

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

Laureate to head Berkeley Lab ... University of California regents have appointed *Steven Chu*, professor in the physics and applied physics departments at Stanford University and a co-winner of the Nobel Prize in physics in 1997, director of the UC-managed *Lawrence Berkeley National Laboratory*. Chu, 55, will become the sixth director of Berkeley Lab August 1, replacing departing director Charles V. Shank. Chu received his Ph.D. in physics from UC Berkeley in 1976 while working at the laboratory.

Presidential accolade ... Donald Bren, chairman of The Irvine Company, was awarded the University of California Presidential Medal, recognizing his significant contributions to the *University of California* and higher education. He received the award June 9 at a ceremony celebrating the naming of the Donald Bren School of Information and Computer Sciences at *UC Irvine*. The school naming recognizes Bren's \$20 million gift to ICS, which provides for the creation of 10 endowed chairs for distinguished faculty, among other school support. Privately and through his Donald Bren Foundation, The Irvine Company and related entities, Bren has directed more than \$55 million to support UC programs, with the majority going to the Irvine and Santa Barbara campuses.

From astronomy to zoology ... The largest college at *UC Berkeley*, the *College of Letters & Science*, has teamed up with the *College of Chemistry* to launch a monthly online research magazine to highlight groundbreaking research in the physical and biological sciences. The Web site, ScienceMatters@Berkeley (<http://sciencematters.berkeley.edu/>), will feature research running the gamut of scientific fields, from biology and mathematics to physics and chemistry. Each month, the site will also feature a great moment of discovery in the history of science at Berkeley.

Understanding the brain ... Terry S. Semel, CEO of Yahoo! Inc., and his wife, Jane Bovingdon Semel, founder of a nonprofit production company that addresses public-health

issues through entertainment, will donate \$25 million to endow *UCLA's Neuropsychiatric Institute*. The gift is one of the nation's largest to be dedicated exclusively to better understanding of the brain. Their gift will support research and community education programs to enhance the understanding and treatment of such illnesses as autism, Alzheimer's disease, mood disorders and addiction. In recognition of the Semels' generosity, the institute will be renamed the Jane and Terry Semel Institute of Neuroscience and Human Behavior at UCLA.

HEALTH AND NUTRITION

Influencing teen smoking ... Teenage girls who have never smoked, not even puffed on a cigarette, are far more likely to start smoking if their favorite movie star smokes in movies, according to a three-year study by *UC San Diego's Moores UCSD Cancer Center*. The study's authors conclude that on-screen smoking by popular actors is undermining public health efforts to keep children from smoking. The cancer center's *John Pierce* says the results were very strong, showing that if the movie stars smoke, especially in romance films, they are effectively encouraging young girls to smoke.

Obesity disrupts appetite hormone ... *UCLA* scientists have discovered that lean people experience a huge nighttime surge of ghrelin, the hormone that stimulates hunger, but obese people do not. The study suggests that obesity suppresses the ghrelin spike, perhaps disrupting the body's internal cues for hunger and overpowering its ability to regulate appetite. Ghrelin helps the body control its weight as part of a complex system that regulates food intake and energy output. The team's findings may point to new targets for treating obesity, according to the researchers.

Tracking West Nile virus ... A little-known *UC Davis* program, the *Center for Vectorborne Diseases*, is central to the state's efforts to track movement of the West Nile virus, a potentially deadly pathogen that claimed the lives of 264 people nationwide last year. The center's reputation for accurate, quick analysis is one of the main reasons it has been given such a critical role in tracking the virus. There's been a tremendous surge in the number of dead birds from Southern California that have tested positive for the presence of the virus, and center director *John Edman* says it's likely the virus will show up soon in birds and mosquitoes collected in Northern California. Ten human cases – none of them fatal – have been reported this year in Southern California.

Treating neurodegenerative disease ... *UC San Francisco* scientists and colleagues studying mice have identified a possible strategy for slowing a rare, fatal childhood neurodegenerative disease known as Niemann-Pick type C, in which brain cells accumulate fat and die. The finding could also have implications for treating other neurodegenerative disease, they say. The researchers discovered that the synthesis of neurosteroid hormones in the brain – a process known as neurosteroidogenesis – is severely disrupted in mice that naturally develop the disease. They then determined that replenishing the depleted neurosteroid hormone allopregnanolone, the prime casualty of the disruption, significantly delayed the onset of some of the animals' neurological deficits and doubled their lifespan. The treatment was particularly potent when administered early in the animals' life.

DEVELOPMENTS AND DISCOVERIES

Mosquito reproduction ... *UC Riverside* entomology professor *Alexander Raikhel* headed a team that discovered a chemical chain reaction that prompts disease-spreading mosquitoes to produce and mature their eggs. Finding a way to block this chemical pathway could become a valuable tool in controlling the population of an insect that spreads such destructive diseases as malaria, yellow fever, dengue fever and West Nile virus. According to the Centers for Disease Control and Prevention, 41 percent of the world's population live in malaria-prone regions, and an estimated 700,000 to 2.7 million people die of malaria alone each year, 75 percent of them African children.

Recreating patterns ... In early development, how do cells know to put the right spacing between ribs, fingers and toes? How do they communicate with each other to form symmetrical and repeated patterns such as zebra stripes or leopard spots? For the first time, *UCLA* researchers have recreated the ability of mammalian cells to self organize, forming evenly spaced patterns in a test tube. These interactions can be described in mathematical formulas dictating how cells organize into specific, evenly spaced patterns. The findings may help improve methods for regenerating tissue, controlling birth defects and developing new treatments for specific diseases.

The "granny" factor ... Researchers at *UC Riverside* and colleagues have discovered a dramatic increase in human longevity that took place during the period around 30,000 B.C. that corresponds to an equally large increase in the evolutionary success and creativity of the group. *UCR* assistant professor *Sang-Hee Lee* and colleagues found that the large number of people surviving to an older age improved the quality of life. Lee says the researchers were surprised to see that the time period when old adults outnumbered young adults corresponded with a creative explosion. This increase in the number of relatively old people likely had a major impact, giving modern humans a competitive edge that ensured their evolutionary success.

New strategy against diabetes ... *UC San Francisco* scientists have identified a protein on T cells of the immune system that triggers type 1 diabetes in mice when it interacts with another protein in the pancreas. They have shown that blocking the interaction prevents development of diabetes without weakening normal immune defenses or causing measurable side effects. The success provides a promising strategy against human type 1 diabetes, since the T cell protein has a counterpart in the human immune system, the scientists say.

Patent awarded ... A patent for a highly sensitive test to detect the presence of the "date rape" drug GHB has recently been granted to *UC Santa Barbara*. Several companies have expressed interest in developing and marketing the test, which can be designed as a kit with small strips of paper that change from white to intense purple color in a few seconds if GHB is present. The UCSB test is the most rapid one available that is also sensitive, according to the researchers. Speedy and sensitive detection is extremely important in emergency room settings where comatose patients must be rapidly diagnosed. And law enforcement officials can use the test to detain individuals in possession of GHB. The test can also be used to quickly check a drink for the presence of GHB.

THE CUTTING EDGE

Ultrasound treatment ... Ultrasound scans might be most familiar for getting a peek at a developing fetus, but the technology could also be used to treat cancer. A partnership between *UC Davis*, Siemens Medical Systems and ImaRx Inc., funded by a National Cancer Institute grant, will study ways to deliver drugs to tumors using focused ultrasound. Cancer fighting drugs would be put into tiny capsules that are injected into the bloodstream and can be steered to a tumor using ultrasound. Once there, the capsules target the tumor through antibodies or other molecules coating the capsule surface. They can also be burst open with a focused pulse of ultrasound. *UC Davis* researchers led by *Katherine Ferrara*, professor and chair of biomedical engineering at *UC Davis*, will carry out preclinical studies on the system.

Designer molecules ... By making use of model compounds in drug design, chemists at *UC San Diego* identified a class of molecules that could lead to treatments for a wide range of diseases, including cancer, arthritis and heart disease. Enzymes/protein catalysts in the body that help break down connective tissue like collagen are important in growth and wound healing, but also play a role in many diseases. For example, these enzymes are overactive in arthritis and are used by cancer cells to migrate through connective tissue and spread. While a number of drugs have been designed to inhibit these enzymes, only one has made it through clinical trials because of a variety of drawbacks. The chemists, led by *Seth Cohen* in *UCSD's division of physical sciences*, has identified a promising set of inhibitors that may lack the drawbacks plaguing the previous generation of such compounds.

Comfort study ... *UC Berkeley* researcher *Zhang Hui* has helped develop a sophisticated mathematical model to predict human thermal comfort that can be used to design energy-efficient temperature systems that make people more comfortable in vehicles, buildings and outdoor spaces. Her work has contributed to a sophisticated model based on measurements of skin and body core temperatures and their rates of changes. Engineers, architects and experts in heating, air conditioning and ventilation can use the model to design thermally comfortable spaces, rather than some of the all-too-common structures that have occupants freezing one minute and sweltering the next.

PLANET AND THE ENVIRONMENT

Ancient clues ... Global warming. Rising sea levels. Massive volcanic activity around the world. Widespread erosion. This was Earth in the mid- to late-Cretaceous geological period, 135 million to 65 million years ago, when the largest dinosaurs ruled the planet. Scientists have long sought clues to Earth's ancient climate from ice cores that go back hundreds of thousands of years. Now, chemists at *UC San Diego* and colleagues say they have extended their glimpse of Earth's oceanic and atmospheric past to 130 million years, during one of its greatest upheavals of climatic change. Their results, the first high-resolution record of changes in seawater sulfate, provide a portrait of the interactions between Earth and its atmosphere during the Cretaceous that should help scientists improve their predictions of how our climate might change as the accumulation of carbon dioxide and other greenhouse gases from human activities warm the planet.

Meteor impact ... An impact crater, believed to be associated with the "Great Dying," the largest extinction event in the history of life on Earth, much earlier than the extinction of the dinosaurs, appears to be buried off the coast of Australia, according to new findings of a major research project headed by a scientist at *UC Santa Barbara*. Until now, the time of the Great Dying – when 90 percent of marine life and 80 percent of life on land became extinct 250 million years ago – lacked evidence and a location for a similar impact event. The study's first author, *Luann Becker*, a research scientist at UCSB, and her team, have now found extensive evidence for a 125-mile-wide crater called "Bedout" off the northwestern coast of Australia.

Sequencing pathogens ... Researchers are closer now to thwarting two related plant pathogens, one causing "sudden oak death" and another responsible for a devastating soybean disease, thanks to the DNA sequence produced by the U.S. Department of Energy's *Joint Genome Institute*, in collaboration with the Virginia Bioinformatics Institute. With the genome sequence information for both pathogens, scientists are pushing to identify the cellular processes that can be targeted for novel detection systems and for safe and effective means of chemical or biological control. The Joint Genome Institute, in Walnut Creek, CA, is managed by the *University of California*.

INSIGHTS ON SOCIETY

Doctor in the house? ... Although the current supply of physicians in California is adequate, there are persistent shortages of doctors in low-income and rural counties, particularly those with high Hispanic populations, according to a new *UC Berkeley* report. Moreover, there are troubling signs of a future doctor shortage because many physicians are likely to retire over the next five to 10 years, the report says. Since 1978, the ratio of California physicians to the population has jumped 25 percent, but the growth has not significantly benefited non-metropolitan areas, it says.

The sister relationship ... Sisters treat each other like best friends – and worst enemies. In the new book, *The Perfect Sister: What Draws Us Together, What Drives Us Apart*, *UC Santa Cruz* sociologist *Marcia Millman* explores the complicated sister relationship and the familial forces that shape it. The emotional connection between sisters is very important and hadn't been explored in a serious way, says Millman, who interviewed nearly 100 women of diverse backgrounds from around the country and, in many cases, more than one sister from the same family.

LOOKING TO THE FUTURE

NIH-designation ... With the aim of accelerating the pace of discovery regarding dementing diseases, the *UC San Francisco Memory and Aging Center* has been designated an Alzheimer's Disease Research Center by the National Institutes of Health, making it the only new center in the country to receive the highly competitive funding designation in 2004. The center, to receive \$6.5 million in funding over five years, will fuel the integration of resources between the strong clinical and basic research programs focused on dementia and aging at UCSF and its affiliated institutions, and will tap into UCSF's genetics and neurosciences program. The center is one of the few NIH-designated centers that will focus not only on Alzheimer's disease, but on non-Alzheimer's forms of dementia such as frontotemporal dementia and prion diseases, including Creutzfeldt Jakob disease and new variant CJD, the human form of "mad cow" disease.

Health in space ... *UC Irvine* scientist *Kenneth Baldwin* has been reappointed by the NASA National Space Biomedical Research Institute to lead a research effort that ultimately will help astronauts stay healthy in space for a year or longer – enough time to conduct a manned mission to Mars. As leader of the muscle alterations and atrophy team, Baldwin heads a group of scientists charged with learning why muscles atrophy and lose their functional capacity in the gravity-free environment of space and identifying ways to prevent these harmful changes from happening. The scientists, who come from institutions such as UCI, *UCLA* and Harvard University, also will design exercise equipment and programs to keep astronauts from weakening while traveling through space.

Seafloor observatories ... An international team of scientists will investigate how water flows through rock formations beneath the seafloor during an eight-week expedition this summer to the eastern flank of the Juan de Fuca Ridge off the coast of British Columbia. It will be the first expedition of the Integrated Ocean Drilling Program, an ambitious new international collaboration set up to succeed the Ocean Drilling Program, which supported 20 years of international expeditions to study the ocean floor and obtain evidence of Earth's history from seafloor sediments. *Andrew Fisher*, professor of Earth sciences at *UC Santa Cruz*, is co-chief scientist of this first expedition.

Successful collaboration ... *Los Alamos National Laboratory* and the *University of California* enhanced its partnerships with New Mexico academic institutions when it recently signed a memorandum of understanding with New Institute of Mining and Technology. The agreement will strengthen interactions between Los Alamos and the college by providing additional opportunities for research, education, recruitment and retention. This latest partnership will allow New Mexico Tech to participate, along with the University of New Mexico, New Mexico State University and New Mexico Highlands University, in the outstanding science for which Los Alamos is known, and allows the national laboratory to potentially recruit more of its future scientists locally, officials note.

KUDOS

Prestigious post ... *Ralph J. Cicerone*, *UC Irvine* chancellor since 1998, has been nominated as the next president of the National Academy of Sciences. The nomination, unanimously approved by the NAS Council, precedes an election in late 2004. The new president will take office in July 2005. Cicerone would succeed Bruce Alberts, a cellular biologist on the *UC San Francisco* faculty. Cicerone will continue to serve as UCI chancellor through the 2004-05 academic year.

Anthropologist honored ... *Mary Hancock*, a cultural anthropologist at *UC Santa Barbara*, is one of 23 distinguished scholars to be appointed a fellow of the Woodrow Wilson International Center for Scholars in Washington, D.C. As a resident fellow, Hancock will spend the next academic year at the center for advanced study where she plans to complete a book, *Remembered Futures, Everyday Histories: Politics, Culture and the Past in Urban South India*. Her research focuses on public memory and contemporary cultural constructions of the past, how and why the past is represented and debated, focusing on its impact on transforming urban space and social movements.

Technological advances ... Scientists from the U.S. Energy Department's *Lawrence Livermore National Laboratory* won five, *Los Alamos National Laboratory* also won five and *Lawrence Berkeley National Laboratory* captured two in the latest R&D 100 Awards. The three laboratories are managed by the University of California. Given by *R&D Magazine*, the awards have been called "the Oscars of technology." Each year since 1963, *R&D* has honored the 100 most technologically significant new products and advancements over the past year. The chief criterion for winning the award is the potential for the breakthrough or invention to change people's lives for the better. This year, Department of Energy labs won a total of 31 R&D 100 awards.



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