831.632	9319.642	0.333	16625		350		980		27274.64		0	27274.64
BIO	2L	Intro. to Molecular Bio Lab	Staff	120	0		0	0	0.625	31250		4200		840		36290.00	25	3000	33290.00
BIO	3	Health and Disease	Pallavicini	72	1	0.167	7831.632	9319.642	0.250	12500		1800		504		24123.64		0	24123.64
BIO	5	Bio Today	Staff (Gilbert)	72	1	0.167	7831.632	9319.642	0.250	12500		350		504		22673.64		0	22673.64
BIO	60	Nutrition	Ortiz	90	1	0.167	7831.632	9319.642	0.250	12500		350		630		22799.64		0	22799.64
BIO	101	Biochemistry	A. LiWang	75	1		0	0	0.250	12500		350		525		13375.00		0	13375.00
BIO	102	Molecular Biology					0	0		0				0		0.00	60	0	0.00
BIO	110	The Cell	Manilay	96	1		0	0	0.563	28125		3840		672		32637.00	30	2880	29757.00
BIO	111	Cells, Tissues					0	0		0				0		0.00		0	0.00
BIO	120	General Microbiology	Raymond	60	1		0	0	0.250	12500		350		420		13270.00		0	13270.00
BIO	120L	General Microbiology Lab	Raymond	60	0.25		0	0	0.250	12500		4200		420		17120.00	95	5700	11420.00
BIO	124	Microbial Evolution	Barlow	48	1		0	0	0.250	12500		350		336		13186.00		0	13186.00
BIO	125	Public Hlth Threats					0	0		0				0		0.00		0	0.00
BIO	127	Virology					0	0		0				0		0.00		0	0.00
BIO	140	Genetics	Barlow	96	1		0	0	0.500	25000		2400		672		28072.00	15	1440	26632.00
BIO	141	Evolution	Aguilar	72	1		0	0	0.375	18750		1800		504		21054.00	15	1080	19974.00
BIO	148	Fundamentals of Ecology	Hart	30	1		0	0	0.063	3125		350	1560	210		5245.00	40	1200	4045.00
BIO	149	Conservation Bio					0	0		0				0		0.00		0	0.00
BIO	149F	Conservation Bio Field					0	0		0				0		0.00	50	0	0.00
BIO	151	Immunology	MG-O	90	1		0	0	0.250	12500		350		630		13480.00		0	13480.00
BIO	151L	Immunololgy Lab	MG-O	90	0		0	0	0.375	18750		4050		630		23430.00	35	3150	20280.00
BIO	152	Cancer & Tumor Bio					0	0		0						0.00		0	0.00
BIO	160/160	Comp Phys (alt years)					0	0		0				0		0.00		0	0.00
BIO	161	Human Phys	Ortiz	72	1		0	0	0.375	18750		2160		504		21414.00	20	1440	19974.00
BIO	164	Human Anatomy					0	0		0				0		0.00	30	0	0.00
BIO	170	Neurobiology					0	0		0				0		0.00		0	0.00
BIO	170L	Neurobiology Lab					0	0		0						0.00	15	0	0.00
BIO	180	Mathematical Modeling for Bio	Colvin	60	1		0	0	0.250	12500		350		420		13270.00		0	13270.00
BIO	182	Bioinformatics (alt years)					0	0		0				0		0.00		0	0.00
		Physical Sciences Dispensary					0	0		0	7500	42600		0		50100.00		0	50100.00
		Chemistry ACS Exams					0	0		0		100		0		100.00		0	100.00
CHEM	1	Preparatory Chemistry	Staff (MV)	270	1	0.167	7831.632	9319.642	0.750	37500		350		1890		49059.64		0	49059.64
CHEM	2	General Chemistry	Staff (MV)	168	1	0.167	7831.632	9319.642	0.875	43750		2520		1176		56765.64	5	840	55925.64
CHEM	2	General Chemistry	Staff (MV)	168	1	0.167	7831.632	9319.642	0.875	43750		2520		1176		56765.64	5	840	55925.64
CHEM	8	Prin of Organic Chem	PLiWang	120	1.25		0	0	1.000	50000		4200		840		55040.00	25	3000	52040.00
CHEM	10	General Chemistry II	Menke	160	1		0	0	1.250	62500		4000		1120		67620.00	15	2400	65220.00
CHEM	100	Organic Synth and Mechanism	Meyer	120	1		0	0	0.000	0		350		840		1190.00		0	1190.00
CHEM	100L	Organic Chemistry Laboratory	Meyer	100	0		0	0	0.625	31250		4000		700		35950.00	30	3000	32950.00
CHEM	101L	Adv Synth Lab	Staff (SM)	20	1	0.33	15475.68	18416.06	0.250	12500		3900		140		34956.06	95	1900	33056.06
CHEM	111	Biochemistry I	BIO 101 (AL)				0	0		0				0		0.00		0	0.00
CHEM	112	Quantum Chem and Spect	NewTheor	12	1		0	0		0		350		84		434.00		0	434.00
CHEM	113	Chem Thermodynamics & Kinet					0	0		0				0		0.00		0	0.00
CHEM	114L	Phys Chem and Instr Analy Lab					0	0		0				0		0.00	50	0	0.00
CHEM	115	Instr Analy and Bioanaly Chem	Ye	10	1		0	0		0		350		70		420.00		0	420.00
CHEM	120	Inorganic Chemistry	DKelley	10	1		0	0		0		350		70		420.00		0	420.00
CHEM	122	Biochemistry II					0	0		0				0		0.00	60	0	0.00
CHEM	130	Organic Spectroscopy & Comput					0	0		0				0		0.00		0	0.00
CHEM	131	Molecular Spectroscopy					0	0		0				0		0.00		0	0.00
CHEM	140	Nanoscale Materials Chemistry					0	0		0				0		0.00		0	0.00
CHEM	147	Materials Chemistry Lab					0	0		0				0		0.00		0	0.00
CHEM	194	Communication & Ethics in Chem					0	0		0				0		0.00		0	0.00

Discipline	Crs #	Course Title	Instructor	Proj. Enrollmt	IWC for Course	Lecturer %Time	Lecturer Annual Salary	Sub-Total Lecturer Cost	TA FTE	SubTotal TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Copier Services Costs	Speakers Series Costs	Fall Total	Crs Fee	Fee Income	Net Request
ESS	1	Intro to ESS	Beman	72	1		0	0	0.375	18750		2592	1872	504		23718.00	26	1872	21846.00
ESS	2	Sustainability Science	Ghezzehei	72	1		0	0	0.250	12500		500		504		13504.00		0	13504.00
ESS	50	Ecosystems of CA					0	0		0		0		0		0.00	52	0	0.00
ESS	105	Biogeochemistry	Hart	20	1		0	0		0		500		140		640.00		0	640.00
ESS	120	Environmental Microbiology	Beman	20	1		0	0		0		350		140		490.00		0	490.00
ESS	141	Science and Policy					0	0		0				0		0.00		0	0.00
ESS	148	Ecology	Hart	10	1		0	0	0.063	3125		350	520	70		4065.00	40	400	3665.00
ESS	149	Conservation Biology					0	0		0				0		0.00		0	0.00
ESS	170	Soils					0	0		0				0		0.00		0	0.00
ESS	170L	Soils Lab					0	0		0				0		0.00		0	0.00
ESS	190	Seminar	Beman	10	0		0	0		0		350		70		420.00		0	420.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810.00		0	12810.00
MATH	15	Intro. Sci. Data Analysis	Staff	180	0.75	0.167	7831.632	9319.642	0.500	25000		350		1260		35929.64		0	35929.64
MATH	18	Stat Sci Data Analysis					0	0		0				0		0.00		0	0.00
MATH	21	Calculus I Sci & Eng	Lei	120	1		0	0	0.500	25000		200		840		26040.00		0	26040.00
MATH	11	Calculus I	Staff	120	1	0.167	7831.632	9319.642	0.500	25000		200		840		35359.64		0	35359.64
MATH	11	Calculus I	Staff	100	1	0.167	7831.632	9319.642	0.500	25000		200		700		35219.64		0	35219.64
MATH	22	Calculus II Sci & Eng	Staff	120	1	0.167	7831.632	9319.642	0.500	25000		200		840		35359.64		0	35359.64
MATH	12	Calculus II	Staff	120	1	0.167	7831.632	9319.642	0.500	25000		200		840		35359.64		0	35359.64
MATH	23	Vector Calculus	Blanchette	120	1		0	0	0.500	25000		200		840		26040.00		0	26040.00
MATH	24	Lin Alg & Diff Eqs	Staff	120	1	0.167	7831.632	9319.642	0.500	25000		200		840		35359.64		0	35359.64
MATH	32	Prob & Stats	Staff	120	1	0.167	7831.632	9319.642	0.500	25000		200		840		35359.64		0	35359.64
MATH	91	Topics in Applied Math								0				0		0.00		0	0.00
MATH	122	Complex Variables and Appl.					0	0		0				0		0.00		0	0.00
MATH	125	Intermediate Diff. Eqs.	staff	30	1	0.167	7831.632	9319.642	0.125	6250		200		210		15979.64		0	15979.64
MATH	126	Partial-Differential Equat					0	0		0				0		0.00		0	0.00
MATH	131	Numerical Analysis I	Marcia	90	1		0	0	0.375	18750		200		630		19580.00		0	19580.00
MATH	141	Linear Analysis I	Lei	20	1		0	0	0.125	6250		200		140		6590.00		0	6590.00
MATH	150	Mathematical Modeling	Tokman	23	1		0	0	0.125	6250		200		161		6611.00		0	6611.00
NSED	23	Intro to teach Sci in Ele	Staff	20	0.125	0.0625	2931	3487.89		0		350		140		3977.89		0	3977.89
NSED	24	Fieldwork, Sci Ele	Staff	20	0.125	0.0625	2931	3487.89		0		350		140		3977.89		0	3977.89
NSED	33	Intro to teach Math in Ele	Staff	20	0.125	0.0625	2931	3487.89		0		350		140		3977.89		0	3977.89
NSED	34	Fieldwork, Math Ele	Staff	20	0.125	0.0625	2931	3487.89		0		350		140		3977.89		0	3977.89
NSED	63	Intro to teach Sci in HS	Staff	20	0.125		0	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	64	Fieldwork, Sci HS	Staff	20	0.125		0	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	73	Intro to teach Math in HS	Staff	20	0.125		0	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	74	Fieldwork, Math HS	Staff	20	0.125		0	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	95	Research in Sci & Math teaching	Staff	20	0.5	0.0625	2931	3487.89		0		350		140		3977.89		0	3977.89
NSED	98	Success in Natural Sciencs	Staff	40	0.75	0.125	5862	6975.78	0.250	12500		350		280		20105.78		0	20105.78
NSED	120	Diversity in Educaiton	Staff	40	1	0.167	7831.632	9319.642		0		350		280		9949.64		0	9949.64
NSED	195	Research in Sci & Math teaching	Staff	20			0	0		0		350		140		490.00		0	490.00

Discipline	Crs #	Course Title	Instructor	Proj. Enrollmt	IWC for Course	Lecturer %Time	Lecturer Annual Salary	Sub-Total Lecturer Cost	TA FTE	SubTotal TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Copier Services Costs	Speakers Series Costs	Fall Total	Crs Fee	Fee Income	Net Request
PHYS	6	The Cosmos, Science and You					0	0		0				0		0.00		0	0.00
PHYS	8	Introductory Physics I	Hirst	96	1		0	0	0.563	28125		350		672		29147.00		0	29147.00
PHYS	8	Introductory Physics I	Staff (Menke)	96	1	0.167	7831.632	9319.642	0.500	25000		350		672		35341.64		0	35341.64
PHYS	9	Introductory Physics II	Staff (Kiley)	120	1	0.167	7831.632	9319.642	0.750	37500		350		840		48009.64		0	48009.64
PHYS	9	Introductory Physics II					0	0		0				0		0.00		0	0.00
PHYS	10	Introductory Physics III	Staff (Kiley)	14	1	0.167	7831.632	9319.642		0		350		98		9767.64		0	9767.64
PHYS	18	Intro Phys I for Bio Sci	Staff (Menke)	72	1	0.167	7831.632	9319.642	0.375	18750		350		504		28923.64		0	28923.64
PHYS	19	Physics II -- Bio					0	0		0				0		0.00		0	0.00
PHYS	104	Biophysics					0	0		0				0		0.00		0	0.00
PHYS	105	Analytic Mechanics					0	0		0				0		0.00		0	0.00
PHYS	110	Electrodynamics	Mitchell	20	1		0	0		0		350		140		490.00		0	490.00
PHYS	111	Electromag Radiation Mini					0	0		0				0		0.00		0	0.00
PHYS	112	Statistical Mechanics	Gopinathan	20	1		0	0		0		350		140		490.00		0	490.00
PHYS	122	Waves Mini					0	0		0				0		0.00		0	0.00
PHYS	124	Atomic structure Mini					0	0		0				0		0.00		0	0.00
PHYS	126	Special Relativity Mini					0	0		0				0		0.00		0	0.00
PHYS	132	Thermodymics					0	0		0				0		0.00		0	0.00
PHYS	137	Quantum Mechanics	Tian	20	1		0	0		0		350		140		490.00		0	490.00
PHYS	144	Atomic Physics					0	0		0				0		0.00		0	0.00
PHYS	148	Modern Optics	Sharping	20	1		0	0		0		350		140		490.00		0	490.00
PHYS	151	Solar Energy					0	0		0				0		0.00		0	0.00
PHYS	160	Modern Physics Lab					0	0		0				0		0.00		0	0.00
PHYS	192	Special Topics in Physics	Senior FTE	12	1		0	0		0		350		84		434.00		0	434.00
		TOTAL				4.4415	208288.6	247863.4	25.4605	1273025	13500	140202	3952	40334	0	1718876.41		39422	1679454.41

GRADUATE			Fall 2009 Budget Projection																Fall Net Req
Discipline	Crs #	Course Title	Instructor	Proj. Enrollmt	IWC for Course	Lecturer % Time	Lecturer Annual Salary	Sub Total Lecturer Costs	TA FTE	Sub Total TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Reproduction Services Costs	Speakers Series Costs	Fall Total	Crs Fee	Fee Income	Net Request
CHEM	200	Adv Organic Synthesis	Tsao	10	1							250		112		362.00		0	362.00
CHEM	201	Organic Organometallic Mech												0		0.00		0	0.00
CHEM	212	Mol & Solid St Quant Chem	AKelley	10	1							250		112		362.00		0	362.00
CHEM	215	Chemical Kinetics & Dynamics												0		0.00		0	0.00
CHEM	291	Physics and Chemistry Sem	DKelley	20	1							250		175	1500	1925.00		0	1925.00
MATH	201	Teaching and Learning	Lei	10	0.5							250		70		320.00		0	320.00
MATH	221	Partial-Differential Equat I	Bhat	15	1							250		105		355.00		0	355.00
MATH	222	Partial-Differential Equat II												0		0.00		0	0.00
MATH	223	Asymptotics & Perturbution Met												0		0.00		0	0.00
MATH	231	Numerical Analysis I	Kim	15	1							250		105		355.00		0	355.00
MATH	232	Numerical Analysis II												0		0.00		0	0.00
MATH	292	Linear and Nonlinear Waves	Ilan	15	1							250		105		355.00		0	355.00
MATH	291	Applied Mathematics Seminar	Staff	30	0							250		210	1500	1960.00		0	1960.00
MATH	298	Directed group study	Blanchette	15	0.5							250		105		355.00		0	355.00
MATH	399	University Teaching	Lei	10	0.5							250		70		320.00		0	320.00
PHYS	204	Biophysics												0		0.00		0	0.00
PHYS	210	Electrodynamics I	Winston	12	1							250		84		334.00			334.00
PHYS	212	Statistical Mechanics	Gopinathan	12	1							250		84		334.00			334.00
PHYS	237	Quantum Mechanics I	Scheibner	12	1							250		84		334.00			334.00
PHYS	238	Quantum Mechanics II												0		0.00			0.00
PHYS	292	Special Topics in Physics	Senior FTE	10	1							250		70		320.00			320.00
PHYS	293	Physics Colloquium	Faculty	15	0							250		105	1500	1855.00			1855.00
QSB	200	Adv Molecular Bio	Cleary	20	1							250		140		390.00		0	390.00
QSB	215	Principles of Biological Techn												0		0.00		0	0.00
QSB	248	Adv Ecology	Hart	10	1							250		70		320.00			320.00
QSB	252	Cancer Genetics & Tumor Bio												0		0.00			0.00
QSB	261	Human Physiology	Ortiz	10	1							250		70		320.00		0	320.00
QSB	280	Adv Mathematical Biology												0		0.00		0	0.00
QSB	282	Adv Bioinformatics												0		0.00		0	0.00
QSB	291	QSB Seminar	Cleary +	45	0							250		315	1500	2065.00		0	2065.00
QSB	294	Respon Conduct of Research	Traina	45	0.5							250		315		565.00		0	565.00
QSB	296	Professional Skills Development	Manilay	20	1							250		140		390.00		0	390.00
QSB	297	Systems Biology												0		0.00		0	0.00
		TOTAL			0	0	0	0	0	0	0	5250	0	2646	6000	13896.00	0	0	13896.00

UNDERGRADUATE			Spring 2010 Budget Projection																Spring Net Req
Discipline	Crs #	Course Title	Instructor	Enrollment Projections	IWC for Course	Lecturer % Time	Lecturer Annual Salary	Sub Total Lecturer Costs	TA FTE	Sub Total TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Reproduction Services Costs	Speakers Series Costs	Spring Total	Crs Fee	Fee Income	Net Request
		Life Sciences Dispensary									6000	21000		0		27000.00		0	27000.00
BIO	1	Contemp Bio	Oviedo	180	1		0.00	0	0.500	25000		350		1260		26610.00		0	26610.00
BIO	1	Contemp Bio	Staff (Dulai)	180	1	0.167	7831.63	9319.6421	0.500	25000		350		1260		35929.64		0	35929.64
BIO	1L		Staff (Dulai)	240	0		0.00	0	1.250	62500		7200		1680		71380.00	20		71380.00
BIO	2	Intro. to Molecular Bio	Staff (Dulai)	150	1	0.167	7831.63	9319.6421	0.500	25000		350		1050		35719.64		0	35719.64
BIO	2L		Staff (Dulai)	144	0		0.00	0	0.750	37500		5040		1008		43548.00	25	3600	39948.00
BIO	3	Health and Disease			1		0.00	0		0						0.00		0	0.00
BIO	5	Bio Today	Staff (Gilbert)	72	1	0.167	7831.63	9319.6421	0.250	12500		1800		504		24123.64		0	24123.64
BIO	60	Nutrition	Staff (Dulai)	90	1	0.167	7831.63	9319.6421	0.250	12500		350		630		22799.64		0	22799.64
BIO	101	Biochemistry	P.LiWang	60	1		0.00	0	0.250	12500		350		420		13270.00		0	13270.00
BIO	102	Molecular Biology	A. Liwang	20	1		0.00	0	0.125	6250		1400		140		7790.00	60	1200	6590.00
BIO	110	The Cell	Medina	120	1		0.00	0	0.625	31250		4800		840		36890.00	30	3600	33290.00
BIO	111	Cells, Tissues	Alley/Lect	30	1	0.125	5862.00	6975.78	0.125	6250		350		210		13785.78		0	13785.78
BIO	120	General Microbiology					0.00	0		0				0		0.00		0	0.00
BIO	120L	General Microbiology Lab					0.00	0		0						0.00	95		0.00
BIO	124	Microbial Evolution (alt years)					0.00	0		0				0		0.00		0	0.00
BIO	125	Public Hlth Threats	Roussos	30	1	0.167	7831.63	9319.6421	0.125	6250		350		210		16129.64		0	16129.64
BIO	127	Virology	Choi	60	1		0.00	0	0.250	12500		350		420		13270.00		0	13270.00
BIO	140	Genetics	Frank	96	1		0.00	0	0.500	25000		2400		672		28072.00	15	1440	26632.00
BIO	141	Evolution	Dawson	48	1		0.00	0	0.250	12500		1200		336		14036.00	15	720	13316.00
BIO	148	Fundamentals of Ecology					0.00	0		0				0		0.00	40	0	0.00
BIO	149	Conservation Bio	Aguilar	24	1		0.00	0	0.125	6250		350		168		6768.00		0	6768.00
BIO	149F	Conservation Bio Field	Aguilar	24	0		0.00	0	0.125	6250		350	1248	168		8016.00	50	1200	6816.00
BIO	151	Immunology					0.00	0		0				0		0.00			0.00
BIO	151L	Immunololgy Lab					0.00	0		0						0.00	35		0.00
BIO	152	Cancer & Tumor Bio	Pallavicini	60	1	0.167	7831.63	9319.6421	0.250	12500		350		420		22589.64			22589.64
BIO	160/160	Comp Phys (alt years)	New Fac?	48	1		0.00	0	0.250	12500	12000	1440		336		26276.00		0	26276.00
BIO	161	Human Phys					0.00	0		0				0		0.00	20	0	0.00
BIO	164	Human Anatomy	Dayrat	40	1		0.00	0	0.250	12500		1600		280		14380.00	30	1200	13180.00
BIO	170	Neurobiology	Cleary	75	1		0.00	0	0.250	12500		350		525		13375.00		0	13375.00
BIO	170L	Neurobiology Lab	Cleary	60	0		0.00	0	0.375	18750		1500		420		20670.00	15	900	19770.00
BIO	180	Mathematical Modeling for Bio	Colvin	28	1		0.00	0	0.013	625				196		821.00		0	821.00
BIO	182	Bioinformatics (alt years)	Ardell	23	1		0.00	0	0.125	6250		350		161		6761.00		0	6761.00
		Physical Sciences Dispensary					0.00	0		0	7500	42600		0		50100.00			50100.00
		Chemistry ACS Exams					0.00	0		0						0.00			0.00
CHEM	1	Preparatory Chemistry	Staff (MV)	120	1	0.167	7831.63	9319.6421	0.375	18750		350		840		29259.64		0	29259.64
CHEM	2	General Chemistry	Staff (MV)	144	1	0.167	7831.63	9319.6421	0.750	37500		2160		1008		49987.64	5	720	49267.64
CHEM	2	General Chemistry	Staff (MV)	144	1	0.167	7831.63	9319.6421	0.750	37500		2160		1008		49987.64	5	720	49267.64
CHEM	8	Prin of Organic Chem	Forman	120	1.25		0.00	0	0.813	40625		4200		840		45665.00	25	3000	42665.00
CHEM	10	General Chemistry II	AKelley	140	1		0.00	0	0.875	43750		3500		980		48230.00	15	2100	46130.00
CHEM	100	Organic Synth and Mechanism	Tsao	90	1		0.00	0		0		350		630		980.00		0	980.00
CHEM	100L	Organic Chemistry Laboratory	Tsao	80	0		0.00	0	0.500	25000		3200		560		28760.00	30	2400	26360.00
CHEM	101L	Adv Synth Lab					0.00	0		0				0		0.00	95	0	0.00
CHEM	111	Biochemistry I	BIO 101 (PL)	20	1		0.00	0		0				140		140.00		0	140.00
CHEM	112	Quantum Chem and Spect					0.00	0		0				0		0.00		0	0.00
CHEM	113	Chem Thermodynamics & Kinet	Ye	20	1		0.00	0		0		350		140		490.00		0	490.00
CHEM	114L	Phys Chem and Instr Analy Lab	Anne	12	1	0.167	7831.63	9319.6421	0.250	12500		900		84		22803.64	50	600	22203.64
CHEM	115	Instr Analy and Bioanaly Chem					0.00	0		0				0		0.00		0	0.00
CHEM	120	Inorganic Chemistry	Dave	20	1		0.00	0		0				140		140.00		0	140.00
CHEM	122	Biochemistry II	BIO 102 (AL)	20	1		0.00	0		0		1400		140		1540.00	60	1200	340.00
CHEM	130	Organic Spectroscopy & Comput	Meyer (if no grad	20	1		0.00	0		0		350		140		490.00			490.00
CHEM	131	Molecular Spectroscopy					0.00	0		0		350		0		350.00		0	350.00
CHEM	140	Nanoscale Materials Chemistry					0.00	0		0		350		0		350.00		0	350.00
CHEM	147	Materials Chemistry Lab	Menke	10	1		0.00	0		0		850		70		920.00		0	920.00
CHEM	194	Communication & Ethics in Chem	AKelley	16	0.5		0.00	0		0		350		112		462.00		0	462.00

Discipline	Crs #	Course Title	Instructor	Enrollment Projections	IWC for Course	Lecturer % Time	Lecturer Annual Salary	Sub Total Lecturer Costs	TA FTE	Sub Total TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Reproduction Services Costs	Speakers Series Costs	Spring Total	Crs Fee	Fee Income	Net Request
ESS	1	Intro to ESS					0.00	0		0				0		0.00	26	0	0.00
ESS	2	Sustainability Science					0.00	0		0						0.00			0.00
ESS	50	Ecosystems of CA	Kueppers	75	1		0	0	0.25	12500		350	3900	525		17275.00	52	3900	13375.00
ESS	105	Biogeochemistry					0.00	0		0				0		0.00		0	0.00
ESS	120	Environmental Microbiology					0.00	0		0				0		0.00		0	0.00
ESS	141	Science and Policy	Kueppes/West	40	1		0.00	0	0.250	12500		350		280		13130.00		0	13130.00
ESS	148	Ecology					0.00	0		0				0		0.00	40	0	0.00
ESS	149	Conservation Biology	BIO	8	1		0.00	0		0				56		56.00		0	56.00
ESS	170	Soils	Berhe	20	1		0.00	0		0		350		140		490.00		0	490.00
ESS	170L	Soils Lab	Berhe	20	0		0.00	0		0	5000	1040	520	140		6700.00		0	6700.00
ESS	190	Seminar	Kueppers	20	0		0.00	0		0		350		140		490.00		0	490.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	5	Pre-Calculus	Staff	30	0.75		0	0	0.250	12500		100		210		12810		0	12810.00
MATH	15	Intro. Sci. Data Analysis	Staff	90	0.75	0.125	5862	6976	0.250	12500		350		630		20456		0	20455.78
MATH	18	Stat Sci Data Analysis	Staff	40	1	0.167	7832	9320	0.250	12500		350		280		22450		0	22449.64
MATH	21	Calculus I Sci & Eng	Lei	120	1		0	0	0.500	25000		350		840		26190		0	26190.00
MATH	11	Calculus I	Staff	120	1	0.167	7832	9320	0.500	25000		350		840		35510		0	35509.64
MATH	11	Calculus I	Staff	120	1	0.167	7832	9320	0.500	25000		350		840		35510		0	35509.64
MATH	22	Calculus II Sci & Eng	Staff	100	1	0.167	7832	9320	0.500	25000		350		700		35370		0	35369.64
MATH	12	Calculus II	Staff	100	1	0.167	7832	9320	0.500	25000		350		700		35370		0	35369.64
MATH	23	Vector Calculus	Staff	120	1	0.167	7832	9320	0.500	25000		350		840		35510		0	35509.64
MATH	24	Lin Alg & Diff Eqs	Ilan	120	1		0	0	0.500	25000		350		840		26190		0	26190.00
MATH	32	Prob & Stats	Lei	120	1		0	0	0.500	25000		350		840		26190		0	26190.00
MATH	91	Topics in Applied Math	Blanchette	20	1		0	0		0		350		140		490		0	490.00
MATH	122	Complex Variables and Appl.	Marcia	30	1		0	0	0.125	6250		350		210		6810		0	6810.00
MATH	125	Intermediate Diff. Eqs.					0	0		0				0		0		0	0.00
MATH	126	Partial-Differential Equat	Tokman	30	1		0	0	0.125	6250		350		210		6810		0	6810.00
MATH	131	Numerical Analysis I					0	0		0				0		0		0	0.00
MATH	141	Linear Analysis I					0	0		0				0		0		0	0.00
MATH	150	Mathematical Modeling					0	0		0				0		0		0	0.00

Discipline	Crs #	Course Title	Instructor	Enrollment Projections	IWC for Course	Lecturer % Time	Lecturer Annual Salary	Sub Total Lecturer Costs	TA FTE	Sub Total TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Reproduction Services Costs	Speakers Series Costs	Spring Total	Crs Fee	Fee Income	Net Request
NSED	43	Intro to teach Sci in Mid Sch	Staff	20	0.125	0.0625	2931.00	3487.89		0		350		140		3977.89		0	3977.89
NSED	44	Fieldwork, Sci Mid Sch	Staff	20	0.125	0.0625	2931.00	3487.89		0		350		140		3977.89		0	3977.89
NSED	53	Intro to teach Math in Mid Sch	Staff	20	0.125	0.0625	2931.00	3487.89		0		350		140		3977.89		0	3977.89
NSED	44	Fieldwork, Math Mid Sch	Staff	20	0.125	0.0625	2931.00	3487.89		0		350		140		3977.89		0	3977.89
NSED	63	Intro to teach Sci in HS	Staff	20	0.125		0.00	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	64	Fieldwork, Sci HS	Staff	20	0.125		0.00	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	73	Intro to teach Math in HS	Staff	20	0.125		0.00	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	74	Fieldwork, Math HS	Staff	20	0.125		0.00	0	0.032	1600		350		140		2090.00		0	2090.00
NSED	95	Research in Sci & Math teaching	Staff	20	0.5	0.063	2931.00	3487.89		0		350		140		3977.89		0	3977.89
NSED	98	Success in Natural Sciencs	Staff	40	0.75	0.125	5862.00	6975.78	0.250	12500		350				19825.78		0	19825.78
NSED	100	Inst, Assmt & Mgmt for Teach	Staff	30	1	0.167	7831.63	9319.6421		0		350		210		9879.64		0	9879.64
NSED	195	Research in Sci & Math teaching	Staff	20	0.5		0.00	0		0		350		140		490.00		0	490.00
PHYS	6	The Cosmos, Science and You	Wil v B	60	1		0.00	0	0.250	12500		350		420		13270.00		0	13270.00
PHYS	8	Introductory Physics I	Staff (Menke)	144	1	0.167	7831.63	9319.6421	0.750	37500		350		1008		48177.64		0	48177.64
PHYS	8	Introductory Physics I					0.00	0		0				0		0.00		0	0.00
PHYS	9	Introductory Physics II	Staff (Kiley)	96	1	0.167	7831.63	9319.6421	0.500	25000		350		672		35341.64		0	35341.64
PHYS	9	Introductory Physics II	Staff (Kiley)	96	1	0.167	7831.63	9319.6421	0.500	25000		350		672		35341.64		0	35341.64
PHYS	10	Introductory Physics III					0.00	0		0				0		0.00		0	0.00
PHYS	18	Intro Phys I for Bio Sci					0.00	0		0				0		0.00		0	0.00
PHYS	19	Physics II -- Bio	Staff (Menke)	72	1	0.167	7831.63	9319.6421	0.375	18750		350		504		28923.64		0	28923.64
PHYS	104	Biophysics	Hirst	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	105	Analytic Mechanics	Scheibner	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	110	Electrodynamics					0.00	0		0				0		0.00		0	0.00
PHYS	111	Electromag Radiation Mini	Ghosh	20	0.5		0.00	0		0		350		140		490.00		0	490.00
PHYS	112	Statistical Mechanics					0.00	0		0				0		0.00		0	0.00
PHYS	122	Waves Mini	Ghosh	20	0.5		0.00	0		0		350		140		490.00		0	490.00
PHYS	124	Atomic structure Mini	Mitchell	20	0.5		0.00	0		0		350		140		490.00		0	490.00
PHYS	126	Special Relativity Mini	Mitchell	20	0.5		0.00	0		0		350		140		490.00		0	490.00
PHYS	132	Thermodynamics	New Senior FTE	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	137	Quantum Mechanics					0.00	0		0				0		0.00		0	0.00
PHYS	144	Atomic Physics	Chiao	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	148	Modern Optics					0.00	0		0				0		0.00		0	0.00
PHYS	151	Solar Energy	Winston	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	160	Modern Physics Lab	Sharping	20	1		0.00	0		0		350		140		490.00		0	490.00
PHYS	192	Special Topics in Physics		20	0		0.00	0		0		350		140		490.00		0	490.00
		TOTAL				4.1945	196705.27	234079.27	23.578	1178900	30500	135440	5668	38493	0	1623080.27		28500	1594580.27

GRADUATE			Spring 2010 Budget Projection																Spring Net Req
Discipline	Crs #	Course Title	Instructor	Enrollment Projections	IWC for Course	Lecturer % Time	Lecturer Annual Salary	Sub Total Lecturer Costs	TA FTE	Sub Total TA Costs	One-Time Costs	Supplies & Materials	Field Trips Costs	Reproduction Services Costs	Speakers Series Costs	Spring Total	Crs Fee	Fee Income	Net Request
CHEM	200	Adv Organic Synthesis												0		0.00		0	0.00
CHEM	201	Organic Organometallic Mech	Meyer	8	1							250		56		334.00		0	334.00
CHEM	212	Mol & Solid St Quant Chem												0		0.00		0	0.00
CHEM	215?	Chemical Kinetics & Dynamics	DKelley (A)	8	1							250		56		334.00		0	334.00
CHEM	291	Physics and Chemistry Sem	AKelley	24	0									168	1500	1675.00		0	1675.00
MATH	201	Teaching and Learning												0		0.00		0	0.00
MATH	221	Partial-Differential Equat I												0		0.00		0	0.00
MATH	222	Partial-Differential Equat II	Bhat	16	1							250		112		362.00		0	362.00
MATH	223	Asymptotics & Perturbution Met	Blanchette	16	1							250		112		362.00		0	362.00
MATH	231	Numerical Analysis I												0		0.00		0	0.00
MATH	232	Numerical Analysis II	Kim	16	1							250		112		362.00		0	362.00
MATH	292	Special Topics												0		0.00		0	0.00
MATH	291	Applied Mathematics Seminar	New Hire	45	1							250		315	1500	2065.00		0	2065.00
MATH	298	Directed group study												0		0.00		0	0.00
MATH	399	University Teaching												0		0.00		0	0.00
PHYS	204	Biophysics	Hirst	16	1							250		112		362.00		0	362.00
PHYS	210	Electrodynamics I												0		0.00		0	0.00
PHYS	212	Statistical Mechanics												0		0.00		0	0.00
PHYS	237	Quantum Mechanics I												0		0.00		0	0.00
PHYS	238	Quantum Mechanics II	Tian	16	1							250		112		362.00		0	362.00
PHYS	292	Special Topics in Physics												0		0.00		0	0.00
PHYS	293	Physics Colloquium	Faculty	45	0									315	1500	1815.00		0	1815.00
QSB	200	Adv Molecular Bio												0		0.00		0	0.00
QSB	215	Principles of Biological Techn	MG-O	20	1							250		140		390.00		0	390.00
QSB	248	Adv Ecology												0		0.00		0	0.00
QSB	252	Cancer Genetics & Tumor Bio	Pallavicini	10	1							250		70		320.00		0	320.00
QSB	261	Human Physiology												0		0.00		0	0.00
QSB	280	Adv Mathematical Biology												0		196.00		0	196.00
QSB	282	Adv Bioinformatics	Ardell	10	1							250		70		334.00		0	334.00
QSB	291	QSB Seminar	BEST	45	0							250		315	1500	2065.00		0	2065.00
QSB	294	Respon Conduct of Research												0		0.00		0	0.00
QSB	296	Professional Skills Development												0		0.00		0	0.00
QSB	297	Systems Biology	Raymond	20	1							250		140		390.00		0	390.00
		TOTAL			0	0			0		0	3250	0	2205	6000	11728.00	0	0	11728.00

Student Credit Hours Taught During Spring 2009
Updated by Institutional Planning and Analysis on June 4, 2009

School	Subject	Undergraduate Program Area Credited for Teaching Subject	Total Student Credit Hours Taught in Subject Area	Student Credit Hours Taught by Senate Members*	Student Credit Hours Taught by Non-Senate Members*
College 1	CORE	BIO	12	12	
		BIOE	12	12	
		ESS	15		15
		WRI	2040		2040
		Total	2079	24	2055
	Total	BIO	12	12	
		BIOE	12	12	
		ESS	15		15
		WRI	2040		2040
		Total	2079	24	2055
Engineering	BEST	BIOE	29	29	
		CHEM	3	3	
		MSE	9	9	
		PHYS	5	5	
		Total	46	46	
	BIOE	BIOE	153	153	
		MSE	12	12	
		PHYS	1	1	
		Total	166	166	
	CSE	COGS	34	34	
		CSE	1311	377	934
		Total	1345	411	934
	ENGR	BIOE	584	584	
		CSE	84	12	72
		ENVE	138	33	105
		ME	348	348	
		MGMT	1	1	
		PHYS	8	8	
		Total	1162	985	177
	ENVE	ENVE	181	177	4
		GEOG	36	36	
		MGMT	10	10	
		PHYS	6	6	
		Total	233	229	4
	ES	BIO	9	9	
		ENVE	91	91	
		ESS	18	17	1
		GEOG	1	1	
		MGMT	1	1	
		PHYS	8	8	
		Total	127	126	1
	ME	ME	307	168	139
		Total	307	168	139
	MEAM	ENVE	1	1	
		ME	34	34	
		PHYS	1	1	
		Total	36	36	

Student Credit Hours Taught During Spring 2009
Updated by Institutional Planning and Analysis on June 4, 2009

School	Subject	Undergraduate Program Area Credited for Teaching Subject	Total Student Credit Hours Taught in Subject Area	Student Credit Hours Taught by Senate Members*	Student Credit Hours Taught by Non-Senate Members*
	MSE	BIOE	24	24	
		MSE	16	16	
		Total	40	40	
	Total	BIO	9	9	
		BIOE	790	790	
		CHEM	3	3	
		COGS	34	34	
		CSE	1395	389	1006
		ENVE	411	302	109
		ESS	18	17	1
		GEOG	37	37	
		ME	689	550	139
		MGMT	12	12	
		MSE	37	37	
		PHYS	29	29	
		Total	3462	2207	1255
Natural Sciences	BIO	BIO	4933	2214	2719
		BIOE	3	3	
		CHEM	38	38	
		ESS	6		6
		NSED	132	132	
		PHYS	11		11
		Total	5122	2387	2735
	CHEM	BIO	155	155	
		CHEM	2045	1013	1032
		MSE	1	1	
		Total	2200	1168	1032
	ESS	BIO	25	20	5
		ESS	23	18	5
		PHYS	9		9
		Total	56	38	18
	MATH	BIO	120		120
		MATH	3934	1137	2797
		ME	1	1	
		PHYS	63	2	62
		Total	4117	1139	2978
	NSED	BIO	33		33
		NSED	199		199
		Total	232		232
	PHYS	ENVE	16	16	
		MATH	134		134
		ME	9	9	
		PHYS	1457	815	642
		Total	1615	839	776
	QSB	BIO	207	201	6
		BIOE	28	28	
		CHEM	13	13	
		Total	247	241	6

Student Credit Hours Taught During Spring 2009
Updated by Institutional Planning and Analysis on June 4, 2009

School	Subject	Undergraduate Program Area Credited for Teaching Subject	Total Student Credit Hours Taught in Subject Area	Student Credit Hours Taught by Senate Members*	Student Credit Hours Taught by Non-Senate Members*
	Total	BIO	5471	2589	2882
		BIOE	31	31	
		CHEM	2095	1063	1032
		ENVE	16	16	
		ESS	28	18	10
		MATH	4068	1137	2931
		ME	9	9	
		MSE	1	1	
		NSED	331	132	199
		PHYS	1540	816	724
		Total	13589	5812	7777
Social Sciences, Humanities, and Arts	ANTH	ANTH	401	289	112
		Total	401	289	112
	ARTS	ARTS	1165	385	780
		Total	1165	385	780
	CHN	CHN	168		168
		Total	168		168
	COGS	COGS	835	759	76
		CSE	1	1	
		PHIL	32	32	
		PSY	76		76
		Total	943	791	152
	ECON	ECON	232	112	120
		PHIL	80	80	
		POLI	360	320	40
		Total	672	512	160
	FRE	FRE	148		148
		Total	148		148
	GASP	ARTS	341	245	96
		Total	341	245	96
	HIST	HIST	1241	733	508
		Total	1241	733	508
	JPN	JPN	212		212
		Total	212		212
	LIT	LIT	683	487	196
		Total	683	487	196
	MGMT	COGS	108	108	
		ECON	292	196	96
		MGMT	756		756
		POLI	32		32
		Total	1188	304	884
	PHIL	COGS	24	24	
		PHIL	481	96	385
		Total	505	120	385
	POLI	POLI	1376	818	558
		Total	1376	818	558

Student Credit Hours Taught During Spring 2009
Updated by Institutional Planning and Analysis on June 4, 2009

School	Subject	Undergraduate Program Area Credited for Teaching Subject	Total Student Credit Hours Taught in Subject Area	Student Credit Hours Taught by Senate Members*	Student Credit Hours Taught by Non-Senate Members*
	PSY	COGS	235	1	234
		CSE	1	1	
		PSY	3904	1714	2190
		Total	4140	1716	2424
	SOC	SOC	1065	636	429
		Total	1065	636	429
	SPAN	SPAN	580		580
		Total	580		580
	USTU	WRI	30		30
		Total	30		30
	WCH	ARTS	3	3	
		HIST	50	50	
		LIT	66	66	
		Total	119	119	
	WH	HIST	148	36	112
		Total	148	36	112
	WRI	HIST	3	3	
		WRI	3288		3288
		Total	3291	3	3288
	Total	ANTH	401	289	112
		ARTS	1509	633	876
		CHN	168		168
		COGS	1202	892	310
		CSE	2	2	
		ECON	524	308	216
		FRE	148		148
		HIST	1442	822	620
		JPN	212		212
		LIT	749	553	196
		MGMT	756		756
		PHIL	593	208	385
		POLI	1768	1138	630
		PSY	3980	1714	2266
		SOC	1065	636	429
		SPAN	580		580
		WRI	3318		3318
		Total	18416	7194	11222

Student Credit Hours Taught During Spring 2009
Updated by Institutional Planning and Analysis on June 4, 2009

School	Subject	Undergraduate Program Area Credited for Teaching Subject	Total Student Credit Hours Taught in Subject Area	Student Credit Hours Taught by Senate Members*	Student Credit Hours Taught by Non-Senate Members*
TOTAL	Total	ANTH	401	289	112
		ARTS	1509	633	876
		BIO	5492	2610	2882
		BIOE	833	833	
		CHEM	2098	1066	1032
		CHN	168		168
		COGS	1236	926	310
		CSE	1397	391	1006
		ECON	524	308	216
		ENVE	427	318	109
		ESS	61	35	26
		FRE	148		148
		GEOG	37	37	
		HIST	1442	822	620
		JPN	212		212
		LIT	749	553	196
		MATH	4068	1137	2931
		ME	698	559	139
		MGMT	768	12	756
		MSE	38	38	
		NSED	331	132	199
		PHIL	593	208	385
		PHYS	1568	845	724
		POLI	1768	1138	630
		PSY	3980	1714	2266
		SOC	1065	636	429
		SPAN	580		580
		WRI	5358		5358
		Total	37546	15237	22309

* Senate members whose primary duties are administrative are included in the non-members column.

Student Majors During Spring 2009
Prepared by Institutional Planning and Analysis on April 30, 2009

	Number[1] of Majors
Undergraduate Majors	
Engineering	
Bioengineering	102
Computer Science	147
Environmental	47
Materials Science	14
Mechanical Engineering	128
Undeclared	46
Natural Sciences	
Applied Math	40
Biological Sciences	610
Chemical Sciences	63
Earth Systems Science	18
Physics	30
Undeclared	33
SSHA	
Anthropology	5
Cognitive Science	71
Economics	58
History	77
Literatures & Cultures	60
Management	184
Political Science	113
Psychology	340
Social & Cog Sciences	13
World Cultures & History	11
Undeclared	50
Undeclared	334
Graduate Majors[2]	
Environmental Systems	26
Biological Engineering	14
Electrical Engineering	19
Mechanical Engineering	8
Applied Math	11
Physics & Chemistry	
Quant & Sys Biology	42
Social & Cog Sciences	22
World Cultures	20

[1] Students with dual majors are counted twice.

[2] UC Merced offers only two majors, one in environmental systems and the other in individual studies. For convenience, the individual graduate program emphases have been broken out.

Subject Code	Term	Cred-Hrs-Sum
AMSE	200530	31
AMSE	200610	24
AMSE	200630	57
AMSE	200710	55
ANTH	200630	256
ANTH	200710	144
ANTH	200730	384
ANTH	200810	227
ANTH	200830	700
ANTH	200910	401
ANTH	200930	872
ARTS	200530	139
ARTS	200610	350
ARTS	200630	525
ARTS	200710	420
ARTS	200730	398
ARTS	200810	920
ARTS	200830	873
ARTS	200910	1,199
ARTS	200930	1,346
BEST	200730	62
BEST	200810	91
BEST	200830	185
BEST	200910	159
BEST	200930	205
BIO	200910	5,164
BIO	200930	4,954
BIOE	200530	1
BIOE	200610	15
BIOE	200630	75
BIOE	200710	14
BIOE	200730	155
BIOE	200810	143
BIOE	200830	227
BIOE	200910	183
BIOE	200930	108
BIS	200530	1,263
BIS	200610	1,186
BIS	200630	1,543
BIS	200710	1,554
BIS	200730	2,896
BIS	200810	2,906
BIS	200830	3,836
CHEM	200530	854
CHEM	200610	764
CHEM	200630	1,530
CHEM	200710	1,505
CHEM	200730	2,118
CHEM	200810	2,061
CHEM	200830	3,226
CHEM	200910	2,271
CHEM	200930	3,746
CHN	200710	100
CHN	200730	52
CHN	200810	56
CHN	200830	132
CHN	200910	168

Subject Code	Term	Cred-Hrs-Sum
CHN	200930	180
COGS	200530	432
COGS	200610	194
COGS	200630	752
COGS	200710	649
COGS	200730	882
COGS	200810	510
COGS	200830	1,145
COGS	200910	1,012
COGS	200930	1,207
CORE	200530	836
CORE	200610	2,594
CORE	200630	630
CORE	200710	1,324
CORE	200730	906
CORE	200810	1,506
CORE	200830	1,296
CORE	200910	2,079
CORE	200930	1,678
CSE	200530	284
CSE	200610	242
CSE	200630	486
CSE	200710	666
CSE	200730	938
CSE	200810	936
CSE	200830	1,423
CSE	200910	1,483
CSE	200930	1,556
D	200530	0
EAPE	200730	75
EAPE	200810	147
EAPE	200830	120
EAPE	200910	135
EAPE	200930	315
ECON	200530	680
ECON	200610	168
ECON	200630	704
ECON	200710	420
ECON	200730	921
ECON	200810	305
ECON	200830	1,325
ECON	200910	701
ECON	200930	1,284
EDUC	200730	4
EECS	200930	246
ENGR	200510	12
ENGR	200530	277
ENGR	200610	206
ENGR	200630	299
ENGR	200710	527
ENGR	200730	622
ENGR	200810	945
ENGR	200830	1,009
ENGR	200910	1,233
ENGR	200930	1,667
ENVE	200430	28
ENVE	200510	8

Subject Code	Term	Cred-Hrs-Sum
ENVE	200530	204
ENVE	200610	148
ENVE	200630	347
ENVE	200710	154
ENVE	200730	299
ENVE	200810	111
ENVE	200830	344
ENVE	200910	233
ENVE	200930	343
ES	200430	61
ES	200510	115
ES	200530	151
ES	200610	180
ES	200630	167
ES	200710	216
ES	200730	243
ES	200810	258
ES	200830	299
ES	200910	338
ES	200930	384
ESS	200430	4
ESS	200530	134
ESS	200610	70
ESS	200630	56
ESS	200710	170
ESS	200730	184
ESS	200810	317
ESS	200830	230
ESS	200910	56
ESS	200930	202
FRE	200630	108
FRE	200710	116
FRE	200730	88
FRE	200810	72
FRE	200830	112
FRE	200910	148
FRE	200930	196
GASP	200830	396
GASP	200910	344
GASP	200930	672
GEOG	200730	8
GEOG	200830	0
HIST	200530	528
HIST	200610	432
HIST	200630	640
HIST	200710	604
HIST	200730	947
HIST	200810	1,060
HIST	200830	995
HIST	200910	1,244
HIST	200930	1,080
ICP	200530	520
ICP	200610	120
ICP	200630	584
ICP	200710	112
ICP	200730	520
JPN	200630	124

Subject Code	Term	Cred-Hrs-Sum
JPN	200710	164
JPN	200730	128
JPN	200810	168
JPN	200830	196
JPN	200910	208
JPN	200930	304
LIT	200530	296
LIT	200610	288
LIT	200630	412
LIT	200710	328
LIT	200730	385
LIT	200810	468
LIT	200830	456
LIT	200910	704
LIT	200930	792
MATH	200530	1,249
MATH	200610	1,596
MATH	200630	2,581
MATH	200710	2,292
MATH	200730	3,837
MATH	200810	3,403
MATH	200830	5,059
MATH	200910	4,155
MATH	200930	5,910
ME	200710	9
ME	200730	24
ME	200810	112
ME	200830	81
ME	200910	307
ME	200930	103
MEAM	200730	33
MEAM	200810	35
MEAM	200830	62
MEAM	200910	73
MEAM	200930	120
MGMT	200630	295
MGMT	200710	206
MGMT	200730	654
MGMT	200810	1,036
MGMT	200830	1,060
MGMT	200910	1,188
MGMT	200930	1,256
MSE	200730	33
MSE	200810	2
MSE	200830	78
MSE	200910	42
MSE	200930	54
NSED	200710	64
NSED	200730	90
NSED	200810	104
NSED	200830	239
NSED	200910	232
NSED	200930	229
PHIL	200530	312
PHIL	200630	472
PHIL	200710	536
PHIL	200730	328

Subject Code	Term	Cred-Hrs-Sum
PHIL	200810	416
PHIL	200830	668
PHIL	200910	508
PHIL	200930	596
PHYS	200530	144
PHYS	200610	477
PHYS	200630	784
PHYS	200710	892
PHYS	200730	980
PHYS	200810	1,348
PHYS	200830	1,829
PHYS	200910	1,675
PHYS	200930	1,958
POLI	200610	320
POLI	200630	164
POLI	200710	185
POLI	200730	1,028
POLI	200810	560
POLI	200830	1,235
POLI	200910	1,403
POLI	200930	1,614
PSY	200530	1,308
PSY	200610	1,183
PSY	200630	1,887
PSY	200710	2,355
PSY	200730	2,659
PSY	200810	2,663
PSY	200830	4,073
PSY	200910	4,228
PSY	200930	5,723
PUBP	200530	4
PUBP	200610	140
PUBP	200630	104
PUBP	200710	124
QSB	200430	12
QSB	200510	34
QSB	200530	113
QSB	200610	97
QSB	200630	201
QSB	200710	230
QSB	200730	314
QSB	200810	350
QSB	200830	526
QSB	200910	572
QSB	200930	589
SCS	200530	12
SCS	200610	129
SCS	200630	24
SCS	200710	8
SCS	200730	17
SCS	200810	12
SCS	200830	9
SCS	200930	17
SOC	200630	284
SOC	200710	390
SOC	200730	571
SOC	200810	696

Subject Code	Term	Cred-Hrs-Sum
SOC	200830	840
SOC	200910	1,068
SOC	200930	1,752
SPAN	200530	212
SPAN	200610	186
SPAN	200630	384
SPAN	200710	368
SPAN	200730	470
SPAN	200810	398
SPAN	200830	732
SPAN	200910	580
SPAN	200930	864
UCDC	200730	12
UCDC	200830	18
UCDC	200930	105
UNIV	200830	0
USTU	200830	25
USTU	200910	30
USTU	200930	61
WCH	200530	108
WCH	200610	124
WCH	200630	154
WCH	200710	170
WCH	200730	140
WCH	200810	132
WCH	200830	202
WCH	200910	238
WCH	200930	242
WH	200810	56
WH	200830	132
WH	200910	148
WH	200930	128
WRI	200530	2,500
WRI	200610	1,596
WRI	200630	1,968
WRI	200710	1,252
WRI	200730	3,345
WRI	200810	2,844
WRI	200830	4,835
WRI	200910	3,306
WRI	200930	5,557
XICE	200430	10
XICE	200510	3
XICE	200530	8
XICE	200630	13
XICE	200710	13
XICE	200730	24
XICE	200810	42
XICE	200830	11
XICE	200910	8
XICE	200930	30

Faculty FTE Planning and Allocation
School of Social Sciences, Humanities, and Arts

May 10, 2010

The big picture

As a new campus in the University of California system, UCM faces numerous challenges. As a part of it, we must live up to the high standards of that system in terms of building an excellent research profile combined with the creation of an effective learning environment for both undergraduate and graduate students. To accomplish this, we must build core strengths in traditional disciplines within the social sciences, humanities, and arts.

All of this must be done with limited resources. Although the UC system has been generous to UCM, the current budget climate has meant that the university has not been able to grown as quickly as was anticipated. From a faculty perspective, it means that the size of programs is quite small. For instance, the largest of our programs, Psychological Sciences, has a total of seven faculty members. In the arts, we have only three, and in history, we have only four, one of whom is retiring at the end of this academic year. The faculty at UCM, then, has had to balance research, teaching, and an extraordinarily high service load given the newness of the campus and the tradition of shared governance within the UC system.

As the faculty has worked to build disciplinary strength, they must simultaneously pay heed to the strategic vision of the campus itself. In 2009, the campus released *Beginnings: A Legacy Renewed for the 21st Century*, a document that lays out the guiding principles for the development of UCM. One theme that consistently cross-cuts the rhetoric of that document is a strong focus on interdisciplinary—the creation of research programs, courses, and institutions that blur disciplinary boundaries to address pressing questions. Although in theory an emphasis on interdisciplinarity is not antithetical to the development of strong core disciplinary programs, in practice, there is a real tension between these two goals. Some faculty, either by interest or training, are more adept at taking advantage of interdisciplinary opportunities than some, whereas others are more intent on building what might be termed "disciplinary silos." Not surprisingly, this tension colors how faculty view the process by which future FTE requests are defined and ultimately allocated. This is especially true at a campus where literally every discipline can make a reasonable case for the allocation of scarce FTE to their program.

Overview of the campus-wide planning process

FTE allocations are made by the provost and executive vice chancellor in conjunction with the Academic Senate Committee on Academic Planning and Resource Allocation (CAPRA). In practice, the provost makes an annual call for FTE requests, the dean of each school develops a request, and the plan is submitted by the dean of the school to

provost, who forwards its to CAPRA. The committee reviews the plan and makes recommendations to the provost, who then makes the final decision on the allocation of FTE to the schools.

Since UCM is still evolving, the planning window and details of the provost's call have varied over time. For the 2009-10 call, the planning window was for three years: AY 2010-11, 2011-12, and 2012-13. In this call, the provost indicated that from his perspective, SSHA would most likely receive seven FTE in each of the years for a total of 21 (see Appendix 1). The provost's call outlined the criteria he would use to assess the plans submitted by the schools. CAPRA also issued its own set of criteria for how it would evaluate FTE requests from the schools (Appendix 2), and in general, these overlap with those of the provost. However, some of the details between the plans are sufficiently different to create some confusion as to how best to respond and craft a final document that satisfies both at some fundamental level.

Overview of planning process within the school

SSHA is divided into four governing bodies (also known as bylaw 55 units and which are still in the process of approval): Cognitive and Information Sciences (CIS), Humanities and World Cultures (HWC), Psychological Sciences (PSY), and Social Sciences and Management (SSM). Within each, they are responsible for preparing curriculum, providing evaluations of faculty for promotion and tenure, and hiring of new faculty. Majors and minors currently reside within these bodies or in some case, across them (Appendix 3)

Each of these governing bodies is responsible for the development of its own strategic plan where, among other things, they make a case for FTE allocations. These plans are ideally developed in coordination with one another and with reference to the SSHA strategic plan (which is currently under revision; the last one was developed in March 2008) as well as relevant institutional planning documents. Cross-cutting these governing bodies are graduate groups; there are two: Social and Cognitive Sciences (which includes cognitive science, economics, political science, and psychological sciences) and World Cultures (anthropology, history, literature [Spanish-speaking and English-speaking worlds], and world heritage). These groups develop curricular plans for the graduate level and in most cases, these plans have FTE requests attached to them.

Following the FTE call from the provost, the dean requests that each bylaw 55 unit submit their prioritized list of FTEs, which are then placed into an overall priority list by the dean. This list is then presented to the SSHA executive committee, where it is reviewed and debated. The resultant priority list is generally created by consensus during a lively give-and-take of different visions or priorities of what SSHA should be. The final list is then presented to the entire SSHA voting faculty for their consideration. The plan is then submitted to the provost. Although plans tend to be passed with a majority in favor, it is possible that a plan can receive a negative vote. The dean may

choose to revise the plan or submit it to the provost and CAPRA with an explanation of this.

Criteria used in FTE planning

All existing units within SSHA must grow. This is obvious. However, resource scarcity creates intense competition for new FTE between the four bylaw units. As noted above, the provost indicated that we were likely to be authorized to obtain 21 FTE over the three-year planning window. In the plans for FTE from the bylaw 55 units, a total of 52 FTE was requested. Not surprisingly, each unit acts in their self-interest, but some actors are more concerned with the common good. That is, they are willing to consider a variety of models for resource allocation based upon multiple criteria.

As the dean, I am responsible for the entire school, and thus must balance often selfish (but usually justified) FTE requests with a vision toward building not just programs, but a coherent school. Here is a paragraph from my charge to the executive committee (dated 22 March 2010):

> "3) Within the Priority 1 category, my selection of requested FTE is based upon the following criteria: a) current and projected enrollment at the undergraduate level; b) my evaluation of program strength and coherence based upon the narratives sent to me as a part of this process. This also includes consideration of graduate education as offered to me by our two graduate groups; c) other factors, most notably whether a program has an opportunity to bring distinction to SSHA and UCM, how a program fits into interdisciplinary thinking at UCM, and finally, whether a program offers a potential for making a significant contribution to the Research Themes articulated in the 2009 Strategic Academic Vision of UCM. Student credit hours generated by discipline (and broken down by Senate/non-Senate appointments) for AY 2009-10 can be found in Appendix 2.
>
> I stress that this draft plan is thus not strictly enrollment driven, and I hope you will keep this in mind as you review my recommendations and offer alternatives. As you do so, I hope you will be as forthcoming about your criteria as have I. "

I make judgments on a mix of qualitative and quantitative data.

The most commonly cited criterion used to advocate for FTE allocations from within bylaw 55 units is enrollment growth. The Census of enrollments offered by the Registrar is a prime data source as is the Statement of Intent to Register, which provides a sense of what majors and courses of study incoming freshmen are likely to pursue. This is helpful as a general planning document, although it is widely acknowledged that student interests usually change dramatically over time.

Consider this example from the AY 2009-10 planning process using psychology as an example. Psychology has the largest enrollment and number of majors within SSHA.

Enrollments for PSY courses '08-09: 2574 (1265, fall; 1309, spring) over 59 courses (29, fall; 30, spring) Note: for fall, of 29 courses, 19 were faculty-taught; of those, 8 were independent study/research for spring, of 30 courses, 21 were faculty-taught; of those, 13 were independent study/research

Enrollments for PSY courses 09-10: 2881 (1421, fall; 1460, spring) over 72 courses (35, fall; 37 spring) .Note: for fall, of 35 courses, 26 were faculty-taught; of those, 15 were independent study/research. For spring, of 37 courses, 28 courses were faculty-taught; of those, 19 were independent study/research

PSY Majors: Fall '08: 327; Spring '09: **328**
PSY Minors: Fall '08: 51; Spring '09: **82**

PSY Majors: Fall '09: 340; Spring '10: **340**
PSY Minors: Fall '09: 85; Spring '10: **160**

There is obvious evidence of enrollment growth and a significant spike in minors from AY 2008-09. Given these data, here is how psychology created a justification for their FTE request (document dated 14 February 2010):

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors), plans to achieve excellence and how this will be assessed (including accreditation issues, if any).

   Psychology is the largest major in SSHA but has only 7 ladder rank faculty and the highest student/faculty ratio in SSHA. About 60% of Psychology undergraduate classes are taught by Unit 18 lecturers. Far more ladder rank faculty are needed to support the major. We have improved the major by adding more writing requirements (e.g., a new course WRI 101 specific to Psychology is now required of majors), and by redistributing TAs to support this effort. For WASC accreditation purposes, we have created Program Learning Outcomes and an assessment plan to regularly assess whether we achieve those outcomes.
2. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, plans to achieve international excellence and how this will be assessed, estimated student demand for graduate programs.

   Psychological Sciences currently has eleven graduate students. Student demand for graduate training in psychology is very high, with 34 of 55

applicants to SSHA being in Psychology as of January 22, 2010. Other campuses average 2.5 graduate students per faculty member, a standard likely to be met at UC Merced within a few years, as well. Additional ladder rank faculty are needed to continue to grow graduate training and research excellence.

The Psychological Sciences faculty is near completion of a revised draft CCGA application for a Graduate Group in Psychological Sciences. The application outlines assessment plans for the new graduate group, both assessing students within the group on a regular basis, and assessing the Group itself periodically.

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs

   Not applicable.

4. If applicable, support of or synergy with cross-school or interdisciplinary programs or research.

   Psychological Sciences currently envisions three primary venues for interdisciplinary collaboration. First, Psychological Sciences has been successful in seeking and hiring faculty who have overlapping interests that can support the Cognitive Science program, such as Yarrow Dunham, a developmental psychologist who has strong cognitive training and interests, and Jack Vevea, a quantitative psychologist who has developed quantitative models of cognitive phenomena.

   Second, faculty who will be hired in Health Psychology will contribute to interdisciplinary collaboration with faculty in the School of Natural Science and the School of Engineering who are involved in health research at UC Merced. For example, Professor Wallander led the recent submission of the letter of intent for an interdisciplinary center at UC Merced within the system-wide UC School of Global Health; and Professors Wallander and Shadish are active members of the UC Faculty Medical School Advisory Committee.

   Third, faculty who will be hired in Quantitative Psychological Sciences will contribute to the need for expert statistical consultation among faculty in the School of Natural Science and the School of Engineering who are involved in the creation of a medical school. For example, at the request of the Dean of Natural Science, Professor Shadish wrote a document describing models for statistical consultation and training that could be used at UC Merced in the short to medium term future.

1. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

   Psychological Sciences faculty regularly give lectures in CORE 1. At the lower division level, PSY 1(enrollment around 300, offered each semester) is an option for filling school general education requirements, and PSY 10 (enrollment around 176, offered each semester) is an option for filling the quantitative methods general education requirement. The majority of students in both these courses are not Psychology majors. Only PSY 1 is

prerequisite to upper division PSY courses. Consequently these courses are heavily enrolled by non-Psychology major as filling upper division general education requirements outside the major.

Other units developed similar plans, and in each case, the primary argument was enrollment growth. Even those programs that saw limited or modest growth suggested that the addition of an FTE to their program would spur enrollment growth.

In the case of psychology, I was impressed by their enrollment figures and growth potential, and I recommended that they receive six of the 21 positions over the planning window. The executive committee approved this recommendation.

In contrast, program building and the criterion of UCM distinction was used to justify my priority ranking of an FTE for World Heritage (WH), where there is currently only a single ladder faculty, low enrollment, and a single major. In my priority list, I included an FTE for a second faculty member in this program and was greeted by significant hostility from some members of the executive committee, who asked why I would "waste" an FTE on the program. One argued that the program should be closed.

My reply was simply that the WH program is unique in the UC system as well as nationally, that it brings real distinction to the campus, and it promotes interdisciplinary ties between the disciplines. When University Relations comes calling for a demonstration to donors, they frequently turn to WH. I requested another FTE in WH to increase ties with anthropology and cognitive science, and perhaps ultimately, the nascent management program. The position was maintained in the plan sent to the provost and to CAPRA.

Aside from this example, all other FTE are assigned to existing majors within the bylaw 55 units, and thus, promote the development of those majors. At this time, SSHA is not seeking to expand the range of majors, preferring instead to build the current core disciplines. We do add minors, however, since we insist that they incur no new resource commitments. Faculty can and do propose minors, and these proposals are reviewed by the SSHA curriculum committee.

Space remains one of the most serious problems for the expansion of SSHA. The Social Sciences and Management Building (SSM) is scheduled to open in the summer of 2011, and this will make it easier to accommodate our hiring plans through AY 2012-13. Beyond that, however, a lack of suitable space will make it difficult to hire certain FTE in psychology and cognitive sciences, particularly those specialties that require dry or damp laboratories. Long-term hires in these areas will be impacted until new space is obtained or different models of space allocation are adopted.

Institutional planning documents are used as guidelines, and have a limited effect on how the bylaw 55 units develop their FTE requests. If one of their stated desires reflects

a institutional priority, you can be sure that it will be used as a justification. If it does not, it will be ignored. As dean, I use these documents to help me think about specific requests, and I will, on balance, favor requests that make a clear effort to touch on institutional goals and serve to cross disciplines.

Search successes have some impact on the FTE allocation process. In years past, certain positions were frozen by the central administration during the worst of the budget crisis. Although bylaw 55 units were free to argue that frozen positions should be considered as priorities, I (as well as the central administration) argued that these positions had to be included in the priority rankings developed by each unit.

UCMERCED

To: Dean Maria Pallavicini, School of Natural Sciences
Dean Jeff Wright, School of Engineering
Dean Hans Bjornsson, School of Social Sciences, Humanities and Arts

From: Keith Alley, Executive Vice Chancellor and Provost

Subj.: Call for School Academic Plans

Date: December 2, 2009

With the budget uncertainty of the past year there has been little incentive to move forward with strategic planning at the school level. Although this was understandable, we now need to return to a more formal approach to planning the future of the schools. Starting this year, instead of the annual planning that was part of our initial years, I would like to begin a process of rolling three year plans for each of the Schools. The plan for the period from 2010-2011 to 2012-2013 will be due in the Office of Academic Affairs by February 15, 2010. This is also an appropriate time for existing or newly proposed Bylaw 55 units to formalize their plans and submit a proposal that will be vetted through the approved Senate procedures. It is important that all of the existing informal Bylaw units undertake the process outlined in the approved procedures for establishing academic units.

In the next three years the expectation is that the campus will authorize searches for approximately fifty (50) faculty LRF. This will help to accommodate an expected enrollment growth to a student body of 5350 in 2012-2013. When successful this will bring the total ladder rank faculty numbers to 190, still well below the calculated number generated by our student enrollment, which at 18.7:1 should be approximately 283 FTE. However, if we assume that 80:20 ratio of LRF to NSF that is characteristic of other campus we should have 226 LRF by the end of this period. Needless to say, the number of LRF that we can recruit is limited by the availability of laboratory and office space as well as the size of the startup fund pool that can be assembled. In addition, the actual allocations will be subject to the final financial agreements that are being worked out with the Office of the President.

Preparation for this year's planning entails the following assumptions. 1. We will grow by 650 students per year for each of the three years, 2. Enrollment trends in each of the three schools will begin to gravitate towards a distribution of 50% Social Sciences, Humanities and Management, 35% in Natural Sciences and 15% in Engineering. 3. Space will be a major deterrent to successful recruitment in the basic and applied sciences. 4. Allocations devoted to startup packages for new faculty will of necessity be more moderate. 5. That the Office of the President will fund

enrollment growth and that the State will continue the $5M in supplemental funding throughout the period. This last assumption is the most difficult and any change in the assumed funding model will require an adjustment in the FTE allocations.

By this notice I am asking that each School begin preparing an Academic Plan for the years 2010-2013 using the following annual FTE allocations as the starting point: SSHA-7 per year; SOE-3 per year; SONS-5 per year. In addition, to the normal consultation and planning process within the School I am asking each dean to consult with the Graduate Groups for which they are the lead Dean and with the leadership of the established or proposed ORUs. Although you have broad license on how your plan is tailored, each plan must include the following elements:

- an evaluation of research opportunities that will add critical strength in the existing research programs or that will allow the campus to embark on new areas of research vital to our future.
- an assessment of each position's importance to supporting existing graduate and undergraduate programs that will allow for the development of new programs of instruction in the future.
- an analysis of how the FTE will be used to support the principles and delivery of the general education curriculum.
- a detailed assessment of the space needs for each of the FTE and any plans that will allow current allocated laboratory space to be used to accommodate additional hires.

In addition, four presidential postdoctoral appointees (one each in SOE and SONS; two in SSHA) will come due during the planning period. These will be regularized outside of the FTE allocation and, thus, need not be included in the planning process.

Per our normal process I will consult with CAPRA as we move forward with the final allocations of FTE. For your information I have enclosed a copy of their criteria for evaluating School plans.

Finally, the School allocations described above account for 45 of the 50 FTE. In the next few weeks, I will be working with the Academic Senate to specify a Strategic Investment process directed at the five research themes that the campus identified in its Academic Vision. These calls will be open to all three Schools and will include the possibility of cross-school appointments that have germinated from faculty interactions.

C.: Steve Kang, Chancellor
Sam Traina, Graduate Dean
Mark Aldenderfer, Dean Designate, SSHA
Martha Conklin, Chair, Divisional Council
Mike Colvin, Chair, CAPRA

UC Merced CAPRA (Committee on Academic Planning and Resource Allocation)
Guiding Criteria for Evaluating Academic Plans from Schools and Graduate Groups

Strategic planning is an annual process which begins with faculty in all units, including schools, graduate groups, and research institutes, creating plans for the development and growth of research and academic programs. These plans are used as the basis for formal resource requests developed in the Deans' offices in collaboration with the faculty. The resource requests and strategic plans are then sent to the Executive Vice Chancellor (EVC) who passes them to CAPRA for formal review. CAPRA then develops recommendations based on the following guiding criteria to the EVC who makes the final resource decisions.

Changes for AY 09-10

UC Merced is continuing its growth trajectory, although in this time of limited resources this growth must be strategic, balancing research excellence and program growth. Although a significant number of undergraduate majors have been initiated (>18), we have only one CCGA-approved graduate program. The ongoing UC budget challenges will require more careful planning to ensure that each new faculty line addresses the campus' most critical needs for both undergraduate and graduate programs. Moreover, planning must move from a year-by-year process to a multiyear year process to allow proper staging of new majors and research programs. For these reasons, CAPRA is requesting the following *additional* criteria for AY09-10 and future academic plans (the AY08-09 criteria are below).

1. Academic plans should include a 5 year description of specific goals (and associated objective metrics) associated with each program that is requesting new faculty lines. These goals can be based on external assessments (e.g. ABET accreditation or CCGA approval), specific program expansion (e.g. adding a new track or graduate emphasis), or quantitative target (e.g. supporting a particular student growth rate). Moreover, the overall academics plans should prioritize and provide a timeline for all such goals described in the plan.
2. Academic plans should explicitly address *strategic constraints* on the campus, such as the need to balance more and less costly programs, the availability of research and teaching space, and start up funds.
3. Academic plans should consider the full life-cycle of existing programs, describing target sizes over the next five or more years and plans to reach a sustainable level given current budget constraints.
4. Academic plans should include estimated resource requests for program review and ongoing assessment.
5. Academic plans should describe plans for coordination or even consolidation of programs within or between schools or between graduate groups to make the most efficient use of current and proposed faculty lines. Proposed hires whose teaching will be primarily outside of their home program, need to be explicitly cited in the plans for the programs in which they will be teaching.
6. Proposed new undergraduate and graduate programs must be included in academic plans *well in advance* of the year in which they will be proposed. Moreover, plans for new programs must include year-by-year hiring goals to achieve the necessary size to create the new program. Finally, any proposed new programs used as the basis for new faculty

lines must include memos from the cognizant school or graduate groups' Dean and Academic Planning Chair stating a multiyear commitment to give high priority to faculty hires for this new program. These memos must be included in the academic plan voted on by the school faculty.

Guiding Criteria

CAPRA expects that yearly academic planning decisions will be done primarily by faculty in schools, graduate groups, and institutes through an update of their Strategic Plans and submission of an annual Academic Resource Plan from the schools. CAPRA requests that the Academic Resource Plan be concise and focused on specific requests and their justification. For example, relatively established academic areas, tied to a major, are not expected to submit long, general descriptions of their disciplines to CAPRA, nor is it necessary to describe very long-term strategic aims not related to current resource requests. Note that each school and graduate group should continue to update and refine their full Strategic Plans, and these plans should be provided to CAPRA in support of, and as justification for, the Academic Resource Plan.

CAPRA requests that each school submit four tables: one with prioritized FTE requests for the current academic, another with the prioritized FTE requests for the following academic year, one with a list of current and planned majors and graduate groups for the next two years, and one with their proposed space needs. (See Appendices 1-3 for examples.) The tables should be consistent with each other and the text of the plans. Note that multiple positions may be assigned to the same priority level (e.g., 1st, 2nd, 3rd tier).

Each school may format its Academic Resource Plan in whatever style is suited to its needs, as long as it provides CAPRA with the necessary information to ensure effective allocation of FTEs and space across the campus. It is expected that schools' planning documents will address realistic resources needed to attract and accommodate new FTEs and the future growth of their activities, including estimates of: cost of startup packages; laboratory space requirements; office space needs of associated research staff and graduate students; special infrastructure needs (library holdings, IT, central facilities, animal room, clean room, fume hoods, heating/cooling, electrical, regulatory compliance staff, etc.)

In addition, the Academic Resource Plan should include text justifying the FTE requests in terms of their support of research programs/graduate groups and undergraduate majors (or have links to the appropriate sections of the school Strategic Plans).

Justification for Prioritization

Explain concisely how the prioritization of requested FTEs reflects the aims, goals, and demands of programs discussed in the Strategic Plan of the school, and of graduate groups associated with faculty in the school, in particular:

1. Support of graduate groups and research, referring to balance of critical mass in specific areas versus the need for broadening coverage, the number of *essential* courses not being currently taught, the proposed timeline for applying for CCGA approval (if not yet completed), plans to achieve international excellence and how this will be assessed, and current and estimated future student demand for graduate programs.
2. Support of undergraduate majors, referring to estimated student demand (both majors and courses provided to non-majors). Include an estimate of the number of faculty to create a viable major, the number of *essential* courses are not being currently taught, the role of

lecturers in the current program, as well as plans to achieve excellence and how this will be assessed (including accreditation issues, if relevant).

3. If applicable, development of new or incipient research and/or graduate or undergraduate degree programs,
4. If applicable, support of, or synergy with, cross-school or interdisciplinary programs or research.
5. Support for general education (e.g. providing professors/lecturers to support CORE courses and general education courses for other schools).

Faculty and Space Resources

1. Overview of faculty workload issues, including current and anticipated shortfalls or imbalances, as well as the school workload policy, including the likely extent of reliance on lecturer appointments. Note that permanently required lecturer lines should be requested as such by schools.
2. Balance of tenured and untenured faculty, and opportunities for mentoring.
3. An updated description of the school's space planning and allocation procedures.
4. Special resource issues related to faculty hiring, e.g. plans to hire faculty cohorts or special facilities needs for new hires.
5. Special issues relevant to achieving diversity of UC Merced's faculty.

How this information will be used. CAPRA will place heavy emphasis on prioritized FTE requests voted on by the faculty and justified by the Strategic Plans of the school and associated graduate groups. In addition, CAPRA will consider other information, such as availability of resources; consistency of a school's plan with the plans of other schools, graduate groups, and institutes; other campus-wide strategic initiatives; status of ongoing searches, balance of tenured and untenured faculty and balance of faculty across schools; student enrollment information; other information from school deans. Using this information, CAPRA will make recommendations to the EVC/Provost regarding categories of new faculty lines (e.g., 1st, 2nd, 3rd tier).

Revised XXXXX, 2009

CAPRA: Michael Colvin (Chair)
Wolfgang Rogge (Vice-Chair)
Evan Heit
Chris Kello (GRC)
Susan Amussen (UGC)
Martha Conklin (ex-officio)

Appendix 1**: Sample Table of Requested FTEs**

Table of Requested FTEs, Year 1 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

Table of Requested FTEs, Year 2 of 2 Year Plan

EVC Targets: Number of Positions: _____, Total Startup: _____, Total Space:_____

Priority	Name of Position	Level (Lecturer/Assistant/ Associate/Full)	Primary Major Contribution (current or planned)	Secondary Major Contribution (optional)	Primary Graduate Group	Secondary Graduate Group (optional)	Estimated start-up costs	Estimated Space needs	Special needs and strategic considerations, if any
examples									
=1	Latin American History	Associate/Full	History	Literature	World Cultures		$XX-YYK	office	
=1	Biological Anthropology (cross-unit with Nat Sci)	Assistant	Anthropology	Biology	World Cultures	QSB	$XX-YYK	office + XYZ sq ft lab	needs vivarium space
=1	Health Psychology	Full	Psychology		SCS		$YYK	office + XYZ sq ft lab	could contribute to medical school planning
=4	Applied Microeconomics (Health)	Associate/Full	Economics		SCS	Applied Math	$YY-YYK	office	
=4	Languages	Lecturer						office	must be on campus

This table was approved by a vote of the School of _____ faculty on (date).

Notes: This table should reflect school priorities, although it is possible that multiple positions will be assigned to the same priority level. Additional considerations such as opportunity hires, spousal hires, diversity issues, should be noted where relevant, with further description in the text of the plan.

Appendix 2: **Sample Table of Majors and Graduate Groups**

Name	Established or Planned Start Date	Number of students (08-09)	Student Credit Hours (08-09)	Number of Current Faculty (and Names)	Number of Current Searches (and Names)	Requested FTEs (and Names)
Examples						
Anthropology	9/08	n/a	100	3 (Anderson, Smith, Jones)	1 (Cultural Anthropology)	1 (Biological Anthropology)
Economics	Established	33	400	4 (Johnson, Rogers, Lopez, Stein)	2 (Applied Microeconomics, tenured + untenured)	1 (Applied Microeconomics-health)
History	Established	35	350	2 (Randall, Walker)	1 (US History)	1 (Latin American History)

Appendix 3**: Space Needs and Planning**

Name	Offices on campus (number)	Lab space on campus (sq ft)	Total campus space (sq ft)	Space at Castle (sq ft)	Space at other location (specify)
Current total (9/2009)					
New space for AY09-10 hires					
Total for AY09-10					

Majors:

* Anthropology
* Cognitive Science (B.A.)
* Cognitive Science (B.S.)
* Economics
* History- emphasis United States and World
* Literatures & Cultures (English)
* Literatures & Cultures (Spanish)
* Management
* Political Science
* Psychology
* Sociology

Minors:

* American Studies
* Anthropology
* Arts
* Chicano Studies
* Cognitive Science
* Economics
* History
* Literatures & Cultures
* Management
* Philosophy
* Political Science
* Psychology
* Public Health
* Services Science
* Sociology
* Spanish
* Writing