



The University of California
Advanced Solar Technologies Institute
(UC Solar)

Research—Innovation—Education

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“To truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy.”

—*Barack Obama*

“UC Solar faculty, staff and students are dedicated to the development of innovative technologies that make solar energy more efficient, more affordable, and the best choice for the people of California and the world.”

—*Roland Winston, CAST Director*



UC Solar Overview

- UC Solar is a new multi-campus, multidisciplinary solar research institute made up of faculty and researchers from UC Merced, UC Berkeley, and UC Santa Barbara
- Established in 2010 by a five year, \$2.25 million seed grant from the UC Office of Research
- The institute's faculty members include mechanical engineers, materials scientists, environmental engineers, physicists, biochemists and computer scientists
- UC Solar is led by UC Merced Professor Roland Winston
- Research projects are funded by government, corporate and foundation grants and private philanthropy



UC Solar Overview

- Initial UC Solar research areas include:
 - **UC Merced:** designing non-tracking solar concentrators, developing optics for indoor lighting, and designing and building a low-cost solar thermal cooling prototype
 - **UC Berkeley:** focusing on achieving very high-efficiency devices using nanoneedles, nanowires and quantum dots
 - **UC Santa Barbara:** developing materials to harness power in the ultraviolet portion of the solar spectrum



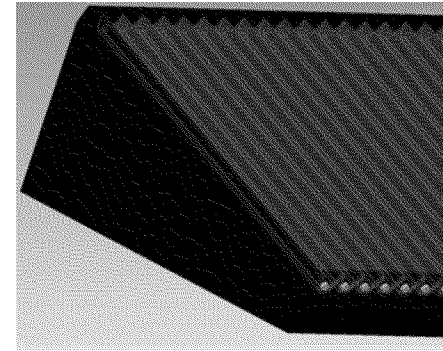
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Highlight Project—Solar Cooling

- Development of Low-Cost, Non-Tracking Collector/ Concentrators for Use in Solar Thermal Cooling Systems
 - Targets commercial buildings
 - Collectors power a double effect absorption chiller ($\sim 180^{\circ}\text{C}$)
 - Produces 1Mw thermal energy psm at a target cost of \$150 - \$200 psm
- Reduces power consumption and greenhouse gases
- A prototype 25Mw system (6.5 ton chiller) is being constructed at UC Merced and will launch in May 2010
- CEC funding; prototype funded by philanthropy



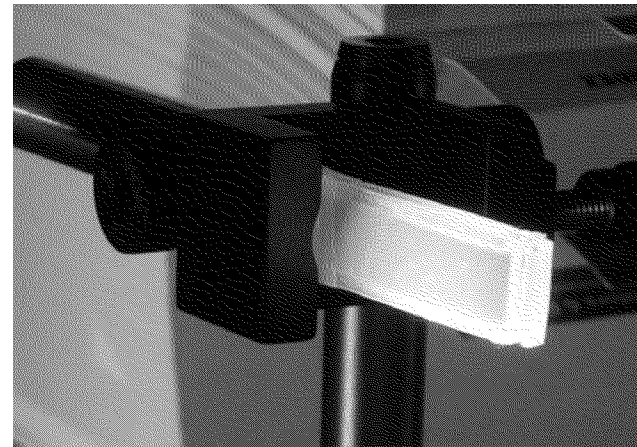
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Highlight Project—LSCs

- Developing Efficient, Low-Cost Luminescent Solar Concentrators (“Solar Windows”)
- Bright light emitted by the concentrator can be collected by a Si PV cell attached to the edge
 - Concentrate both direct and diffuse light without tracking
 - Require less PV materials
 - Reduce heat dissipation
 - Easily integrated into buildings



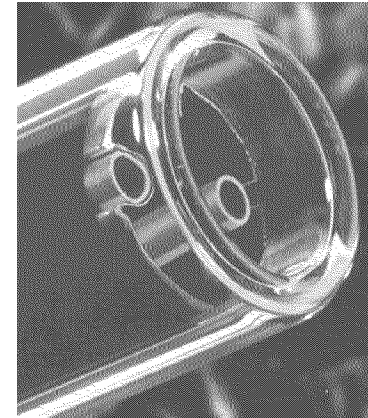
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Highlight Project—Hybrid Thermal/PV

- Development of Integrated Hybrid Solar Thermal/ Photovoltaic Collectors
 - Targets residential applications
 - Reduces natural gas/electricity consumption
 - More energy collected in a smaller area
 - Reduces the energy payback time by ~50%
- Proposes the application of PV thin films as coatings on inner glass cylinders of dewar type tubes
- Partnering with Beijing Yongdon Heat-Pipe Solar Technology Limited and Merced-based APG Solar
- CSI funding has been applied for; additional grant funding is being pursued



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UC Solar Industry Partners

- The UC Solar Industry Consortium enables collaboration with industry and helps ensure that innovations can be brought to market quickly and efficiently
- UC Solar Consortium Members (or “Sponsors”) pay a modest annual fee to:
 - Partner with some of the UC’s finest scientific minds and the solar industry’s most progressive companies
 - Participate in research projects and receive advance knowledge of scientific breakthroughs and new inventions
 - Work closely with students and postdoctoral researchers
 - Influence the solar research and education agenda at the world’s leading research university

The logo for UC Merced, featuring the word "UCMERCED" in a serif font with a decorative border.The logo for the University of California, featuring the word "Cal" in a stylized, cursive font.The logo for UC Santa Barbara, featuring the letters "UCSB" in a bold, sans-serif font above a stylized wave graphic.

UC Solar Objectives

- Short term objectives include:
 - Establishing relationships with key energy stakeholders throughout the state
 - Adding Industry Consortium members
- Long term objectives include:
 - Recruiting world-class faculty and researchers from all 10 UC campuses
 - Establishing UC Solar as a pre-eminent center of excellence in solar energy research and education
 - Transforming the economy of California (and the Central Valley) by creating innovative solar technologies and a new generation of solar entrepreneurs

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CPUC Partnership Proposal

- “Founding Sponsor” model (e.g., PIER at the UC Davis Lighting Center)
- With the CPUC, approach CA public utilities and create a “Founding” consortium
- Founding companies would receive special recognition in return for a long term financial commitment to UC Solar
- This financial commitment would fund:
 - Scholarships and Fellowships
 - Direct Support of Research Projects
 - Educational Programs (in partnership with CPUC/utilities)
 - Matching Funds for State and Federal Research Grants
 - Demonstration Projects and Solution Prototypes

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Contact Us

- For more information regarding UC Solar, please visit the UC Solar website at: <http://cast.ucmerced.edu>

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