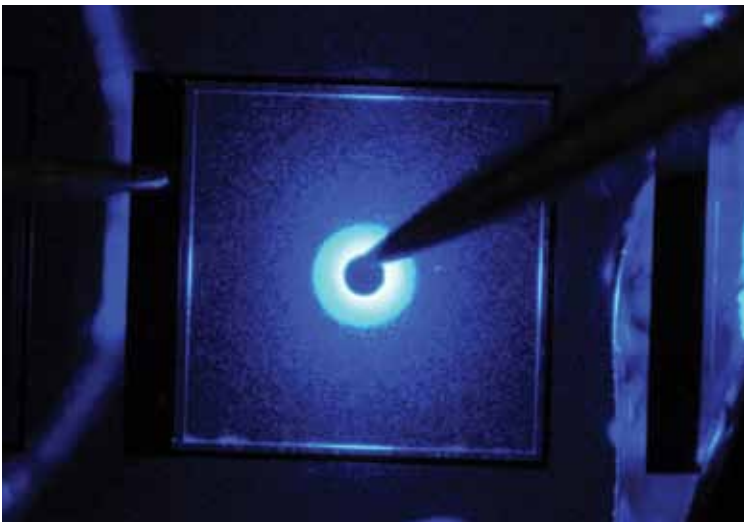


## RESEARCH



ELIZABETH ANIN RANGEL

UCSB patents include photonic crystals (above) and light emitting diodes (LEDs) developed at the Solid State Lighting and Energy Center.

### Patents, Inventions, and Income on Rise

From the atomic force microscope to light-emitting diodes, UC Santa Barbara has staked its place as a world leader in scientific advancements and inventions. Now, thanks to UCSB's growing research enterprise, the campus has seen the number of inventions and patents — and the income they generate — rise dramatically over the past three years.

All told, UCSB had 611 active inventions in its 2008 portfolio, which also includes 316 active U.S. patents. That compares to 572 active inventions and 302 U.S. patents in 2007, and 480 inventions and 280 patents in 2006. In addition, UCSB had 103 new invention disclosures in 2008. Historically, the University of California system has been a national leader in inventions and patents.

The campus's portfolio also included 38 new licensing agreements in 2008, entered into with companies interested in developing products based on UCSB research. At the close of fiscal 2008, a full 46 percent of UCSB's active inventions were under some form of commercial licensing agreement.

"We try to get the technologies invented by UCSB researchers into the marketplace, so that they can help the economy and society," said Michael Witherell, vice chancellor for research.

In fiscal 2008, UCSB produced total utility patent income of \$3.88 million. That's an increase of more than \$1.5 million from 2006, when

the university reported income of \$2.316 million. The increase is due, in part, to the work of the Office of Technology & Industry Alliances.

"The quality of the companies we work with makes a big difference in successfully translating UCSB research into products that benefit the public," said Sherylle Mills Englander, the office's director.

Nine new companies based on UCSB technology were formed in 2008. Over the years, more than 90 local companies have been established by alumni of the campus.

### Energy Frontier Center Coming to UCSB

UCSB'S Institute for Energy Efficiency will be home to a new Energy Frontier Research Center, the White House announced this spring. Funded by the American Recovery and Reinvestment Act, the center will receive a total of \$19 million over five years.

The purpose of the new center — and 45 others the U.S. Department of Energy Office of Science is establishing at universities, national laboratories, nonprofit organizations, and private firms across the nation — is to advance scientific research on energy. John E. Bowers, professor of electrical and computer engineering and director of the Institute for Energy Efficiency, will also serve as director of the new project, to be known as the Center on Materials for Energy Efficiency Applications.

"The award of this center supports and strengthens the two core missions of the Institute for Energy

Efficiency — creating new technologies for energy efficiency, and training a new generation of energy scientists and engineers," Bowers said.

### Findings

■ A significant discovery in understanding the way **human embryonic stem cells** function has been reported by UCSB scientists. The finding helps explain nature's way of controlling whether cells will renew, or will transform to become part of an ear, a liver, or any other part of the human body. The study was reported in *Cell*. The scientists, led by Kenneth S. Kosik, co-director of the Neuroscience Research Institute, say the finding bodes well for cancer research, since tumor stem cells are the engines responsible for the growth of tumors. The discovery is also relevant to other diseases and injuries.

■ A new study by researchers from UCSB's National Center for Ecological Analysis and Synthesis sheds light on how **threats to the world's endangered coral reef ecosystems** can be more effectively managed. In the journal *Coral Reefs*, lead authors Kimberly A. Selkoe and Benjamin S. Halpern explain how their maps of the Northwestern Hawaiian Islands — a vast area stretching over 1,200 miles — can be used to make informed decisions about protecting the world's fragile reefs. Coral reef ecosystems are at risk due to the direct and indirect effects of human activities. The study was designed to help natural resource managers make decisions on issues such as the granting of use permits and the identification of areas to monitor for climate-change effects.

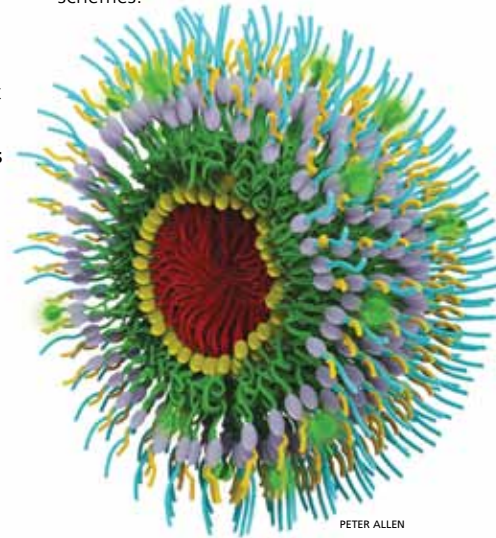


COURTESY OF PNNINOAA

Coral reefs: fragile and at risk

■ Researchers have recently demonstrated a **breakthrough in the quantum control of photons**, the

energy quanta of light, that could eventually have implications in banking, drug design, and other applications. In a paper published in *Nature*, UCSB physics researchers Max Hofheinz, John Martinis, and Andrew Cleland document how they used a superconducting electronic circuit known as a Josephson phase qubit to prepare highly unusual quantum states using microwave-frequency photons. The project is funded by the federal agency called the Intelligence Advanced Research Projects Activity, or IARPA. The government is particularly interested in quantum computing because of the way banking and other important communications are currently encrypted. Using large numbers, with hundreds of digits, encryption codes are changed daily and would take years of traditional computing to break. Quantum computing could potentially break those codes quickly, destroying current encryption schemes.



PETER ALLEN

Plaque-attacking nanoparticles

■ Scientists and engineers at UC Santa Barbara and other researchers have together developed a **nano-particle that can attack plaque** — a major cause of cardiovascular disease. The treatment is promising for the eventual development of therapies for cardiovascular disease, which is blamed for one third of all deaths in the United States each year. Atherosclerosis, which was the focus of the study, is one of the leading causes of cardiovascular disease. In atherosclerosis, plaque builds up on the walls of arteries and can cause heart attack and stroke. Erkki Ruoslahti, distinguished professor at the UCSB Burnham Institute for Medical Research, and Matthew Tirrell, dean of engineering, led a team of seven