

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

New leadership . . . Acting on the recommendation of UC President *Robert C. Dynes*, the Board of Regents appointed retired Admiral *S. Robert Foley* vice president for laboratory management. Foley, 75, a longtime naval commander and consultant on energy and defense issues, will have primary responsibility for the university's management of the three national laboratories – *Lawrence Berkeley* and *Lawrence Livermore* in California and *Los Alamos* in New Mexico.

Boost for cancer research . . . A gift of \$35 million – the largest contribution from individual donors in the history of *UC San Francisco* – has been made by the Helen Diller family to support construction of a cancer research building at UCSF-Mission Bay. It will be named the Helen Diller Family Cancer Research Building in recognition of the family's pivotal role in making the research center possible. The five-story building will be a prominent feature of the 43-acre campus, which is under construction in San Francisco.

NASA partnership . . . *UC Santa Cruz* will manage a national research program valued at more than \$330 million under a new agreement between UC and NASA. The 10-year contract, a first-of-its-kind for NASA, establishes a University Affiliated Research Center at the NASA Ames Research Center at Moffett Field (San Mateo County). NASA officials say the center will provide research and educational capabilities to meet NASA's mission and develop a future work force in technology and science. Initial research is likely to be in the areas of information technology and computer science, nanotechnology, and aerospace operations.

"Genius" award . . . For his exceptional creativity and originality in research revealing secrets of ancient cities, *UC San Diego* anthropological archaeologist *Guillermo Algaze* has been named a 2003 MacArthur Foundation fellow. The honor comes with a no-strings-attached \$500,000 grant. Algaze, 48, chair of the anthropology department, is widely recognized for developing new approaches to understanding origins and society in cities that existed nearly 5,000 years ago.

HEALTH AND NUTRITION

Cancer advance . . . Breast cancer researchers from *UC Davis*, Canada and Switzerland have demonstrated for the first time that it is possible to block genetic switches in mice that turn cancer on and off, thus preventing and even reversing breast cancer in the animals. The findings suggest potential new molecular targets for drugs to prevent and potentially eradicate breast cancer in humans. Investigators demonstrated that removing a single gene known as beta-1 integrin prevented or halted breast cancer growth in laboratory mice.

Treating kidney disease . . . It's long been known that black Americans are four to five times as likely as white Americans to suffer from kidney disease that is severe enough to require dialysis or transplantation. Now, a new study conducted by researchers at *UC San Francisco* and colleagues shows that rates of early kidney disease do not differ between the two groups, but that blacks with early disease are five times as likely as whites to progress to the severe stage that requires dialysis or transplantation. This suggests that black Americans with early kidney disease require much more aggressive treatment than has been commonly practiced.

Breast cancer detection . . . The *Beckman Laser Institute* at *UC Irvine* will lead a national effort to standardize use of a new technology that improves breast cancer detection, cancer therapy management and the quality of life for cancer patients. With a \$7 million grant from the National Cancer Institute, the center will focus on speeding the ongoing development of an experimental laser-based technology called "diffuse optical imaging." This technology can be used to detect and give detailed information on tumors, and researchers will use it to create laser imaging devices that complement conventional detection methods, such as mammography and MRI.

Ineffective treatment . . . Combining two types of drugs prescribed for osteoporosis does not produce a synergistic benefit in treating the disease, according to a study headed by a *UC San Francisco* researcher. It disproved a previously untested but widespread belief among bone researchers that combining the two types of drugs – bone-building parathyroid hormone and bone resorption inhibiting bisphosphonates – should interact in a beneficial way for patients. The combination is no better than either drug alone and may even reduce the bone-building benefit, according to study results.

UC aging initiative . . . Looking to meet the needs of California's aging population, the *University of California* has pulled together \$12 million in state and private support to fully fund six new endowed chairs in geriatric medicine – a subspecialty dedicated to providing medical care for elderly patients. The new faculty chairs will be created at UC's five medical school campuses – *Davis, Irvine, Los Angeles, San Diego*, and *San Francisco* – and at *Berkeley*. Berkeley does not have a medical school, but the campus offers major health sciences programs in public health and optometry, as well as a joint medical student educational program that is operated in conjunction with UCSF. State funding was provided to fund two new chairs at \$2 million each – to be named in honor of former governors Edmund G. "Pat" Brown, Sr., (at UCSF) and Ronald W. Reagan (at UCI).

DEVELOPMENT AND DISCOVERIES

Targeting obesity . . . Researchers at the *UC Irvine College of Medicine* have identified how a natural fat compound works to tell the body to stop eating – a discovery that may be the basis for a new class of drugs targeting obesity and other eating disorders. *Daniele Piomelli*, professor of psychiatry and pharmacology, and colleagues found that the fatty acid, called OEA (oleylethanolamide), activates its cell receptor molecules to regulate hunger and metabolism. The team also discovered that by increasing OEA levels while maintaining normal levels of these cell receptors, they could reduce appetite and weight in rodents, as well as lower their blood cholesterol and triglyceride levels.

Pain reaction . . . A new *UCLA* study shows that different parts of the brain are stimulated in reaction to pain depending on gender. The research represents the largest gender-comparison study of its kind. Although researchers found some overlapping areas of brain activation in men and women, several areas of male and female brains reacted differently when given the same pain stimulus. The female brain showed greater activity in limbic regions, which are emotion-based centers. In men, the cognitive regions, or analytical centers, showed greater activity. Both responses have advantages and neither is better, the scientists said.

Perceiving odor . . . Imagine the smell of coffee in the morning. Did you close your eyes and inhale deeply through your nose? Neuroscientists at *UC Berkeley* found that most people do and that the very act of sniffing plays a vital role in the brain's perception of odor. The researchers report that the sniff people take when trying to imagine an odor closely resembles the sniff they would have taken if the odor were really there. For example, when imagining the smell of bus fumes, people take a timid sniff, but when imagining the smell of a rose, they take a vigorous sniff. If people are prevented from sniffing, the vividness of the image is significantly reduced. From these findings, the scientists conclude that the brain recreates the components of real sensation, such as sniffing, in order to create mental images.

Stem cell potential . . . A *UCLA* study demonstrates for the first time that specific cells found in the adult artery wall have stem cell-like potential. Researchers found artery cells that change into cartilage, bone, muscle and marrow stromal cells. This may lead to a new source of adult stem cells, which may increase potential treatment options and avoid the controversial use of fetal stem cells. *UCLA* researchers also report that the artery wall cells, called calcifying vascular cells, are the only cells other than actual bone marrow stromal cells that support survival of immature (developing) blood cells. This finding may have future applications in reconstitution of bone marrow after cancer treatment.

CO₂ warning . . . Researchers at the *Lawrence Livermore National Laboratory* have found that continued release of carbon dioxide during the next several centuries would increase ocean acidity more rapidly than during the past 300 million years, resulting in damage to marine life. The burning of coal, oil and gas release the greenhouse gas, carbon dioxide, into the atmosphere. Eventually, the ocean absorbs most of this carbon dioxide. CO₂ emissions since the Industrial Revolution have contributed greatly to global climate change, notably an increase in overall temperatures worldwide.

THE CUTTING EDGE

Semiconductor research . . . *UCLA* will lead a new multimillion dollar research center as part of an initiative to expand semiconductor research at universities. The Functional Engineered Nano Architectonics Focus Center will be funded by the Semiconductor Industry Association, the industry's largest trade association, and the U.S. defense department. "Architectonics" is derived from a Greek word meaning "master builder," which aptly describes the center's researchers as they build a new generation of nanoscale materials, structures and devices for the electronics industry. Established in *UCLA's* Samueli School of Engineering and Applied Science, the center will receive \$13.5 million over three years, and as much as \$70 million over the next decade.

Radar and wine . . . Winemakers know that soil moisture is key to growing quality wine grapes, but accurately monitoring the soil's water content is a difficult and expensive task. Now, innovative research led by *UC Berkeley* scientists is lending a high-tech hand to the fine art of grape growing by using ground penetrating radar to map soil moisture in vineyards. It will help viticulturists refine their irrigation strategies and has the potential to improve grape quality while reducing energy and water use.

New graduate program . . . *UC Santa Cruz* has established a master of fine arts degree program, its first, in digital arts/new media. The new program will draw from a variety of disciplines including graphic arts, three-dimensional and environmental arts, music and sound design, film, video, and theater. Campus officials report strong demand for digital arts courses over the past several years. Its department of film and digital media, begun in 1996, has rapidly grown to more than 400 majors.

Information overload . . . If you feel like you're experiencing information overload, *UC Berkeley* researchers have a good idea why. Worldwide information production has increased by 30 percent each year between 1999 and 2002, according to the researchers, led by *Peter Lyman* and *Hal Varian* of the *School of Information Management and Systems*. The amount of new information stored on paper, film, optical and magnetic media has doubled in the last three years.

PLANET AND ENVIRONMENT

Plant gene discovered . . . UC scientists have identified a gene that controls the production by terrestrial plants of methyl halides, gaseous compounds that contribute to the destruction of ozone in the stratosphere. The discovery of the gene is important because it now provides scientists with a genetic tool with which to probe how and why plants produce methyl halides. The team of plant geneticists at *UC San Diego* and atmospheric chemists at *UC Irvine* dubbed the gene HOL for "Harmless to Ozone Layer" because disruption of the gene largely eliminates methyl halide production. The scientists emphasize that the ubiquity of the HOL gene in plants and their results cannot be used to suggest that plants are responsible for the depletion of the earth's ozone layer.

Very chilly past . . . New research at *UC Riverside* has highlighted the profound role the evolution of plants and animals had on stabilizing the erratic climate of the early Earth, paving the way for increasingly diverse and complicated organisms. Post-graduate researcher *Andy Ridgwell* and associate professor *Martin Kennedy*, both at UCR, with *Ken Caldeira* at the *Lawrence Livermore National Laboratory*, suggest that emerging life played a role in moderating ice ages that have resulted in today's moderate climate. Kennedy says that the catastrophic ice ages that characterized Earth's early record and challenged animal evolution were seemingly brought under control by the animals themselves, and we owe our comparatively moderate climate to the production of calcium carbonate skeletons and shells.

Streamlining environmental research . . . The new Californian Cooperative Ecosystem Studies Unit establishes a streamlined method for matching the research and technical assistance needs and funding of federal agencies with the scientific interests and expertise of university faculty and graduate students. The Californian CESU pulls together nine UC campuses, three California State University campuses and six federal agencies. It provides a way to help maintain biodiversity and protect ecosystems by providing expertise to the land managers who need scientific information and will help graduate students conduct research and receive federal funding for their projects.

Smog in the heartland . . . *UC Irvine* atmospheric scientists have found that greenhouse gases released from oil and natural gas exploration and processing in Oklahoma, Texas and Kansas create regional air pollution levels similar to those found in large urban centers elsewhere in the nation. *F. Sherwood Rowland*, *Donald R. Blake* and colleagues sampled ground-level hydrocarbon gases through a 1,000 mile-wide swath of the central and southwest regions of the country in late 2001 and early 2002. They recorded levels of various hydrocarbons – including methane, ethane, propane and butane – in and around Oklahoma City that equaled or surpassed those in such high-smog cities as Los Angeles, Houston, New York and Chicago. These hydrocarbons participate in the formation of ground-level ozone, a major component in smog that contributes to lung ailments in children.

INSIGHTS ON SOCIETY

Outsourcing trend . . . A new wave of outsourcing of white-collar jobs is sweeping the country, and the trend could leave as many as 14 million service jobs in the U.S. vulnerable, according to *UC Berkeley* researchers. Not all of the at-risk jobs are likely to be lost, say *Ashok Deo Bardhan* and *Cynthia Kroll*. But jobs remaining in the U.S. could be subject to pressures to lower wages, and the jobs that leave may slow the nation's job growth or generate losses in related activities. Jobs most vulnerable to the new wave of outsourcing, the researchers say, include medical transcription services, stock market research for financial firms, customer service call centers, legal online database research, payroll and other "back office" activities.

Federal grant . . . *Frank Gresham*, a *UC Riverside* education professor and Lehigh University colleagues have joined to form a national center that will determine effective strategies for treating children with the most severe social, emotional and behavioral problems. The U.S. department of education has given the center \$3.5 million that will enable them to develop Project Reach, which will follow 125 K-9 students for four years to identify effective strategies for improving their long-term quality of life.

Conspiracy theories . . . John F. Kennedy's assassination on Nov. 22, 1963, remains the most popular subject for conspiracy theories in America, says a *UC Davis* scholar who is writing a book on such theories during the 20th century. In fact, only 10 percent of Americans believe Lee Harvey Oswald acted alone when he shot the 35th president, says *Kathryn Olmsted*, author of "Challenging the Secret Government: The Post Watergate Investigations of the CIA and FBI." Conspiracy theories about JFK's murder didn't really gain steam until the Church Committee in 1975 revealed government cover-ups in the 1964 Warren Commission report on the Kennedy assassination, she says.

LOOKING TO THE FUTURE

New protein . . . *UCLA* scientists have identified a new protein that detects changes in glucose, the blood sugar that fuels body function. The discovery could lead to the development of new drugs to combat diabetes and obesity. The *UCLA* project focused on SGLT3, a protein categorized as a transporter of sodium and glucose. In a surprise discovery, however, the scientists found that the body produced the protein in a variety of tissues not normally involved in this function. The scientists' chance observation suggested that SGLT3 was not a sodium/glucose transporter, but a protein involved in sensing fluctuations in the body's blood sugar. In addition, it pointed to a new role for this gene in human physiology.

Wireless technology . . . The use of sophisticated wireless technology to coordinate and enhance care of mass casualties in a terrorist attack or natural disaster is the focus of a new federally funded research project at *UC San Diego*. It brings together broad-based participation from academia, industry, the military, and emergency responders in the region. The project aims to develop technologies to enhance communication among emergency teams and ensure their safety by tracking the location and wind drift of the chemical or radioactive matter used as a weapon of mass destruction against civilians.

NanoSystems institute . . . *UC Santa Barbara* has broken ground on a new \$53 million building to house the California NanoSystems Institute, one of the four California Institutes for Science and Innovation and a multidisciplinary partnership between UCSB and *UCLA*. By exploring the power and potential of manipulating structures molecule-by-molecule, the institute is on its way to creating revolutionary new materials, devices and systems that will enhance virtually every aspect of our lives in medical delivery and health care, powerful new information technologies, and energy efficient devices.

KUDOS

Inventors grand prize . . . *Jamie Link*, a graduate student in *UC San Diego's department of chemistry and biochemistry*, has won the \$50,000 grand prize in the Collegiate Inventors Competition, a program of the National Inventors Hall of Fame. She won for developing dust-sized chips of silicon that allow scientists to rapidly and remotely detect a variety of biological and chemical agents, including substances that a terrorist might dissolve in drinking water or spray into the atmosphere. The invention of these tiny silicon chips, or "smart dust," was made in the laboratory of UCSD professor *Michael Sailor*, Link's graduate adviser who will receive \$10,000 for his role in the development.

Conservation award . . . *Steven Gaines*, director of the *Marine Science Institute* at *UC Santa Barbara* and acting vice chancellor for research, has been named one of five scholars worldwide to win the most prestigious award honoring and investing in applied ocean conservation science and outreach. He has received a 2003 Pew Marine Conservation Fellowship, which includes a \$150,000 grant over three years to carry out innovative, interdisciplinary projects addressing challenges facing marine environments around the world.



President, University of California

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