

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, students and staff of the University of California and the national laboratories managed by the university.

In The News

Gore Joins UCLA . . . Former Vice President Al Gore joins **UCLA** as a visiting professor this spring to focus on creating a new area of study in family-centered community development. He will be a visiting professor in the **UCLA School of Public Policy and Social Research** and a visiting scholar in the campuswide **Institute for Children, Families and Communities**.

Cultural Trove . . . The man often described as the father of Chicano music has donated memorabilia of his 60-year career to the **California Ethnic and Multicultural Archives** in the **Davidson Library** at **UC Santa Barbara**. Singer and songwriter Eduardo "Lalo" Guerrero, who has appeared in films and on television, presented the archive with correspondence, phonograph records and audio cassettes, and photographs and videos. Guerrero, 84, of Palm Springs, received the National Medal of the Arts in 1996.

Carbon Cycle Research . . . **UC Irvine** will establish a regional carbon cycle research center to help scientists determine how carbon flows through the air, oceans, soils and plants. A \$2-million grant from the W. Keck Foundation allows UCI to build the nation's first accelerator mass spectrometry facility dedicated exclusively to research on the processes that determine atmospheric carbon dioxide levels, which, in excessive amounts, contribute to the greenhouse effect and global warming.

Gamma Ray Camera . . . Solar Two, once the largest solar power farm in the world, has been given a second life as a gamma ray observatory by researchers from **UC Riverside** and **UC Davis**. Gamma rays are of great scientific interest because they offer clues to some of the mysteries of the universe, such as the birth of a galaxy and the supernova of a dying star. Constructed in Barstow by Southern California Edison and the U.S. Department of Energy, the plant generated solar power until 1998.

Giant Genome Software . . . **Jim Kent**, a graduate student in biology at **UC Santa Cruz**, designed and wrote the computer program called GigAssembler that was used to put together the draft sequence of the human genome, published in "Nature" this February. Kent's 80-hour work weeks in the marathon programming effort began to affect his wrists, so he used ice packs to control the pain. GigAssembler helped analyze data from the genome consortium's sequencing laboratories and assemble the draft of the genome sequence.

Health and Nutrition

African-American Mortality . . . African Americans hospitalized at Veterans Affairs medical centers have a 25 percent lower mortality than white patients, according to researchers from **UC San Francisco** and the San Francisco VA Medical Center. The researchers suggested that the equal access to care provided at the center might partially explain the findings.

'Smart' Cancer Detection . . . **Lawrence Livermore National Laboratory** scientists and colleagues have developed a new, minimally invasive diagnostic tool that can instantly detect breast cancer cells. The "Smart Probe," smaller than the needle used in routine blood tests, is inserted directly into breast tissue, making invasive, costly biopsies avoidable.

Cholesterol and Osteoporosis . . . Everyone knows that eating fatty foods may cause high cholesterol and heart disease, but **UCLA** researchers have now learned that unhealthy eating and high cholesterol may also contribute to osteoporosis. They found that a high-fat diet dramatically reduced bone density and bone mineral in an animal model. The study could lead to new treatment options for osteoporosis.

New Heart Preservative . . . Only 10 percent of patients who need a new heart actually get one, and one reason is restricted transport time. Now, **UC Irvine** researchers **Jeff Milliken** and **Dan Serna** have developed a chemical preservative that kept rabbit hearts healthy and beating for up to 12 hours. If successfully adapted for humans, the preservative could make it possible to transport hearts across longer distances and provide healthier hearts for transplant.



Apples Help . . . Researchers at the **UC Davis School of Medicine** have determined that drinking apple juice and eating apples has a beneficial effect on risk factors for heart disease. Their clinical study shows that compounds in apples and apple juice act in much the same way that red wine and tea do to slow one of the processes that lead to heart disease.

T-Cell Maintenance . . . Researchers at the **Gladstone Institute of Virology and Immunology**, affiliated with **UC San Francisco**, have learned how T-cell levels may be maintained in people. T-cells are disease-fighting white blood cells that are essential for a healthy immune system. The study has important implications for developing treatment strategies for patients who have diseases such as HIV and cancer where the immune system is destroyed, or for patients whose immune system is suppressed by chemotherapy or who are undergoing a bone marrow transplant.

New Life for Old Brains . . . UC San Diego School of Medicine researchers have found that essential brain fibers that shrivel up and disappear in aged monkeys can be restored to normal levels with infusion of tissue that has been genetically altered to produce nerve growth factor, a naturally occurring substance found in all vertebrate animals. The new findings provide additional support for the potential use of gene therapy to treat loss of memory and cognitive function in Alzheimer's patients.

Depression Findings . . . In one of the first national studies to evaluate mental health care, findings by **UCLA** researchers show that millions of U.S. adults who suffer from depression or anxiety disorders fail to receive proper care through their physicians. The researchers found that 90 percent of those who visited a mental health specialist received proper care, compared with 19 percent of those who visited a primary care provider only.

Developments and Discoveries

Leaves into Petals . . . Biologists at **UC San Diego** have discovered how to genetically convert leaves into petals – potentially enabling a suitor to present his love with a long-stemmed rose in which the many leaves along the stem are converted into colorful petals. Researchers have known for a decade how to convert the flower organs into leaves, but hadn't been able to convert leaves into flower organs.

Bizarre Planetary Systems . . . Astronomers from **UC Berkeley** and **UC Santa Cruz** and colleagues report the discovery of two multi-planet systems that are among the most bizarre found to date. One of them is orbited by a massive planet and another bulkier object at least 17 times larger than Jupiter, the largest planet orbiting the sun. It's unclear whether it's a planet, a dim failed star or some as-yet unidentified astronomical object.

Elephants and Moles? . . . Elephants, aardvarks and golden moles, seemingly very different creatures, evolved from a single ancestor in Africa more than 65 million years ago when dinosaurs lived, reports **UC Riverside** biologist **Mark Springer**. He reported the strongest genetic proof yet that relationships between major groups of mammals, including primates and humans, are more related to the ancient geography of supercontinents than any physical similarities.

Abandon Treatment . . . A common treatment for children in diabetic crisis should be abandoned in most cases because it appears to contribute to a rare, but often fatal, complication known as cerebral edema, according to researchers at the **UC Davis School of Medicine and Medical Center**. Their study also identifies two simple blood-test measurements that can help predict which patients are in greatest danger of developing the potentially deadly complication.

Gender Differences . . . The idea that “men are from Mars and women from Venus” may have a biological basis after all. A **UC Irvine** study shows that men and women use different sides of their brain to process and store long-term memories of emotional experiences. The amygdala, an almond-shaped structure found on both sides of the brain, processes emotionally influenced memories exclusively on the right side of the brain in men and on the left side in women.

Leaking Electricity . . . Researchers at **UC Berkeley** and **Lawrence Berkeley National Laboratory** report that the average California home pays between \$50 and \$70 every year to keep the electronics humming while the appliances go unused. Eliminating this standby or “leaking” electricity could save households between 6 and 26 percent on their average monthly electricity bill, the study found.

Warped Galaxy . . . UC Santa Cruz astronomers have obtained new evidence of an extreme warp in the stellar disk of the Andromeda Galaxy, our nearest galactic neighbor. The new findings appear to confirm earlier observations and suggest that the warp in Andromeda may be the most extreme case of a warped stellar disk ever observed in a spiral galaxy.

The Cutting Edge

Biomechanical Pancreas . . . A team of scientists from **Lawrence Livermore National Laboratory** have created a biomechanical pancreas that will help diabetes patients monitor their glucose levels. The team received a federal Department of Energy Bright Light award for their work.

DNA Zipper . . . Scientists from **UC Santa Barbara** and colleagues have taken a major step forward in understanding the individual molecules that comprise DNA. They have been able to “see” and thus describe the “teeth” of what they call the “zipper” that forms the double helix of DNA, the basic material of life. UCSB researcher *Mattanah S. de Vries* says as the DNA is “unzipped,” replication occurs.

Quiet Place . . . Scientists at **Los Alamos National Laboratory** have taken another step forward in the quest for a quantum-based computer, which could solve certain mathematical problems at greatly advanced speed. The researchers have demonstrated the existence of a physical state immune to certain types of information-corrupting “noise,” which could otherwise disrupt computations based on quantum states.

Plumbing the Depths . . . A remote controlled submarine is being used to study mysterious bacteria living a half a mile below the surface of Monterey Bay. The research team, led by **UC Davis’ Doug Nelson**, outfitted the sub with high-definition cameras and laser measuring equipment. Because of their strange and hostile habitat, deep-sea bacteria have evolved survival strategies found nowhere else. They live on hydrogen sulfide seeping from cracks in the seafloor and use nitrate in seawater instead of oxygen.

Active Genes . . . The most complete map to date of the human genetic material located next to the ends of chromosomes indicates more active genes than were previously thought to exist there, **UC Irvine** researchers report. They discovered that areas of human chromosomes connecting to the tips (known as telomeres) contained genetically active sequences of DNA, suggesting that the areas next to telomeres do not consist of nonfunctioning “junk DNA,” but active genes that may play important roles in cancer and aging.

Quick Technique . . . Using an exquisitely sensitive magnetic field detector, a team of physicists, chemists and biochemists at **UC Berkeley** and **Lawrence Berkeley National Laboratory** has created a fast immunoassay. The new technique could let clinicians do in an hour or in minutes what now takes a day. Hospitals could diagnose an illness at the bedside or food processors discover bacterial contamination immediately.

Planet and Environment

Clearing the Air . . . The Western Regional Air Partnership has tapped **UC Riverside** as headquarters for a new \$1 million project that will help clear the haze from views around the jagged edge of the Grand Canyon and in front of Yosemite’s Half Dome. Environmental engineers will help western states comply with the federal Clean Air Act’s mandate to improve visibility in national parks and wilderness areas.

Fewer Strawberries? . . . California’s strawberry industry, which produces most of the nation’s strawberries, will likely suffer a 20 percent drop in production with the phaseout of the pesticide methyl bromide, report **UC Davis** agricultural economists. Methyl bromide use is being eliminated under an international agreement because studies show that it contributes to the destruction of the Earth’s ozone layer.

Coral and El Niño . . . Using pieces of ancient coral reefs as windows on the history of climate, geologist *David W. Lea* at **UC Santa Barbara** and colleagues have discovered that at no time in the past 130,000 years does the weather phenomenon known as El Niño appear to have been as intense as it was in the 20th century. By analyzing the temperature and salinity of the water, as revealed by the ancient coral, the researchers were able to reconstruct past climate.

Toxic Algae . . . **UC Santa Cruz** researchers studying a bloom of toxic algae in Monterey Bay have found the algal toxin domoic acid in anchovies, sardines and krill. Harvesting of anchovies and sardines for human consumption was halted and there were no reports of adverse effects on wildlife from this particular bloom. Nevertheless, the findings raise concerns about the potential effects of the toxin on marine mammals and birds, says UCSC’s *Mary Silver*. Among the animals potentially affected are endangered species of whales that feed in Monterey Bay.

Clean Chips . . . Scientists at **Los Alamos National Laboratory** have developed a new technology application that could all but eliminate the use of hazardous corrosives and the production of wastewater in the fabrication of chips for computers. The photoresist removal technology relies on a carbon dioxide fluid, produces virtually no hazardous waste and reuses the carbon dioxide in the process, adding no greenhouse gas to the atmosphere.

Ice Streams . . . The West Antarctic ice sheet, with enough ice to raise global sea levels by five to six meters, has long been a focal point of concerns about global warming. A new analysis of ice streams that flow through the huge West Antarctic ice mass by **UC Santa Cruz’s Slawek Tulaczyk** shows that there could be thinning and shrinking of the ice shelves the streams nourish, most notably the large Ross ice shelf that covers the Ross Sea. Loss of the ice shelf over the Ross Sea could, in turn, trigger changes in global ocean circulation and climate, Tulaczyk says.

Insights on Society

Living Wills Don't Work . . . Advance directives, or living wills, don't help family members predict patients' wishes in end-of-life decisions, say **UC Irvine** researchers. They found that surrogate decision makers – most often spouses and adult children – accurately predict patients' preferences regarding life-sustaining treatment about 70 percent of the time, and advance directives don't significantly improve that level of accuracy.

Frosh and Computers . . . The results of **UCLA's** annual survey of the nation's freshmen show a difference in confidence in computer skill levels between males and females. The fall 2000 survey, conducted by the **Higher Education Research Institute** at **UCLA's Graduate School of Education and Information Studies**, found a record 78.5 percent of first-year students using computers regularly during the year before college. But a new survey question on computer skill levels revealed a much lower confidence level in females.

Early Greek Temple . . . The earliest evidence of a Greek temple in Israel has been discovered by **UC Berkeley** archaeologist *Andrew Stewart* in a northern port city that was once King Solomon's harbor on the Mediterranean Sea. The find at Tel Dor, 25 miles south of Haifa, dates to the first or second century B.C. It pushes back evidence of a major Greek presence in Palestine and surrounding territories by 200 years.

Looking to the Future

Easy Switch to Clearer TV . . . Scientists at **Los Alamos National Laboratory** have developed a technology that could make the coming transition from current analog television to high-definition television easier. The technology is a new transmission algorithm capable of compressing a HDTV data stream to the point where the HDTV and analog TV signals can be broadcast over the same channel.

Stem Cell Cancer Therapy . . . Physicians with the **UC San Diego Blood and Marrow Transplant Program** are evaluating an experimental type of stem cell transplant for its effectiveness against advanced kidney cancer, a disease known to be highly resistant to conventional therapy and usually fatal. The results so far have been described as dramatic. Advanced kidney cancer is usually fatal in less than a year. Fewer than 10 percent of people with kidney cancer survive for more than five years.

Kudos

NAS Honor . . . UC San Diego Chancellor *Robert C. Dynes* has been elected to the Council of the National Academy of Sciences. The 17-member council is the governing body responsible to the membership for activities undertaken by the NAS and for its corporate management. Dynes will serve for three years.

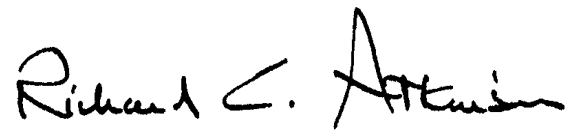
Exemplary Service . . . Thomas T. Haider, an advisor and adjunct professor in the **UC Riverside/UCLA Thomas Haider Program in Biomedical Sciences**, is one of six physicians in the nation selected for the 2001 Pride in the Profession Award from the American Medical Association. In 1994, Haider established the Children's Spine Foundation in Riverside to provide comprehensive spinal care, including surgery, for children without health insurance. Haider also sponsors a children's hospital in Afghanistan.

Investing in Education

Environmental Gift . . . Two Connecticut-based alumni of **UC Berkeley** have established a \$1 million fund to improve environmental management around the world. The gift from Carolyn and Dick Beahrs will support advanced education in a wide range of inter-related issues affecting development and the environment, including global warming, water management, population and poverty.

Cardiac Care Gift . . . La Jolla residents Judith and Jack White have given a gift of \$1.1 million to endow the Judith and Jack White Chair in Cardiology at the **UC San Diego School of Medicine**. The White's endowment will support teaching and research in cardiology. With this gift, UC San Diego now has 83 endowed chairs.

Tobacco Archives . . . The American Legacy Foundation has awarded \$15 million to **UC San Francisco** to establish permanent Internet access to tens of millions of pages of once-secret tobacco industry documents and to develop a center for scholarly study of the material. Most of the documents have been obtained through litigation led by state attorneys general.



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