

President's *report*

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The following is a glimpse of some recent achievements by the faculty, staff and students of the University of California and the national laboratories managed by the university.

IN THE NEWS

Scientific recognition ... Fourteen *University of California* researchers have been elected to the prestigious National Academy of Sciences in recognition of their original research contributions to science and engineering. The 14 UC faculty are among 72 new members and 18 foreign associates elected this year, and brings total NAS membership to 2,013, of which 372 are affiliated with UC. Five of the new NAS members are affiliated with *UC Berkeley*, three with *UC San Diego*, two each with *UC Irvine* and *UC Santa Cruz*, and one each with *UC Davis* and *UCLA*.

Pilot podcasts ... Further extending its curricular reach to the iPod generation, *UC Berkeley* recently announced "Berkeley on iTunes U," a free service that makes video and audio recordings of a growing number of course lectures available on and off campus through Apple Computer's iTunes Music Store. The agreement brings the campus's multimedia assets under one UC Berkeley-branded media gateway. To access "Berkeley on iTunes U," visit itunes.berkeley.edu

Economic influence ... *UC Davis* generated \$3.06 billion in economic activity in California during the last full fiscal year, based on recently released financial information for 2004-05. That represents an increase of 4.4 percent, or \$130 million, in economic activity from the \$2.93 billion generated in 2003-04. UC Davis remains one of the largest employers in the seven-county capital region, with 27,816 full-time and part-time employees. The campus paid out \$1.147 billion in salaries and wages to those employees in 2004-05 (ending June 30, 2005) while collecting revenues totaling \$2.25 billion – half of which are estimated to have come from outside the area.

Sudan divestment ... The *University of California Board of Regents* have voted to divest from several companies involved in significant business activities that provide revenue to the Sudanese government to continue acts of genocide in Darfur, marking the first major public university in the nation to take such action. Regents voted to divest all UC shares, including those combined in index funds in nine companies held within separately managed equity portfolios of the university's

pension and endowment funds. The exact dollar amount involved will not be known until the divestment occurs.

HEALTH AND NUTRITION

Arthritis research ... *UCLA/Veterans Affairs* researchers found that for arthritis patients, taking a combination of two drugs may be most effective in protecting against stomach upset, called "dyspepsia," which is a side effect of common pain medications. The study showed that for arthritis patients, taking an anti-inflammatory drug like Naproxen with an acid-reducing drug like Prevacid may prove more effective than taking a Cox-2 inhibitor like Celecoxib alone for protecting against stomach upset. More than 15 million Americans suffer from chronic arthritis, including osteoarthritis and rheumatoid arthritis.

Eye research ... *UC Irvine* has received a \$2 million gift from The Allergan Foundation, the philanthropic arm of Allergan Inc., to the department of ophthalmology. The gift – the largest donation ever to ophthalmology – will further strengthen the department's research agenda and clinical care. Some of the nation's top researchers in the areas of retinal disease, glaucoma, corneal disease and refractive surgery currently work at UC Irvine, and Allergan's donation will help them meet complex medical and surgical eye care needs, conduct clinical research, develop programs and technologies in conjunction with industry, and seek clinical solutions to serious and debilitating eye-threatening diseases.

Lipid molecule ... Scientists at the *UC Santa Barbara* have created a new molecule that holds promise in fighting disease via gene therapy. Inherited diseases, as well as many cancers and cardiovascular diseases, may eventually be helped by this approach, which delivers therapeutic genes directly to cells. These genes can correct genetic defects, for example, or help the body's immune system fight cancer cells. Lipid DNA complexes are attracting increasing attention as non-viral DNA delivery vehicles. They have been described as one of the "hottest new technologies" for gene therapy, accounting for nearly 10 percent of ongoing clinical trials.

WRN secrets ... Scientists from *Lawrence Berkeley National Laboratory* and the Scripps Research Institute have determined the crystal structure and molecular mechanisms of a key part of WRN, a protein that protects humans from premature aging and cancer. When the gene for WRN is defective the result is Werner's syndrome, a rare inherited disease that shows no symptoms until puberty, but soon causes rapid aging. Beginning in their 20s, victims

may become afflicted with cataracts, hair loss, wrinkled skin, osteoporosis, arteriosclerosis, and type II diabetes; many patients contract cancer, and most die by the age of 50. Understanding how the WRN protein normally works to maintain genomic integrity could lead to new forms of treatment for cancer and age-related pathologies.

DEVELOPMENT AND DISCOVERIES

Altruistic behavior ... A new study of side-blotched lizards in California has revealed the genetic underpinnings of altruistic behavior in this common lizard species, providing new insights into the long-standing puzzle of how cooperation and altruism can evolve. Led by researchers at **UC Santa Cruz**, the study offers the first evidence in vertebrates of an important theoretical concept in evolutionary biology known as “greenbeard” altruism. *Barry Sinervo*, professor of ecology and evolutionary biology at UCSC and first author of a paper describing the new findings, says the study reflects a major breakthrough in the understanding of how cooperative behavior arises from genes.

Profiling tool ... A chemical profiling technique that has potential for detecting the onset of cancer at the cellular level has been developed by scientists with the **Lawrence Berkeley National Laboratory** and **UC Berkeley**. A team of researchers, led by chemist *Carolyn Bertozzi*, has reported a technique for rapidly profiling O-linked glycoproteins in living animals. Changes in O-linked protein glycosylation – the attachment of sugars to proteins through an oxygen atom on the protein – are known to correlate with cancers and other diseases, such as inflammations and bacterial infections. Until now, however, scientists have lacked a practical means of monitoring such changes in a physiological setting.

THE CUTTING EDGE

Artificial eyes ... Using the eyes of insects such as dragonflies and houseflies as models, a team of bioengineers at **UC Berkeley**, has created a series of artificial compound eyes. They are the first hemispherical, three-dimensional optical systems to integrate microlens arrays – thousands of tiny lenses packed side by side – with self-aligned, self-written waveguides, that is, light-conducting channels that themselves have been created by beams of light, said *Luke P. Lee*, the Lloyd Distinguished Professor of Bioengineering. Potential applications include surveillance; high-speed motion detection; environmental sensing; medical procedures, such as endoscopies and image-guided surgeries that require cameras; and a number of clinical treatments that can be controlled by implanted light delivery devices.

Detecting explosives ... Airport screeners, law enforcement and military personnel and others have a new ally in the war against terrorism – a portable, sensitive and accurate explosives detector developed by **Lawrence Livermore National Laboratory** researchers. The new explosives detector, called the Easy Livermore Inspection Test for Explosives, or ELITE, is highly sensitive to more than 30

different explosives, making it one of the most effective explosive detection systems available, says *John Reynolds*, who led the technology’s development and is the deputy director of LLNL’s **Forensic Science Center**. The detector has received a Federal Laboratory Consortium award for excellence in technology transfer.

Biosensor project ... A team of **UC Santa Cruz** researchers has received major funding from the National Institutes of Health to develop new sensor technology for biomedical applications. The project builds on earlier advances by UCSC researchers in optical and electrical sensing technologies and involves a broad interdisciplinary group of collaborators at UCSC and Brigham Young University. *Holger Schmidt*, associate professor of electrical engineering, is principal investigator on the grant, which will provide \$1.6 million over four years for the sensor project. Potential applications for the new device include highly sensitive testing for medical diagnostics. It could also be a powerful tool for basic research in molecular biology.

PLANETS AND ENVIRONMENT

Carbon dioxide ... An important source of uncertainty in predictions about global warming is how plants will respond to increasing atmospheric carbon dioxide. Now biologists at **UC San Diego** have made significant advances toward understanding the mechanism plants use to regulate their carbon dioxide intake. The study shows how the level of carbon dioxide in the atmosphere controls the opening and closing of leaf stomata – pores through which plants “breathe” in carbon dioxide. The researchers say that their findings provide important insights into the cellular and genetic mechanisms through which increasing carbon dioxide emissions will impact the world’s vegetation.

Air purifier danger ... In a small, poorly ventilated room, an indoor air purifier that produces even a few milligrams of ozone per hour can create an ozone level that exceeds public health standards, **UC Irvine** researchers have found. Scientists also discovered that ozone produced by air purifiers adds to ozone already present in any room, a prediction that had never been experimentally verified in a realistic indoor environment. The results mean that people operating air purifiers indoors are more prone to being exposed to ozone levels in excess of public health standards, says *Sergey A. Nizkorodov*, a UCI chemistry professor. The findings will be studied by officials deciding how to regulate the distribution of indoor air purifiers.

INSIGHTS INTO SOCIETY

Facial cues ... Women are able to subconsciously pick up cues in men’s faces and use those cues to determine if they are attracted to them for long-term or short-term relationships, according to a new study conducted by **UC Santa Barbara** researchers and colleagues. Men whose faces reflected an interest in children were intuitively perceived by woman as candidates for long-term commitments, whereas men whose faces indicated high testosterone levels were

determined to be short-term prospects for relationships. Women are surprisingly accurate in being able to determine interest in children and testosterone levels, says *James Roney*, an assistant professor of psychology at UCSB and lead author of the paper.

Determination to succeed ... What kind of student will succeed in college? While there are many possible answers to the question, researchers at *UC Riverside* have found that one predictor is being seriously undervalued – conscientiousness. *Seth Wagerman*, a doctoral candidate in psychology, and *David Funder*, chairman of the UCR psychology department, found that success in college is much more related to a student's work ethic and self-discipline than to absolute intelligence or excellent test-taking ability. The study also adds more evidence to the argument that less emphasis should be placed on the SAT college entrance exams.

Taxpayers' savings ... A newly released *UCLA* study reports that California taxpayers save nearly \$2.50 for every dollar invested in nonviolent drug offenders eligible for substance abuse treatment under the state's Substance Abuse and Crime Prevention Act, or Prop. 36, approved in 2000. Over a 30-month follow-up period, Prop. 36 saved state and local governments \$173.3 million for offenders entering the program during its first year. For offenders who completed their required drug treatment, nearly \$4 was saved for each dollar expended, according to researchers at the *Semel Institute for Neuroscience and Human Behavior* in the *David Geffen School of Medicine*. The savings that accrued were largely due to reductions in jail and prison time.

Artistic vision ... In a rare effort by technologists to give artists an important role in the evolution of multidisciplinary research in science and engineering, one of California's highest-profile technology institutes has named its first Artist in Residence at *UC San Diego*. The UCSD division of the *California Institute for Telecommunications and Information Technology (Calit2)* appointed *Sheldon Brown* to the new position for an initial two-year term. He is a professor in UCSD's department of visual arts and director of the university's *Center for Research in Computing and the Arts*. The 43-year-old artist has played an instrumental role as leader of the institute's new media arts efforts since Calit2's creation in 2000.

LOOKING INTO THE FUTURE

Exercise and children ... Researchers with the *UC Irvine Center for the Study of Health Effects of Exercise in Children* have received a \$7.2 million, five-year National Institutes of Health grant to study the impact of physical activity on childhood health. The information gained will be used to find how exercise can be best used to prevent asthma and childhood obesity, and to enhance the process of growth and development in children with chronic disease and disability. Physical activity is a critical moderator of growth and development in children and adolescents.

Egypt online ... In cooperation with an international team of scholars, *UCLA* is launching the world's first comprehensive online encyclopedia dedicated to all aspects of ancient Egypt and its legacy. Over the next decade, hundreds of scholars are expected to contribute to the constantly evolving and peer-reviewed *UCLA Encyclopedia of Egyptology*, which ultimately will contain approximately 4,000 entries and weigh in at 6 million words. The project will be the first reliable and comprehensive scholarly interactive Web resource on ancient Egypt, says *Jacco Dieleman*, encyclopedia editor and a *UCLA* assistant professor of *Near Eastern Languages and Culture*. Designed to become available in stages beginning in 2008, the project is at core a conventional encyclopedia.

Research ties ... *UC Irvine* and *UC San Diego* have partnered with four universities in Southern England to pursue innovative research opportunities in biology, engineering and medicine. Funded by a \$2.6 million grant from the government of the United Kingdom, the collaborative research projects are to focus on developing technologies that will eventually lead to commercially viable products. The U.S.-U.K. collaboration came about after UCI received a \$75,000 *UC Discovery Grant* aimed at seeking new ways for enhancing involvement of the state's industries in "pre-technology" research. The partnership with the U.K. universities will be a step toward meeting this goal by accelerating the development of usable technologies that can entice industry involvement and ultimately benefit California residents.

Supporting teachers ... The *New Teacher Center* at *UC Santa Cruz* has received its largest-ever grant to fund the expansion of its work in Ravenswood City School District in East Palo Alto. The center's mentoring with new teachers has led to a stunning turnaround in teacher retention at the three participating schools: 84 percent of new teachers returned to the classroom in 2004-05, compared with only 27 percent the previous year. In 2005-06, 87 percent of new teachers returned. The \$2.46 million grant from the William and Flora Hewlett Foundation will allow the center to expand its work to all seven schools in the Ravenswood district and increase the scope of support to include the district superintendent, all principals, and veteran and new teachers. More than 3,000 students and 150 teachers will benefit from the expanded collaboration.

KUDOS

Prestigious honor ... Twenty-nine *UC* faculty were among the 175 new U.S. members elected to the American Academy of Arts and Sciences, which honors the country's leaders in scholarship, business, the arts and public affairs. Nominated by current academy members, the new fellows were selected through a highly competitive process that recognizes individuals who have made pre-eminent contributions to their disciplines and to society at large. Eleven of the new American Academy of Arts and Sciences members are affiliated with *UC Berkeley*, six with *UC San Diego*, three with *UC Santa Cruz*, and two each with *UC Irvine*, *UCLA*, *UC San Francisco* and *UC Santa Barbara*, and one with *UC Davis*.

Geophysicist tapped ... *UC Riverside's* Distinguished Professor of Geophysics, *James Dieterich*, has been named chairman of the U.S. Geological Survey's re-established National Earthquake Prediction Evaluation Council. The 12-member council will advise the director of the USGS on earthquake prediction, forecasting and hazard assessment. The USGS reports that earthquakes are one of the most costly natural hazards facing the nation, posing a significant risk to 75 million Americans in 39 states. The USGS has the lead federal responsibility to provide notification of earthquakes to enhance public safety and to reduce losses through effective forecasts based on the best possible scientific information.

Gifted teacher ... Pick almost any subject on American culture, and chances are that *Prof. Jay Mechling* has written about it, been quoted about it in the media – or taught it to undergraduates during the past 35 years at *UC Davis*. For his nationally renowned scholastic breadth and teaching depth, American studies scholar Mechling has been awarded the 2006 UC Davis Prize for Undergraduate Teaching and Scholarly Achievement. The \$30,000 prize, funded by the UC Davis Foundation through gifts from the Davis Chancellor's Club Fellows, is believed to be the largest prize of its kind in the nation. Created in 1985, the prize is awarded annually based on the recommendations of faculty members, students and research peers.

Business plan ... An alternative energy company called Aurora BioFuels has won the \$25,000 first prize at the eighth annual UC Berkeley Business Plan Competition at *UC Berkeley's Haas School of Business*. Aurora BioFuels presented a plan showing how to create bio-diesel fuel with yields 125 times higher than existing bio-diesel conversion technologies, and at half the cost. The company also won the People's Choice Award of \$5,000 for garnering the most votes from the audience at the final awards ceremony in April. The winning team is comprised of full-time UC Berkeley MBA students *Matt Caspari* and *Guido Radaelli*; *Bert Vick*, a UC Berkeley Ph.D. student in molecular and cell biology; and *Tasios Melis*, a UC Berkeley professor of plant and microbial biology.

INVESTING IN EDUCATION

Endowed chair ... As national attention on the "crisis in education" grows, *UC Davis* will enhance its leadership position in preparing the next generation of teachers thanks to a recent \$1.09 million gift to its *School of Education*. Eager to raise the profile of teachers and strengthen the training they receive, Dolly and David Fiddymont of Roseville have established the first endowed chair for the four-year-old school, one of only a handful of academic chairs nationwide that are focused on teacher education. The gift, which will strengthen the school's ability to attract a nationally recognized scholar to lead the teacher education program, is the largest private donation made to the School of Education.



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