

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

Still the Best . . . UCLA Medical Center is the best hospital in the Western United States for the 12th consecutive year, according to the latest *U.S. News & World Report* annual survey of America's leading hospitals. It ranked as the fifth-best hospital nationally and is the only Southern California hospital to earn a spot on the magazine's honor roll during the 12 years *U.S. News* has undertaken the survey. For the second consecutive year, **UCLA's Jonsson Comprehensive Cancer Center** won ranking as the best cancer center in the Western United States.

Top Recognition . . . UC Davis Medical Center ranks among America's best hospitals in nine of 17 medical specialties, according to the *U.S. News & World Report* survey. It achieved recognition in digestive disorders (39th), ear, throat and nose (38th), geriatrics (46th), hormonal disorders (36th), kidney disease (29th), orthopaedics (31st), respiratory disorders (24th), rheumatology (47th) and urology (37th).

Another Best . . . UC Irvine Medical Center was named one of the nation's top hospitals for gynecology in the *U.S. News & World Report* annual hospital rankings. The magazine considered 6,116 hospitals to arrive at 168 stellar centers in 17 specialties. UCI's center ranked 33 among 50 hospitals in gynecology.

Big Science . . . UC Santa Barbara's Robert Sugar will play a key role in the Department of Energy's new Scientific Discovery through Advanced Computing program, under which 51 projects will receive a total of \$57 million this fiscal year. The program will advance research in such areas as climate modeling, fusion energy sciences, chemical sciences, nuclear astrophysics, high energy physics and high performance computing. Sugar will oversee efforts at seven universities and three national laboratories. Among the institutions involved are: **Lawrence Berkeley National Laboratory; Lawrence Livermore National Laboratory; Los Alamos National Laboratory; UC Berkeley; UC Davis; UC San Diego; UC Santa Barbara; UCLA;** and **UC Santa Cruz.**

Health and Nutrition

'Mad Cow' Help? . . . UC San Francisco researchers report that two drugs approved to treat either malaria or certain psychotic illnesses are effective in treating mouse cells infected with the protein known as the prion. Prions cause new variant Creutzfeldt-Jakob disease, the human equivalent of "mad cow disease," and other diseases. The researchers advocate immediate establishment of clinical trials to investigate the efficacy of the drugs in patients dying of prion diseases.

Wounds and Kidneys . . . The body's natural response to a wound – sending specialized cells to the transplant site to initiate the development of scar tissue – might be a major contributor to chronic kidney rejection following transplant, report researchers at the **UC San Diego School of Medicine**. Their work is the first demonstration that kidney rejection is caused by the recipient's own cells' normal reaction rather than by the donor organ cells.

Prostate Cancer Advance . . . A potential drug therapy for late-stage prostate cancer developed at **UC Riverside** has been put on a fast track toward clinical trials by the National Cancer Institute. The NCI, through its Rapid Access to Intervention Development program, will begin preclinical development of a protein designed in the laboratory of UCR professor *Ameae Walker*.

Heart Helps . . . Red wine and garlic aren't the only dietary supplements that keep our hearts healthy. Folic acid and vitamin B12 also appear to offer cost-effective treatments for heart disease and the reduction of associated deaths, according to a new **UC San Francisco** study. The researchers say the evidence for the beneficial effects of vitamins B12 and folic acid is much stronger than for garlic, vitamin E and other dietary supplements promoted for heart disease prevention.

Detecting Change Early . . . Small, barely detectable, changes in the retina may predict the onset of vision loss in people with diabetes and allow early treatment, if a study at **UC Berkeley's School of Optometry** is successful. Preliminary tests have found a striking relationship between these small changes and existing eye damage. Led by optometry professor *Anthony Adams*, the school has launched a \$1.6 million research project to study these changes in people with diabetes.



Photoreceptors Adapt . . . Like a field of sunflowers nodding toward the sun, photoreceptors – the light-sensitive cells in the retina – can apparently reorient themselves swiftly toward the brightest points of light after cataract surgery, **UC San Diego** scientists report. Researcher *Harvey Smallman* says it appears photoreceptors may be phototropic in the same way as plants.

Developments and Discoveries

Salty Water Tomato . . . A genetically engineered tomato plant that thrives in salty irrigation water and may hold the key to one of agriculture's greatest dilemmas has been developed by plant biologists at **UC Davis** and the University of Toronto. As the first truly salt-tolerant crop, the tomatoes offer hope that other crops can be genetically modified for planting in areas of the world with salty irrigation water and salt-damaged soils.

Planets Discovered . . . With the help of improved measurement techniques, planet hunters at **UC Berkeley** and colleagues have been able to detect a Jupiter-sized planet orbiting a nearby star at a distance comparable to that of Jupiter in our solar system. The discovery is the first time that astronomers have detected two planets with nearly circular orbits around the same star.

Seismic Clues . . . **UC Santa Cruz** researcher *Casey Moore* and colleagues are seeking new clues to the cause of some of the Earth's most powerful earthquakes in the Nankai Trough, a geologically active area Japan's coast where two of Earth's tectonic plates collide, producing major quakes. They are using special technology to drill into the Earth, measure and monitor physical properties.

Ancient Atoms . . . Robert Becker of **UC Davis** and **Lawrence Livermore National Laboratory** and colleagues have found traces of the first generation of atoms in the universe, 14 billion light years from Earth. The observations are the first of the cosmic "Dark Age" between the Big Bang and the first visible stars and galaxies.

Fertilizer at Sea . . . New findings by **UC Santa Cruz** scientists and colleagues suggest that the deep ocean is teeming with organisms producing essential natural fertilizers. A research team led by UCSC's *Jonathan Zehr* has discovered a previously unknown type of photosynthetic bacteria that fixes nitrogen, converting it from the atmosphere into a form other organisms can use.

The Cutting Edge

Miniscule Mutation . . . **UC San Francisco** researchers report that they were able to slow the growth of human cancer cells – or cause them to commit suicide – by creating a miniscule mutation in the telomerase enzyme. The study suggests that the human cancer cells are much more sensitive to disruptions in the enzyme than had been thought. Researchers say the findings hint at a possible new strategy for thwarting cancers.

Eye Drug Testing . . . The first phase of a **UCLA**-led clinical trial of a new drug for age-related macular degeneration has found the drug to be safe and, in some cases, highly effective. The results showed that the drug rhuFab V2 can be safely injected directly into the eye. Twenty-seven percent of patients treated showed dramatic visual improvements. Age-related macular degeneration is the leading cause of blindness in the developed world. It occurs when the central part of the retina, known as the macula, deteriorates.

Breast Cancer Molecule . . . **UC Irvine** researchers report the molecule glypican-1, located on the surface of cells, is found at higher levels in breast cancer cells. The high concentration of glypican-1 in cancer cells suggests the molecule may help trigger a chain of events that promotes the activation of a gene previously associated with breast cancer. The study indicates that interruption of glypican's activity may provide a new way to treat or prevent the disease and measuring levels of the molecule could lead to earlier detection.

HIV Vaccine? . . . **UC San Francisco** and **UC Davis** scientists have developed the first vaccine that protects against vaginal transmission of a virus closely related to HIV. In studies with monkeys, all vaccinated animals remained healthy a year after exposure to virulent Simian Immunodeficiency Virus that normally causes AIDS-like disease within a year. The results have prompted plans for human clinical trials with an HIV version of the vaccine.

Waves and Particles . . . In the quantum world, waves can act like particles and particles like waves, interfering like overlapping ripples in a pond. Now, physicists at **UC Berkeley** and **Lawrence Berkeley National Laboratory** have shown that this same quantum interference occurs between two samples of superfluid helium-3, a liquid so cold – a thousandth of a degree above absolute zero – that it flows without resistance. One potential application of this quantum interference is in an ultrasensitive superfluid gyroscope.

Solar System's Origin . . . Three instruments designed and built by researchers at **Los Alamos National Laboratory** will help scientists understand the origin of the solar system. The instruments are aboard Genesis, a remote-controlled NASA space mission that will capture particles from the sun and return them to Earth. Genesis will collect samples to reveal the makeup of the cloud that formed the solar system five billion years ago.

Most Powerful . . . In the latest ranking of the world's 500 most powerful supercomputers, an installation at **Lawrence Berkeley National Laboratory** is listed as the most powerful unclassified supercomputer. It can perform 3.8 trillion calculations per second. In overall rankings, it finished second to a classified system at **Lawrence Livermore National Laboratory**.

Planet and Environment

Tibetan Plateau Stable . . . A study of the world's highest geological feature, the Tibetan Plateau, has determined that the plateau rose to its current height earlier than previously thought and cannot go higher than it is now. **UC Santa Barbara's** *Bradley Hacker* and colleagues show the plateau dates back 13.5 million years and has reached a maximum average height of five kilometers. Mountainous areas such as the Tibetan Plateau affect weather worldwide – the monsoons of India and Asia are caused by the plateau, for example.

Hard-Working Mammals . . . A new study by **UC Santa Cruz** researchers and colleagues may help explain why certain species of marine mammals seem particularly vulnerable to changes in their food supply. The scientists found that some deep-diving sea lions work so hard searching for food that their ability to increase the duration of their dives is limited. As a result, they may be unable to cope with food shortages or other environmental stresses.

Tiny Cannibals . . . Researchers at the **UC San Diego Scripps Institution of Oceanography** say that tiny marine crustaceans called copepods apparently use cannibalism to limit their population. They found that egg mortality in the species is directly related to the abundance of females in the population. A tenfold increase in egg-producing females means half as many eggs will survive.

Location, Location . . . Location, location, location turns out to be a life and death matter for mites, not just a real-estate axiom. Researchers at **UC Santa Barbara, UC Berkeley** and colleagues report when they combine bean plants, plant-eating mites and mites that prey on other mites, the mites ate the plants, were in turn eaten, and all the mites became extinct. But when plants and mites were separated, the mites appeared to continue their life cycles indefinitely because the predators could not exterminate all their prey.

Warming Planet? . . . Researchers at the **Lawrence Livermore National Laboratory** who examined effects of gaps in temperature measurements during the 20th century have concluded that global warming during that period may have been slightly larger than the previously estimated value of roughly 0.6 degrees Celsius. This contrasts with claims by greenhouse skeptics who contend that the warming found in the observational record is an error from incomplete and changing geographical coverage of temperature measurements.

Overfishing and Extinction . . . Researchers at **UC Santa Barbara's National Center for Ecological Analysis and Synthesis** report human-induced mass extinctions of ocean life may have begun thousands of years ago and continued throughout history. They say ecological extinction caused by overfishing precedes all other pervasive human disturbance to coastal ecosystems, including pollution, degradation of water quality and anthropogenic climate change.

Insights on Society

Teaching Values Still . . . **UC Riverside** sociologist *Steven Brint's* study of elementary schools in three Southern California counties discovered that, contrary to popular belief, schools still teach their students values, albeit a mix of the traditional and the contemporary. Brint reports the values school officials emphasized tended to underscore their interest in maintaining order, emphasizing student effort and fostering a sense of campus identity.

Deadly Self-Esteem . . . Individuals' instinctive need to feel good about themselves adversely affects their ability to respond to many AIDS prevention campaigns and their willingness to change their behavior or seek treatment, according to new research from **UC Berkeley**. Researcher *Priya Raghbir* provides critical insight into how public health officials and social marketers can design more effective AIDS prevention campaigns.

New Slang Dictionary . . . Think twice before calling someone a "ballerina," (immoral person with a moral façade), "scud missile" (someone who looks better from a distance than close up) or "hanging chad" (unwelcome follower). The advice is extrapolated from "UCLA Slang 4," a 130-page dictionary from the **UCLA department of linguistics'** long-running Slang Project. Every four years, *Pamela Munro's* students spend a quarter in pursuing new slang as an exercise in the complexities of language. The dictionary is the result of their efforts.

Looking to the Future

Prostate Cancer Study . . . **UC Irvine's Chao Family Comprehensive Cancer Center** and the National Cancer Institute are launching the largest-ever prostate cancer prevention study to determine if selenium and Vitamin E can protect against prostate cancer. The study will take up to 12 years to complete and will include 32,400 men from the United States, Puerto Rico and Canada. Risk factors for the disease include being over age 55, being black or having a father or brother with prostate cancer.

Immunological Pathway . . . An international team of scientists led by *Michael Karin* of the **UC San Diego Cancer Center** has discovered a new immunological pathway with the potential for preventing autoimmune diseases and some lymphomas without compromising the body's immune defenses. The researchers from UCSD, Germany and Pennsylvania found a previously unknown role for an enzyme, I-kappa-B kinase alpha (IKKa).

Computer Energy Consumption . . . The energy crisis has Californians adopting tried-and-true ways for reducing their electricity bills, like turning up the air conditioning thermostat. Now, a research team led by **UC Riverside's Brett Fleisch** is focusing on an often-overlooked electricity-consuming business tool – the computer network. The team is examining hardware configurations and software protocols that could direct computer clusters to perform in a more energy-efficient manner.

Alzheimer's Clue . . . For years, scientists have recognized that a protein called apoE4 is a major risk factor for developing Alzheimer's disease. Researchers at the **Gladstone Institute of Neurological Disease** and **UC San Francisco** have demonstrated how apoE4 alters the ability of nerve cells to maintain their normal internal framework, or cytoskeleton, which is important to the survival and function of the nerve cells. It could lead to the development of an Alzheimer's treatment.

Kudos

Gifford Wins Award . . . *Allen Gifford*, an assistant professor at the **UC San Diego School of Medicine**, has been selected by the Robert Wood Johnson Foundation for its 2001 Generalist Physician Faculty Scholar Award. The program awards \$300,000 over a four-year period to support and develop generalist physicians, also known as family practitioners, general internists and general pediatricians.

Magazine Honors Engineers . . . The team of **UC Riverside** engineers that developed IntelliShare, an automated electric car-sharing program, has been named a finalist in the *Discover* magazine 2001 Innovation Awards. The awards honor scientists whose innovations have the potential to become common technologies. IntelliShare is a fleet of 15 electric cars used by some 300 faculty, students and staff for short trips around and near the campus.

Distinguished Investigator . . . The Academy for Health Services Research and Health Policy has awarded its 2001 Distinguished Investigator Award to **UCLA's Kenneth Wells** for exceptional and lasting contributions to health services research. Wells has conducted groundbreaking research on how changes in insurance and health care delivery, including different types of managed care, have affected treatment of people with psychiatric disorders.


Tien Honored . . . The National Academy of Engineering in October will present its Founders Award, given for lifelong contributions to engineering, to *Chang-Lin Tien*, who served as **UC Berkeley** chancellor from 1990-1997. Tien was cited for his pioneering work in heat transfer and thermal science, as well as for his leadership in education for youth worldwide. Tien's research in thermal science has been applied to fire safety in high-rise buildings, insulating tiles on space shuttles and cooling systems for nuclear reactors.

Investing in Education

Deaths of Stars . . . Scientists from the **Lawrence Livermore** and **Los Alamos** national laboratories, **UC Santa Cruz** and colleagues have received a \$2 million, three-year grant from the Department of Energy to research supernovae, the cataclysmic deaths of stars. A supernova is one of nature's most awesome spectacles, literally the explosion of a star. Observed in nearby galaxies at a rate of more than one per week, these titanic events release immense amounts of energy that can temporarily rival that of their host galaxy.

Whitaker Foundation Award . . . The Whitaker Foundation has awarded \$12 million to the new department of biomedical engineering at **UC Davis**. The grant will help expand the department and enhance campus research in genomics, medical imaging and other fields and also trigger \$35 million in matching funds from state and university sources.

Endowed Chair . . . **UC Irvine's Henry Samueli School of Engineering** has established the **William J. Link Endowed Chair in Biomedical Engineering**. Link pledged \$1.5 million to the school to support the continuing development of the campus's biomedical engineering programs. He is a strong proponent of biomedical engineering's potential to develop procedures and products that will help mankind, as well as the educational and business communities.



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