Research Focus Areas

Solar Concentration

This focus area conducts research in thermodynamically efficient (nonimaging) solar concentration for photovoltaic, solar thermal, and solar daylighting. Applications include electric power, cooling and process heat, and distributed lighting.

Energy Efficiency and Intelligent Infrastructure

This area includes research in smart energy infrastructures, and use of the LEED-certified UC Merced campus as a living laboratory.

Solar Forecasting

The Solar Forecasting Initiative (SFI) combines state-of-the-art satellite and radar data image processing with real-time data from ground solar stations in order to determine solar energy availability for current and near-term atmospheric conditions. Applications include predicting solar energy intensity and availability for electricity grid management purposes.

Thermal Science

This research area investigates improved efficiency and reduced emissions of internal combustion engines and novel cooling and refrigeration cycles.

Nanotechnology

Research in this area involves carbon nanotube solar cells and quantum dot semiconductors for solar energy conversion.

Power Transmission

Research in this area focuses on the problem associated with any kind of energy generation, including the non-carbon-based sources as well as the conventional carbon-based energy sources: the transmission and distribution of power from the power plant to the urban areas where the power is consumed.

Optoelectronics

The focus area of optoelectronics deals with the design and implementation of devices that exploit interactions between photons and semiconducting materials to interconvert seamlessly between optical and electrical energy.