

President's Report

A Report on
Discoveries and
Achievements
at the
University of
California

Vol. 11, No. 5, March 2002

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

Sept. 11 Pollution . . . In the most thorough analysis of the dust and smoke blown through lower Manhattan after the collapse of the World Trade Center Sept. 11, **UC Davis** researchers found unprecedented clouds of very fine particles that should be considered in evaluating rescue workers' and residents' health. They also recommended specific cleaning methods for contaminated apartments, offices and schools.

Cicerone Honored . . . UC Irvine Chancellor *Ralph Cicerone*, one of the world's leading experts on global warming and climate change research, has received the 2002 Roger Revelle Medal of the American Geophysical Union. Cicerone's research on methane, nitrous oxide and many other chemicals has advanced our understanding of how these chemicals affect the planet's energy balance and temperature.

Economic Engine . . . A study examining the contribution of **UC Berkeley** to the San Francisco Bay Area economy has found its research and educational enterprise brings in more than one-half billion dollars in new money annually. The report, providing information on the campus's purchasing, employment and research impacts, noted the campus is the Bay Area's fifth largest employer with a workforce totaling 13,520.

Monitoring Coastal Waters . . . UC Santa Cruz will soon be at the center of an extensive new program to monitor California's coastal waters. The Network for Environmental Observation of the Coastal Ocean will funnel real-time data from seven UC sites along the coast to a database at the Santa Cruz campus. The information will help researchers studying coastal ecosystems, global warming and other issues. The public can access the database via the Internet.

Sontag Papers . . . The **UCLA Library** has acquired the papers of writer Susan Sontag, an extensive literary archive that includes manuscripts of her writings; her correspondence with contemporary writers, artists, musicians and other figures of intellectual and historical interest; her personal notebooks; and her private library of more than 20,000 books.

Health and Nutrition

Pollutants and Pregnancy . . . A **UCLA** study has shown that exposure to two common air pollutants may increase the chance that a pregnant woman will give birth to a child with certain heart defects. The study, from the **UCLA School of Public Health** and California Birth Defects Monitoring Program, provides the first compelling evidence that air pollution may cause some birth defects.

Good News on Chocolate . . . Flavonoids are a group of compounds found in plant-based foods such as tea, wine, cocoa and chocolate. They have a unique chemical structure and appear to be powerful antioxidants, preventing certain harmful biochemical processes in the body. Research by *Carl Keen* of **UC Davis** now indicates the flavonoids in cocoa and chocolate work much like low-dose aspirin in preventing aggregation of blood platelets, which is an important risk factor for blood clots that can cause heart attacks and strokes.

Accelerating Healing . . . Research with chickens at **UC Riverside** has identified a protein – the chicken chemokine "cCAF" – that is pivotal in healing the animals' injuries. The findings have important implications for human healing. Researcher *Manuela Martins-Green* finds that the human chemokine interleukin-8 appears similar in function to cCAF.

DiETING and Darkness . . . Longer nights and overcast skies common in winter may actually make dieters more susceptible to binge eating, a **UC Irvine School of Social Ecology** study has found. The study indicates that dieters were more apt to show binge-eating behavior if they preferred to eat in subdued light – either at night or in a darkened room – compared with dieters who had no preference for eating in darker surroundings.

New Patch Treatment . . . The **UC San Diego Medical Center** is offering a new clinical trial of a skin patch treatment for children who have, or may be expected to have, attention deficit disorder or its closely affiliated condition, attention deficit hyperactivity disorder. The conditions are manifested by symptoms such as an inability to focus, short attention spans and impulsive behavior. The patch is an alternative to twice-daily pills.



Database Released . . . In an ongoing effort to aid in the search for cures and vaccines for sexually transmitted diseases, *Los Alamos National Laboratory* has released a publicly available Web database containing the Human herpesvirus 2 genomic sequence. It will aid in the analysis of genomic sequences from sexually transmitted infectious agents.

Developments and Discoveries

Gondwana Split and Evolution . . . *UC Riverside* researcher *Mark Springer* and colleagues report that among placental mammals the split between Afrotheria and other placentals occurred 103 million years ago, which coincides with the separation of South America and Africa in Gondwana. This suggests that the common ancestor of living placental mammals occurred in the southern hemisphere and not in the northern hemisphere, as is widely held.

Deep Sea Creatures . . . For the first time, deep sea crabs and mussels have been brought back alive from the deep and are being kept alive in special tanks, *UC Santa Barbara* researchers report. The animals, along with tube worms, were taken from an area 400 miles south of Manzanilla, Mexico. They were living at a depth of a mile and a half near hot water vents. At that depth, the ocean is very dark and cold and the worms and mussels survive by chemosynthesis. They convert hydrogen sulfide from the vents as an energy source (instead of light) for the synthesis of proteins and carbohydrates.

Continents Emerged . . . About a billion years ago, the continents emerged relatively suddenly from an ocean that covered 95 percent of the Earth's surface, according to a new theory by geologist *Eldridge Moores* of *UC Davis*. The appearance of large masses of dry land would have caused more extreme weather, changes in ocean currents and the emergence of proper seasons, Moores theorizes. In turn, these environmental changes may have led to rise in atmospheric oxygen that enabled the explosion of new life forms around 500 million years ago.

Once Good Behavior . . . A variant form of a gene associated with attention deficit hyperactivity disorder indicates the disorder is a recent affliction and may once have helped humans survive, says a *UC Irvine College of Medicine* study. The human gene study suggests that behavior now considered inappropriate in a classroom may be related to behavior that once helped humans overcome their environment. The analysis also suggests that this variation occurred recently in human evolution between 10,000 and 40,000 years ago.

Organic-Rich Rocks . . . *UC Riverside* researcher *Martin Kennedy* and colleagues report a new mechanism to explain organic-rich rocks common in Late Cretaceous (60 million years ago) sediments. They report that dissolved organic molecules common in seawater are drawn into the crystal lattice of smectitic clay minerals, where the organic matter is protected from oxidation and metabolization. This organic-rich material is economically important as the ultimate source of oil.

Longe-Range Sharks . . . A new study by *UC Santa Cruz* researchers and colleagues is shattering old beliefs about the great white shark, one of the largest, most awe-inspiring predators. Scientists have long believed that these powerful carnivores spend most of their lives relatively close to shore, pursuing seals and sea lions. But the study reveals that white sharks can range hundreds of miles across the open ocean. One male tagged along the central California coast migrated thousands of miles to the warm waters of Hawaii and remained there for nearly four months.

The Cutting Edge

UCLA Spacecraft Approved . . . The Office of Space Science at NASA has approved the "Dawn Mission," a *UCLA*-led project that will develop a spacecraft to orbit and study Ceres and Vesta, the two largest asteroids in our solar system. The Dawn Mission marks the first time that a spacecraft will orbit two planetary bodies on the same mission.

Memory Loss Drug . . . Researchers *Benno Roozendaal* and *James L. McGaugh* of the *UC Irvine Center for the Neurobiology of Learning and Memory* report that a drug used to treat stress can help restore memories lost to brain damage. The drug metryapone, which limits circulation of the stress hormone corticosterone, helped restore memories impaired by damage to the brain's hippocampus region. This suggests that this form of memory loss is caused by high levels of the stress hormone and can lead to possible human treatments for memory loss caused by stroke and Alzheimer's disease.

Nanolasers . . . Chemists at *UC Berkeley* have taken snapshots of the world's smallest laser in action. The ultraviolet nanowire nanolaser is shorter than the width of a human hair and one-hundredth the width. Such ultraviolet nanolasers have generated excitement because of their potential applications in miniature optical computer circuitry and communications devices. The snapshots were taken with a new type of instrument called a near-field optical scanning microscope.

Cancer Diagnosis . . . A DNA diagnostic technique developed by *Lawrence Livermore National Laboratory* scientists is expected to provide a valuable new tool to improve cancer diagnosis. The Livermore technique permits researchers to detect mutations in individual cancer cells by specific identification and by making numerous copies of the DNA in the genes important for cancer progression in each cell.

Smaller and Smaller . . . *UC Berkeley* researchers have found a way to mate different materials along the length of a single nanowire using manufacturing techniques common in the semiconductor industry. With this ability, a single nanowire could be a complete device, incorporating transistor junctions, light-emitting diodes and even lasers. The development could dramatically shrink computer chips, promising electronic devices on a single nanowire less than one-hundredth the width of a human hair.

Chromosome Copying . . . *Lawrence Berkeley National Laboratory* researchers have discovered that two proteins, previously known for helping to construct “silent” regions of chromosomes, also play an important but unforeseen role in building special structures that cells need to ensure accurate chromosome copying during cell division. If the process of chromosome copying goes awry, cells can lose chromosomes or acquire more than one chromosome copy. In humans, lack of a chromosome can cause blood disorders including leukemia; an extra chromosome 21 causes Down syndrome.

Portable Radiation Detector . . . Long before Sept. 11, engineers from *Lawrence Berkeley National Laboratory*, *Lawrence Livermore National Laboratory* and *Los Alamos National Laboratory* have been working to outsmart terrorists attempting to smuggle radioactive material into the country. Their solution is Cryo3, a 10-pound, battery-powered detector that offers extremely high-resolution radiation analysis in a portable package and promises to bring state-of-the-art radiation spectrometry anywhere radioactive materials are found.

Planet and Environment

Particle Pollution . . . A new study issued by researchers at the *Scripps Institution of Oceanography* at *UC San Diego* argues that particles of human-produced pollution may be playing a significant role in weakening Earth’s water cycle, much more than previously realized. The study used new satellite data from NASA’s Terra satellite revealing the global nature of the particles. Tiny aerosols primarily made of black carbon, the researchers argue, can lead to a weaker hydrological cycle, which connects directly to water availability and quality, a major environmental issue of the 21st century.

Negotiating Pollution Reduction . . . Negotiated agreements between companies and government regulating bodies to reduce pollution have met with greater success in Europe than in the U.S., although U.S. companies can benefit also, say researchers at *UC Santa Barbara*. For example, in Europe, non-governmental organizations (NGOs) and a ministry of environment tend to get involved in negotiations at the beginning. In contrast, in the U.S., a company may negotiate an agreement with the federal Environmental Protection Agency and later end up in litigation with an NGO.

Thickening Ice . . . The stability of the West Antarctic ice sheet has long been a concern because of the potentially catastrophic rise in sea level that would result from its collapse. Researchers at *UC Santa Cruz* and NASA now report that, contrary to previous studies, at least one part of the ice sheet is actually growing rather than shrinking. The scientists used satellite radar images to map the flow of ice in the ice sheet and estimate how its mass is changing.

Consolidated Toxic Tracing . . . To better understand how contaminants such as pesticide travel across the continent, researchers from *Lawrence Berkeley National Laboratory* and Canada’s Trent University have incorporated into a single model toxic release data, wind and water current patterns and regional differences such as soil and vegetation. The BETR model, which derives its name from the two institutions involved, improves on traditional atmospheric models by more completely reflecting how persistent organic pollutants move and accumulate throughout North America.

Tree Discovery . . . A *UC Santa Cruz* researcher and colleagues have identified a conifer found in a remote area of northern Vietnam as a genus and species previously unknown to science. *Daniel Harder*, director of the *UC Santa Cruz Arboretum* and a codiscoverer of the new species, says discovery of the golden Vietnamese cypress indicates more now-unknown species await discovery in the limestone ridges where the tree grows.

Insights on Society

E-Mail and Sept. 11 . . . A study by the *UCLA Internet Project* shows e-mail transformed personal communication after the Sept. 11 attacks. The survey found that more than 100 million Americans sent or received “I Care Mail” for emotional support, along with messages of concern and information about victims. The survey further showed that Web access played only a modest role in delivering information following the attacks; television dominated news delivery.

Stress Symptoms . . . Police officers are more likely to suffer from post-traumatic stress disorder if they experience high levels of emotional distress at the time of traumatic events, says a study from *UC San Francisco* researchers and colleagues. The study of 740 police officers from New York, Oakland and San Jose confirmed a finding from their earlier studies of combat veterans – that those who feel the event is unreal as it unfolds, as if they were in a dream, a movie or a play – have a higher risk of developing symptoms.

Trade and Civilization . . . The road to civilization may be the same as the road to riches, suggest findings from a *UCLA* archaeological team active in the Peruvian highlands. Over the past 15 years, the team led by *UCLA*’s *Charles Stanish*, has uncovered a circuit of almost 100 pre-Inca settlements, some dating back more than 4,000 years. Stanish and his team report the settlements reveal the role of trade in the origins of civilization in this part of the world and perhaps elsewhere as well.

Smoking Papers . . . The *UC San Francisco Library and Center for Knowledge Management* has released on the Internet the Legacy Tobacco Documents Library, a collection of more than 20 million previously secret pages from tobacco industry files from the 1930s to the 1990s. It represent the world’s largest public digital collection maintained by a library. The searchable collection is available at: legacy.library.ucsf.edu

Looking to the Future

Morphine Enhancement . . . Challenging a decades-old understanding of why morphine-like drugs lose effectiveness with increased use, *UC San Francisco* scientists have demonstrated in animals how morphine's potent painkilling powers can be easily sustained without increasing dosages. If confirmed in further studies, the discovery could lead directly to more effective relief using the powerful pain reliever. Morphine is prescribed to control severe, chronic pain, including pain from advanced cancers.

Sponge Cell Receptor . . . A specially designed cell receptor may reduce death rates from pancreatic and other cancers by sopping up excess tumor-produced chemicals like a sponge, a *UC Irvine College of Medicine* study has found. The study, using human cancer cells in mice, helps explain the puzzling increases in certain chemicals seen in tumor cells and may help increase survival rates from pancreatic cancer, currently one of the world's deadliest.

More Power Longer . . . Researchers at *Lawrence Livermore National Laboratory* have developed and demonstrated a laboratory prototype miniature thin-film fuel cell power source that provides portable electrical power for a range of consumer electronics. With the laboratory's fuel cell, a typical cell phone battery could be projected to last more than 300 percent longer, extending standby time from four days to two weeks and talk time from six hours to two days.

Tiny Explosives . . . Chemists at *UC San Diego* have discovered that silicon wafers, the raw starting material for computer chips, can be easily made into tiny explosives. The discovery means that wafers might be used one day to chemically analyze samples in the field or serve as power sources for tiny electronic sensors the size of a speck of dust.

Kudos

University Professors . . . *Alexandre Chorin* of *UC Berkeley's* mathematics department and *Shu Chien* of *UC San Diego's bioengineering and medicine department* have been named University Professors, the *University of California's* highest honor. They are among only 32 faculty so honored. The title of University Professor is reserved for scholars of international distinction who also are recognized as exceptional teachers.

Franklin Medal . . . *Alexandra Navrotsky*, director of the cross-disciplinary nanoscience initiative at *UC Davis*, has been awarded a Benjamin Franklin Medal in Earth Sciences for her work on the thermochemistry of minerals, high pressure materials and nanomaterials. The Franklin medals are often referred to as "the American Nobels."

High Expectations . . . *Robert Rosenthal* of *UC Riverside* will receive the 2002 Distinguished Scientific Award for Application of Psychology from the American Psychological Association. "The Rosenthal Effect" has entered the language as shorthand for the fact that the expectation of researchers influences their results.

Engineering Honors . . . Five *University of California* faculty have been elected to the National Academy of Engineering. They are: *Alan Heeger* and *Evelyn Hu* of *UC Santa Barbara*, *Adib Kanafani* and *Christos Papadimitriou* of *UC Berkeley*, and *William Sirignano* of *UC Irvine*. More than 130 UC faculty are NAE members.

Investing in Education

Mission Bay Gifts . . . A total of \$7 million has been pledged recently toward construction of *UC San Francisco's Mission Bay* campus. UCSF is developing Mission Bay as its second major teaching and research campus on a site near downtown San Francisco. The donors include Betty I. and Gordon E. Moore (\$5 million), the Richard and Rhoda Goldman Foundation (\$1 million), and Ute C. L. and William K. Bowes Jr., (\$1 million, augmenting their previous pledge of \$4 million).

Capps Center . . . Congress has approved a \$500,000 appropriation to assist in establishing the *Walter H. Capps Center for the Study of Religion and Public Life* at *UC Santa Barbara*. *Walter Capps* served 10 months representing California's 22nd Congressional District before suffering a fatal heart attack in 1997. Before serving in Congress, Capps had a 33-year career at UCSB as a professor of religious studies.

McOmie Program . . . Graduate students can now combine advanced agricultural studies at *UC Davis* and California Polytechnic State University, San Luis Obispo through a new joint graduate-education program funded by Lorenzo and Judith McOmie. The McOmie Graduate Education Program will enable students to start their master's degree studies in Cal Poly's College of Agriculture and continue their doctoral studies through graduate programs administered by UC Davis' *College of Agricultural and Environmental Sciences*.



President, University of California

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