

# President's Report

A Report on  
Discoveries and  
Achievements  
at the  
University of  
California

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

## In The News

**Top Charities . . .** Six UC campuses made the 2001 "Philanthropy 400," compiled by the Chronicle of Philanthropy annually. The survey ranks the nation's 400 largest nonprofit organizations by how much money they raise from private sources. The campuses are: **UCLA** (No. 31, with \$253.7 million), **UC San Francisco** (39, \$218.3 million), **UC Berkeley** (56, \$166.8 million), **UC San Diego** (104, \$112.7 million), **UC Davis** (173, \$76.7 million), and **UC Irvine** (204, \$67.2 million). For the ninth consecutive year, the Salvation Army ranked No.1, raising \$1.44 billion, followed by Fidelity Investments Charitable Gift Fund, at \$1.08 billion. If UC's six campuses were combined, UC would be No. 3 with \$895.7 million.

**On the Move . . .** The leading professional association for the nascent field of electronic literature has moved its headquarters from Chicago to **UCLA**. The campus is providing office space and about \$90,000 worth of research and administrative support over five years. The Electronic Literature Organization is housed with the **Department of Design/Media Arts** in the **Dickson Art Center**. The organization promotes the creation and appreciation of prose, poetry, drama and literary criticism that is developed for electronic media, as opposed to traditional literary forms.

**Academic Computer . . .** The National Science Foundation has awarded \$53 million to **UC San Diego** and three other research institutions to build the largest, most comprehensive computing infrastructure ever deployed for scientific research. The Distributed Terascale Facility will integrate the world's fastest unclassified supercomputers, ultra-high speed networks, high-resolution visualization environments and grid-computing toolkits into the TeraGrid.

**Sociology Leader . . .** *William Bielby* of **UC Santa Barbara** has been elected president of the American Sociological Association. Bielby's term will begin in August 2002 and run through August 2003. He will serve as president-elect until taking office. The ASA is a 13,000-member national organization.

**French Lab at UCR . . .** In the first partnership of its kind, French scientists paid by their own government will work permanently on the campus of a U.S. university, creating a joint research laboratory in chemistry at **UC Riverside**. The director of the new UCR-Centre National de la Recherche Scientifique Joint Research Chemistry Laboratory is Dr. Guy Bertrand, an internationally recognized chemist from the Université Paul Sabatier and a distinguished UCR professor. UCR Chancellor Raymond L. Orbach said the partnership would stress practical applications with positive environmental impacts. UC Riverside just opened a new chemical sciences building, a \$14-million addition to Pierce Hall.

## Health and Nutrition

**Eat Less, Live Long . . .** Researcher *Stephen Spindler* of **UC Riverside** finds that laboratory mice that reduce calorie consumption, even for a short time, avoid the majority of age-related diseases. His research suggests for the first time that restricting calories for as little as four weeks can help avoid heart disease, cancer and diabetes. Spindler's team reports that calorie restriction produces chemical changes in the body that could be duplicated with pharmaceuticals.

**Cancer Vaccine? . . .** Insertion of a single gene into several different tumors enabled mice to reject them all, leading scientists at **UC Berkeley** to hope that the gene might form the basis for a vaccine effective against a range of cancers. This simple gene therapy also protected the mice against subsequent injection of tumor cells that had not been altered, meaning their immune systems remembered the initial challenge – a necessary step for any vaccine therapy.

**Deadly Pattern . . .** When high blood pressure isn't controlled, it doesn't stay at one high level. Instead, it spirals higher and higher, increasing the risk of heart attack and stroke, **UC Irvine College of Medicine** researchers report. The pattern occurs because high blood pressure inactivates nitric oxide, an important molecular regulator of blood pressure. The inactivation triggers a vicious circle of increased nitric oxide inactivation and ever higher, uncontrolled blood pressure. The study may lead to more effective ways to control high blood pressure.



**Healthier Hearts . . .** *UC San Francisco* researchers report adults are leading healthier lives, significantly reducing their risk of heart disease mortality. The researchers found that reductions in heart disease risk factors reduced the number of heart-disease-related deaths among Americans by 430,000 between 1981 and 1990 and overall deaths in that period by 740,000. Most of the decline in heart-disease-related deaths was due to reductions in blood pressure and cholesterol levels, while reductions in non-heart disease related mortality were attributed to a fall in smoking rates.

**Antioxidants Help . . .** Certain powerful antioxidants may successfully treat the impaired neurological functions in patients with chronic kidney failure, a *UC Irvine College of Medicine* study has found. The study, conducted in rats, shows for the first time how a group of molecules known as free radicals interacting with nitric oxide can contribute to the neurological problems.

**Anti-Cancer Compound . . .** An anti-cancer compound synthesized by scientists at *UC San Diego* more than a decade ago from toxins of the poisonous jack-o-lantern mushroom has been granted "fast track" status by the U.S. Food and Drug Administration after showing promise. It is the drug candidate irifolven, which has demonstrated shrinkage of solid tumors of the pancreas and other cancers.

## Developments and Discoveries

**Hope for MS . . .** *UC Irvine* researchers have discovered how to reverse the disabling nerve tissue damage affecting persons with multiple sclerosis, a finding that may produce treatments for those who have the debilitating disease. In animal tests, UCI biologists *Thomas Lane, Michael Liu* and *Hans Keirstead* stopped a process called demyelination, a disintegration of the fatty myelin tissue insulating nerve fibers that impairs the signaling function of the central nervous system.

**Drug-Resistant HIV . . .** The number of drug-resistant HIV cases has already reached epidemic proportions in San Francisco, but transmission of drug-resistant strains is not to blame, reports a new study from *UCLA* and *UC San Francisco*. The research team determined that the rise in the number of drug-resistant cases was mainly due to the conversion of drug-sensitive cases to drug-resistant cases during antiretroviral therapy. Sexual transmission of drug-resistant virus did not play a major role in fueling the epidemic of drug resistance.

**Sickle Cell Help . . .** Patients with sickle cell disease experience pain and organ failure when their abnormal red blood cells block flow through small vessels. The blockage may be initiated by blood cells sticking to blood vessel walls. Now, scientists from *UC San Francisco* and *UC San Diego* have described the discovery of a new mechanism that may trigger that adhesion. It involves P-selectin, a glue-like molecule that, when activated, moves to the surface of blood cells to facilitate clotting. This may lead to improved treatment for the disease.

## The Cutting Edge

**Big Jolt . . .** Scientists at the *Los Alamos National Laboratory* have performed the first liner implosion shot on the Atlas pulsed-power facility, demonstrating its readiness to support the laboratory's research work on certification of the nation's nuclear weapons stockpile. The 650-ton Atlas pulsed-power generator discharged current through an aluminum cylindrical shell or liner about the size and shape of a tuna can, causing the liner to implode at very high speeds. During the few millionths of a second that it is operating at full strength, the electrical output of Atlas is roughly equal to four times the world's total electric power production.

**Millions of Stars . . .** A project involving scientists from *Lawrence Livermore National Laboratory, UC Santa Barbara, UC San Diego, UC Berkeley* and the Australian National University has yielded a treasure trove of data on 73 million stars. The research, aimed at determining the nature of dark matter in the halo of the Milky Way and two nearby galaxies, yielded images and light curves of the 73 million stars as a byproduct.

**Supernova Research . . .** Massive exploding stars called supernovae are among the most spectacular phenomena in the universe and astrophysicists struggle to work out the mechanics of these awesome explosions. Now, a team of astrophysicists and computer scientists at *UC Santa Cruz, Los Alamos* and *Lawrence Livermore national laboratories*, and the University of Arizona is beginning the task of building realistic numerical models of exploding stars, using the fastest computers available to simulate the explosions. A \$2 million, three-year grant from the U.S. Department of Energy supports the work.

**Protective Gene . . .** A gene that protects against cancer and environmental stress and promotes longevity has been identified in studies of a nematode by *UC Santa Barbara* researchers. The discovery provides scientists with a new means for identifying novel anti-cancer drugs and may lead to a better understanding of the effects of stress on longevity. It will make it possible to search for more potent and less harmful drugs that prevent or eliminate cancer using simple, easily cultured worms.

**Cell Boundaries . . .** To learn how tissues develop and maintain their organization – and especially to learn what goes wrong when cancer strikes – it's essential to study individual cells and their nuclei within tissues. The problem is that in real tissues, and in many cell cultures grown in the laboratory, cells are often tightly clustered; their boundaries and the borders of their nuclei are hard to distinguish. Now *Lawrence Berkeley National Laboratory* researchers are applying new methods involving stains and computer programs to detect and mark the boundaries of closely packed cells and nuclei.

**Digital Mammography . . .** The Food and Drug Administration has approved a digital mammography system, developed with the help of scientists at **Lawrence Livermore National Laboratory**. While traditional mammography technology uses film to record the X-ray image, the new digital mammography system records the image electronically. The system allows images to be acquired at one location and then rapidly transmitted by computer to another site for interpretation and medical collaboration.

## Planet and Environment

**Fuel Pollution . . .** Respiratory infections caused by smoke from indoor cooking fires common in the Third World could be reduced drastically through the use of inexpensive, more efficient stoves and modestly cleaner fuels, say researchers at **UC Berkeley** and colleagues who monitored illness and pollution levels for three years in a Kenyan village. The study showed that particulate matter pollution levels inside homes that use traditional open fires can be tens of times greater than those in Western industrialized countries.

**Water Governance . . .** Restructuring the control of much of the San Francisco Bay Area's water supply would improve regional water planning, reliability and accountability, according to a report by **UCLA** researchers and released by the **California Policy Research Center**. The researchers contend the San Francisco Public Utility Commission has many of the classic characteristics of an unregulated monopoly and lacks accountability to the 29 other governments and agencies that are its customers.

**Moon-Forming Impact . . .** The "giant impact" theory, first proposed in the mid-1970s to explain how the Moon formed, has received a major boost as new results demonstrate for the first time that a single impact could yield the current Earth-Moon system. Simulations performed by researchers at **UC Santa Cruz** and colleagues show that a single impact by a Mars-sized object in the late stages of Earth's formation could account for an iron-depleted Moon and the masses and angular momentum of the Earth-Moon system.

## Insights on Society

**Increased Pay, Better Performance . . .** Increasing wages for airport security workers, as has been done at San Francisco International Airport, significantly reduces turnover and improves job performance, **UC Berkeley** researchers report. Their report comes as national attention focuses on how to improve security and safety at U.S. airports, as well as on the impacts of low pay, inadequate training and turnover among the nation's 8,000 pre-board baggage screeners. The quality standards program at San Francisco International should be looked to as a model, the researchers contend.

**Uncle Tom No Sell-Out . . .** Since it was published in 1851, "Uncle Tom's Cabin" has spurred not just abolitionist passions, but caricatures of Uncle Tom and other slaves. But **UC Davis** researcher **Patricia Turner** says the characterizations and plot in the original novel differ dramatically from their popular-culture depictions. In the novel, Uncle Tom chooses to be beaten to death because he won't tell the white masters the location of two runaway female slaves who have been sexually abused. But the slur of 'Uncle Tom' is still leveled at blacks by other blacks as a derogatory term for someone who has acted selfishly or is a sell-out, says Turner.

**Dentist Shortage . . .** A shortage of dentists in many communities may contribute to poor access to dental care for many California rural, low-income and minority residents, according to a new study from **UC San Francisco**. It found that two-thirds of communities without dentists are rural, at least 20 percent of California communities may have a shortage of dentists, and many of the same communities do not enjoy the benefits of fluoridated water.

**Quality Differences . . .** For-profit nursing homes are much more likely than their non-profit counterparts to be cited for deficient quality, according to a **UC San Francisco/Harvard** study. Quality was particularly poor at facilities owned by nursing home chains, reports UCSF researcher **Charlene Harrington**. The researchers analyzed data from 1998 government inspections of 13,693 nursing homes that receive Medicare or Medicaid payments – virtually every nursing home in the nation. Inspectors cited for-profit facilities for deficient care 46.5 percent more frequently than non-profits.

**Vote Counting Performance . . .** Electronic and optical scan voting systems did the best job of recording and tabulating votes cast in the 2000 presidential election, while punch card ballots performed the worst, according to the **UC Berkeley Survey Research Center** and its **Institute of Governmental Studies**. The researchers found that, among the nation's 100 largest voting jurisdictions, which served 40 million voters, electronic and optical scan machines outperformed all other machines, producing fewer overcounted or undercounted votes.

## Looking to the Future

**Bizarre Quantum Properties . . .** How to build a super-fast computer that uses the bizarre properties of quantum physics is the aim of the new Quantum Architecture Research Center between **UC Davis**, **UC Berkeley** and the Massachusetts Institute of Technology. Quantum physics describes the special rules that apply to atoms and subatomic particles. One principle is that when a particle is observed, it changes. If a particle can be in one of two states, for example "up" or "down," it only settles on one state when observed. Before observation, it can be in both states simultaneously.

**Quantum Computers . . . Los Alamos National Laboratory** researchers and colleagues have developed a method for protecting quantum information against noise, paving the way for development of storing delicate quantum information. Their work should, in turn, further the evolution of quantum computers. Quantum computers promise greatly increased computational speeds useful for performing critical mathematical tasks, such as database searching and number factoring.

**High-Temperature Superconductors . . .** Researchers at **Lawrence Berkeley National Laboratory** have devised a technique for testing their theories on the microscopic organization of high-temperature superconductors on an atom-by-atom basis. Superconductivity is the flow of charged particles through a material without resistance. The research opens even larger vistas of possibility, including a potential mechanism for getting information into and out of the would-be super-fast quantum computers of the future.

**Very Small Sensor . . . UC Irvine** chemists have built the first practical nanoscale hydrogen sensor that can detect dangerous levels of the explosive gas in devices such as fuel cells and internal combustion engines. Researcher **Reginald M. Penner** and his team built the sensors using nanowires of palladium, a platinum-like metallic element with high electrical conductivity.

**Schizophrenic Brain Loss . . . UCLA** brain researchers have created the first images showing the devastating impact of schizophrenia on the brain. The findings show how a dynamic wave of tissue loss engulfs the brains of teenage schizophrenics. The findings may have key diagnostic implications because aided by a better understanding of how psychosis develops, researchers can detect aberrant loss early and treat patients as early as possible.

**Newer X-Rays . . . Lawrence Livermore National Laboratory** scientist **Harry Martz** reports increased airport security may lead to reconsideration of one of the more promising new scanning methods, called X-ray backscatter. It is a low-energy and low-dose X-ray that penetrates the clothing, but not the body and reflects X-rays back toward the source. It provides an image of concealed objects, eliminating the need to have X-rays pass through the body and reducing X-ray exposure.

**Cheaper, Better Wines . . .** Recession and a grape surplus should give consumers better California wines at lower prices in the coming year, predicts an expert on wine economics at **UC Davis**. **Robert Smiley** says with an abundant supply, grape prices have gone down and wineries will be able to blend better grapes into their non-premium wines, making mid-priced and low-priced wines – those \$14 a bottle and under – both cheaper and better.

## Kudos

**Presidential Medal . . . UC Santa Cruz** Chancellor Emeritus **Robert L. Sinsheimer**, an internationally recognized biologist, has received the University of California's Presidential Medal for his contributions to knowledge and to higher education. The citation accompanying the medal recognizes the key role Sinsheimer played in initiating the Human Genome Project, his achievements as a biologist and his leadership of **UCSC**.

**Air Quality Honor . . . UC Riverside's Roger Atkinson** will receive the American Chemical Society's National Award for Creative Advances in Environmental Science and Technology for 2002. Atkinson developed a means for predicting the lifetimes of organic compounds, a method used widely by industry and regulatory agencies in the U.S. and Europe.

**Kroemer Asteroid . . .** An asteroid previously known as number 24751 has been named **Kroemer**, after **Herbert Kroemer**, a recent **UC Santa Barbara** Nobel Prize laureate. The asteroid was discovered in 1992 by the German astronomer **Freimut Boerngen**, who also suggested naming the asteroid **Kroemer**. The name was recently approved by the Minor Planet Center of the International Astronomical Union in Cambridge, Mass.

## Investing in Education

**Mondavi Gift . . .** Winemaker **Robert Mondavi** and his wife, **Margrit**, have made a personal gift of \$35 million to **UC Davis** to establish the **Robert Mondavi Institute for Wine and Food Science** and to name the campus's **Center for the Performing Arts**, now under construction. The gift is the largest private contribution to **UC Davis** and represents one of the most generous single gifts from an individual donor in the history of the University of California. It includes \$25 million for the **Mondavi Institute** and \$10 million for the **Robert and Margrit Mondavi Center for the Performing Arts**.

**Trace Metal Research . . .** The **W. M. Keck Foundation** of Los Angeles has awarded a grant of \$1 million to **UC Santa Cruz** to support ongoing research on the environmental toxicology of trace metals. Trace metals include toxic elements such as lead and mercury, as well as biologically essential elements, such as copper and manganese, that can be toxic at high concentrations.



Richard C. Atkinson  
President, University of California

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