

# President's report

*It starts here*

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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

**Transformed plaza ...** Maya Lin joined *UC Irvine* officials, students and community members Oct. 25 to dedicate the new 30,000-square-foot, high-tech outdoor UCI Arts Plaza. The transformed plaza creates space for contemplation and creative interaction, while expanding the campus's venues for performing and exhibiting new media art. Lin, whose most prominent design is the Vietnam Veterans Memorial in Washington, was commissioned in 2000 to make over the Claire Trevor School of the Arts' bland concrete courtyard built in the 1960s. The \$3.6 million plaza features one of Lin's signature fountains, a water table, flanked by "whispering" benches playing music and poetry. Lin sees the table and benches as the heart of the plaza and calls it "the drawing room," a place that offers space for study and reflection. Opposite the drawing room is a 200-seat amphitheater with natural seating where live performances and film and video screenings will be held.

**Science education ...** *Virginia S. Hinshaw*, *UC Davis* provost, and *Angelica M. Stacy*, *UC Berkeley* associate vice provost for faculty equity and a chemistry professor, were honored for their work in promoting the careers of women in science and higher education, receiving statewide recognition as outstanding educators from the California National Organization for Women Foundation. The foundation is committed to ensuring the resources for women's exploration and to ending discrimination and harassment that hinders women's discovery, says its executive director, Megan Seely, adding the honorees, Hinshaw, Stacy and three others in education, share this commitment in their professional and daily lives.

**Books online ...** The *University of California libraries* have announced their participation in a partnership to build a freely accessible digital library with materials drawn from across the world. The UC libraries will contribute books and resources to build a collection of out-of-copyright American literature that will include works by many great American authors. With the support of Yahoo! Inc., UC library books will be digitized by the Internet Archive using a new

technology that scans books at the cost of 10 cents per page. In comparison, the costs to scan archival photographs and documents typically begin at \$20 per page. The materials will be available from [www.opencontentalliance.org](http://www.opencontentalliance.org), the Web site of the Open Content Alliance, a global consortium that will build and openly distribute a comprehensive set of digitized print material and multimedia.

## HEALTH AND NUTRITION

**Prostate cancer ...** Researchers at *UCLA's Jonsson Cancer Center* have uncovered the mechanism by which an antibody blocks the growth of prostate cancer in animal models, a discovery that could pave the way for development of a new molecularly targeted therapy. The antibody, called 1G8 and discovered by UCLA scientists, signals the prostate cancer cells to stop growing and die, says *Robert E. Reiter*, a center researcher and professor of urology. The antibody proved effective in several different animal models of prostate cancer, he says, indicating that it could be a potent cancer fighter. The next step is to test the 1G8 antibody in human clinical trials, probably in about a year.

**Cognitive decline ...** Psychological stress during infancy has been found to cause early impaired memory and a decline in related cognitive abilities, according to a *UC Irvine School of Medicine* study. The study suggests that the emotional stress associated with parental loss, abuse or neglect may contribute to the type of memory loss during middle-age years that is normally seen in the elderly. The study, conducted in rats, is believed to be the first to show that early life emotional stress initiates a slow deterioration of brain-cell communication in adulthood. These cell-signaling deficits occur in the hippocampus, a brain region involved in learning, storage and recall of learned memories.

**Food safety center ...** The U.S. Senate has allocated \$1 million to establish the Food and Drug Administration Western Center for Food Safety and Defense at *UC Davis*. The new center will be a cooperative research effort with UC Davis' Western Institute for Food Safety and Security. It will be the first Food and Drug Administration food safety center to address the food safety needs specific to California and the Western U.S. By integrating the food safety mission of the FDA with the scientific expertise of UC Davis, the center will benefit California and the nation that depends on California agriculture for a safe and wholesome food supply, say campus officials.

## DEVELOPMENTS AND DISCOVERIES

**Targeted delivery ...** Prostate, breast and other cancer patients may be offered a new, stancher targeted drug delivery system to treat their diseases in the next decade. Using atomic force microscopy and computer simulations, researchers from *Lawrence Livermore National Laboratory* and the *UC Davis Cancer Center* have unveiled a new and reliable technique to characterize the binding interaction of multivalent molecules designed for targeted drug delivery in cancer treatment. The Livermore team used atomic force microscopy to measure the binding forces between several single-chain antibody fragments and Mucin1 peptide. Mucin1 is commonly found in large quantities in a variety of epithelial cells in the human body, and one of its specific forms is a characteristic marker for prostate, breast, colon, lung, gastric and pancreatic cancers. Binding between Mucin1 and antibodies recognizing the marker is critical to targeted drug delivery for cancer patients. Not only does this technique aid doctors in delivering targeted drugs in cancer treatment, but it also may benefit the laboratory's efforts evaluating antibodies and designing better binding molecules for biosensors that play such a critical role in national security.

**Signaling mechanism ...** *UC San Francisco* scientists have illuminated a key step in a signaling pathway that helps orchestrate embryonic development. The finding, they say, could lead to insights into the development of stem cells, as well as birth defects and cancers, and thus fuel therapeutic strategies. The study, focuses on the Hedgehog family of signaling molecules, which play a central role in directing development of the early embryo's growth and spatial plan, as well as its later organ and limb development. Defects in Hedgehog signaling are a significant cause of some birth defects and cancers. The new finding, say the researchers, will advance scientists efforts to use signaling molecules to direct the differentiation of embryonic stem cells in the culture dish, with the goal of using them to replace or replenish damaged tissues in patients.

**Sharper images ...** A new, sharper picture of the nano-machine that translates our genetic program into proteins promises to help researchers explain how some types of antibiotics work and could lead to the design of better ones. The high-resolution snapshots of the bacterial ribosome were captured by scientists at *UC Berkeley*, and *Lawrence Berkeley National Laboratory* with the lab's *Advanced Light Source*, which generates intense beams of X-rays that can reveal unprecedented structural detail of such large and complex molecules. The new, high-resolution data on the intact ribosome allows researchers to build more detailed and more realistic models of the ribosome that until now were impossible with the "fuzzy pictures" available.

## THE CUTTING EDGE

**Solar cells ...** Imagine a future in which the rooftops of residential homes and commercial buildings can be laminated with inexpensive, ultra-thin films of nano-sized semiconductors that will efficiently convert sunlight into electrical power and provide virtually all of our electricity needs. This future is a step closer to being realized, thanks to a scientific milestone achieved at *Lawrence Berkeley National Laboratory*. Researchers with Berkeley Lab and *UC Berkeley* have developed the first ultra-thin solar cells comprised entirely of inorganic nanocrystals and spin-cast from solution. These dual nanocrystal solar cells are as cheap and easy to make as solar cells made from organic polymers and offer the added advantage of being stable in air because they contain no organic materials.

**Women's cancer center ...** The National Center for Research Resources, a component of the National Institutes of Health, has awarded \$2,085,000 for the design, construction, and fixed equipment costs for a new 11,574-square-foot breast and women's cancer laboratory at *UC Irvine*. It was one of 10 research facilities improvement program projects nationwide that received a total of nearly \$30 million. The grants will allow institutions to construct new laboratory space, improve research imaging capabilities, renovate existing infrastructure systems, and create facilities for research animals.

**Dating technique ...** The radioactive carbon-14 produced by above-ground nuclear testing in the 1950s and 1960s is providing forensic scientists with a more precise way to determine a persons age at the time of death. The method could help in the identification of victims of Hurricane Katrina and other large-scale disasters. The new technique, developed by researchers at *Lawrence Livermore National Laboratory* and the Karolinska Institute in Sweden, determines the amount of carbon-14 in tooth enamel. Scientists can relate the extensive atmospheric record for carbon-14 to when the tooth was formed and calculate the age of the tooth, and its owner, to an accuracy of within about 1.6 years.

## PLANETS AND ENVIRONMENT

**Drought response ...** Despite record rainfall last season, Southern California remains vulnerable to a long-term water-supply crisis because of overuse of Colorado River water, continued rapid population growth and the potential for long-term drought, according to *UCLA Institute of the Environment* researchers. Local governments and water districts throughout the region and the rest of the Southwest should work towards even more increased cooperation on comprehensive water conservation and drought-management strategies, the institute said in its eighth annual Southern California Environmental Report Card issued in October. Because of the looming loss of Colorado River water, significant changes in the way water is imported and used is needed, says *Mary D. Nichols*, institute director. She also serves as president of the board overseeing the Los Angeles Department of Water and Power.

**Toxic levels ...** A group of commonly used pesticides recently found at toxic levels in stream sediments in many agricultural areas around California is also a problem in urban streams, according to a new study by **UC Berkeley** researchers and colleagues. Pyrethroid pesticides, widely used on crops like cotton, fruits and lettuce, and the main residential pesticide now that the once-dominant organophosphates, diazinon and chlorpyrifos, have been phased out, were found in three streams in Roseville, near Sacramento, at levels toxic to organisms that live in the sediment. The new study demonstrates that a potential toxicity problem only recently recognized in agricultural areas is now spreading into urban areas as pyrethroid pesticides have taken over the residential market. Bifenthrin, the pyrethroid that contributed most to the toxicity measured in the study, is available widely and sometimes mixed with fertilizer to spread over lawns.

## INSIGHTS INTO SOCIETY

**Societal savings ...** Every dollar spent on substance abuse treatment generates \$7 in monetary benefits for society, a new **UCLA** study shows. It finds that the average \$1,583 cost of substance abuse treatment is offset by monetary benefits such as reduced costs of crime and increased employment earnings totaling \$11,487. The research team used detailed data from 2,567 clients admitted to 43 treatment providers in 13 California counties during 2000 and 2001. *Susan Ettner*, lead author and professor of general internal medicine and health services research at **UCLA's Geffen School of Medicine** and **School of Public Health**, says that even without considering the health and quality-of-life benefits to drug treatment clients themselves, spending taxpayer dollars on substance abuse treatment appears to be a wise investment.

**Digital divide ...** Access to a home computer increases the likelihood that children will graduate from high school, but blacks and Latinos are much less likely to have a computer at home than are whites, according to a new study by a researcher at the **UC Santa Cruz**, that also found the digital divide is even more pronounced among children than adults. The findings document the persistence of the digital divide and the impact on educational outcomes, even when factors like income and parental education are taken into consideration, says *Robert Fairlie*, associate professor of economics at UCSC. Although many studies have explored the impact of computers in schools, and the federal government has made computer access in schools a priority, very few studies have assessed the impact on youth of having a computer in the home. Another key findings of Fairlie's research: Only 40.5 percent of blacks and 38.1 percent of Latinos have Internet access at home, compared with 67.3 percent of whites.

**Tobacco control ...** By increasing cigarette taxes, raising the smoking age and adopting new or enforcing current regulations that prevent or delay youth smoking, elected officials and other policymakers can improve lives and save billions of taxpayer dollars, according to a **UC Irvine**-led tobacco policy consortium. Research shows that reducing smoking initiation in youth is likely to offer the largest public health impact, says *Daniel Stokols*, UCI professor of planning, policy and design, who helped establish the consortium, a partnership of researchers, community leaders, health advocates, school administrators, teachers and elected officials.

## LOOKING INTO THE FUTURE

**Genome center ...** **UC San Diego's Scripps Institution of Oceanography** has launched a new research center aimed at the burgeoning science of genomics. The Scripps Genome Center will harness the vast potential of studying genomes and genetic coding by combining the latest in computer and information technology with the existing biological and marine science leadership at Scripps. The genome center will address important ocean issues as well as those related to human health, the environment and other areas. Leading the new center is *Terry Gaasterland*, professor of computational genomics, who comes to Scripps after gaining broad notoriety for creating the Rockefeller University's Laboratory of Computational Genomics in New York City.

**Seismic simulation ...** The San Francisco Bay region has a 25 percent chance of a magnitude 7 or greater earthquake in the next 20 years, and a roughly 1 percent chance of such an earthquake each year, according to the "Virtual California" computer simulation. The Virtual California approach to earthquake forecasting is similar to the computer models used for weather forecasting, says *John Rundle*, director of the **UC Davis Computational Science and Engineering Center**, who has developed the model with colleagues from the Jet Propulsion Laboratory and other institutions. The Virtual California model includes 650 segments representing the major fault systems in California.

**Materials research ...** **Los Alamos National Laboratory** has formed a partnership with the **UC Santa Barbara College of Engineering** to create the Institute for Multiscale Materials Studies. The newly established institute is designed to meet critical training, recruiting and staff retention needs for a wide range of current and future national security missions. UCSB will initiate a new graduate emphasis area in multiscale materials and mechanics in the chemical engineering, materials, mechanical engineering and computer science departments to grant degrees. The new graduate emphasis area will focus on linking new advances at the molecular- and nano-scale to the performance of soft matter, such as polymers and biological systems observed at a relatively large scale.

## KUDOS

**Prestigious membership ...** Ten UC faculty were among the 64 new members elected to the Institute of Medicine, part of the National Academies, announced in October. The election raised total active institute membership to 1,461 and UC's total to 140. Active members elect new members from among candidates chosen for major contributions to health and medicine, or to related fields such as social and behavioral sciences, law, administration, and economics. Six of UC's new members are affiliated with **UC San Francisco**, three with **UCLA** and one with **UC San Diego**.

**German award ...** *Guillermo C. Bazan*, professor of materials and of chemistry and biochemistry at **UC Santa Barbara** and director of **Center for Polymers and Organic Solids**, has been selected to receive the prestigious Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation of Germany. The award is conferred in recognition of research achievements to date. With the award, Bazan is invited to carry out research projects of his own choice in cooperation with colleagues in Germany for periods of between six months to one year as a way of promoting international scientific cooperation. Bazan and his UCSB research group work in the area of organic semiconductors with a focus on the basic science of how to synthesize them and how their molecular structure influences collective properties.

**Poetry prize ...** **UC San Diego** professor *Michael Davidson* is the campus's first recipient of a prestigious poetry prize. He was selected to receive the Roy Harvey Pearce Prize for New Poetry by judges from UCSD, Otis College of Art and Design, UC Berkeley and Tuumba Press. The award is made biennially and is named in honor of Pearce, a UCSD emeritus professor and founding member of UCSD's department of literature. Davidson, who teaches American literature, has written eight books of poetry and critical works including, "Guys Like Us: Citing Masculinity in Cold War Poetics."

## INVESTING IN EDUCATION

**Math and science ...** The California Utility Diversity Council, a committee of the California Public Utilities Commission, announced it would invest \$1.365 million in the **University of California-led Mathematics, Engineering, Science Achievement** program, marking the beginning of a new partnership to improve math and science education for disadvantaged K-12 students in California over the next three years. The Mathematics, Engineering, Science Achievement (MESA) program will use the funds – contributed by various investor owned utility companies through the diversity council – to further develop the skills and knowledge of tomorrow's engineers and scientists. Using \$645,000 in financial contributions and \$720,000 in-kind for internships, this work will take place in key areas: K-12 academic preparation; college matriculation support; and paid internships designed to expose MESA graduates to the energy, telecommunications and water management industries and encourage them to pursue careers in these areas.



Robert C. Dynes  
President, University of California

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