President's report
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UC: Serving California through education, research and public service
Vol. 13, No. 4, March 2004

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

Bonds OK'd … Voters on March 2 approved Proposition 55, a $12.3 billion bond measure to fund facilities improvements in California's public schools and higher education facilities. Its passage will allow *UC* campuses to move forward with important facilities projects, including earthquake and life-safety improvements, construction of new buildings to meet the demands of long-term enrollment growth, and renovations to ensure that research and instructional facilities keep pace as technologies and academic programs evolve. Safe, modern facilities are key to UC's ability to continue preparing the work force and producing the research innovations that are vital to the state's economy, said UC President Robert C. Dynes.

Regents appoint provost … *M.R.C. Greenwood* has been appointed provost and senior vice president of academic affairs, the second highest post in the UC system. Greenwood, an internationally recognized expert in genetics and nutrition and a national leader in science and higher education policy, has served as chancellor of UC Santa Cruz since 1996. She becomes provost April 1. Greenwood, 60, succeeds *C. Judson King*, who retires after eight years in the position and returns to UC Berkeley to become director of the Center for Studies in Higher Education.

Economic engine … The *UC Davis* campus and health system are engines for economic growth in California that generate an annual economic impact estimated between $2.7 and $3.4 billion, according to a new campus study. After state government, UC Davis is the second-largest employer in the seven-county capital region, with 29,690 employees in 2001-02, the fiscal year covered in the study. UC Davis paid $960 million in salaries and wages, and had total revenues of $1.97 billion, half of which came from outside of the area. The study found that for every dollar that state government invested in the campus, UC Davis returned $5 to the state economy. Other UC campuses are expected to release results from their economic impact studies soon.

Leadership gift … *UC San Diego* has received $30 million from Ernest Rady and the Rady Family Foundation – the second largest philanthropic gift in UCSD's history – to support the campus's recently established school of management. In recognition of the gift, it will be named the Rady School of Management. Rady is the founder and chairman of American Assets Inc. of San Diego. Construction planning for the school is under way, with occupancy expected in fall 2006.

HEALTH AND NUTRITION

Improved pain treatment … A unique combination of commonly prescribed pain medications is more effective than conventional methods for controlling postoperative pain in patients recovering from total knee- or hip-replacement surgery, according to a *UC Irvine College of Medicine* study. Conducted by *Harry Skinner*, professor and chair of orthopedic surgery, the study found that patients taking a specific combination of analgesic drugs during recovery reported feeling less pain and had a significantly reduced need for opioid drugs like morphine. In addition, patients recovered more quickly, shortening their hospital stay.

Hollywood and tobacco … First-run movies from Disney, Time Warner and Sony have delivered 56 percent of pro-tobacco impressions to U.S. children and teens since 1999, according to a new*UC San Francisco* study. The five-year analysis of more than 775 U.S. movies also shows nearly 80 percent of PG-13 films and 50 percent of G and PG rated movies contain smoking. It's the first to survey tobacco content in all Hollywood releases over five years. Study co-author *Stanton Glantz*, professor of medicine, said public health authorities have tried to educate the studios for 10 years with little effect and suggests a policy solution, the R rating, is needed to get smoking out of kid-rated movies.

Detecting disease … People may soon learn if they have an infectious disease or have been exposed to a bioterrorist pathogen, even before they develop symptoms. Rapid diagnoses one to two days after infection, rather than waiting one or even two weeks for symptoms to appear, are a goal of a new Biosignatures Consortium started by *Lawrence Livermore National Laboratory* and colleagues. The aim of the consortium is to provide the earliest possible diagnosis of infection, whether it's an emerging disease, known disease or bioterrorism threat. Initially, the consortium plans to study whether diseases can be detected in humans through molecular signatures caused by the diseases even before symptoms develop. Another early focus would be to determine whether bacterial infections can be differentiated from viral infections.

Patent donated … *UC Santa Barbara* announced that it has donated rights to a patent that covers the novel use of an established class of cardiovascular medicines as a potential new drug against a global parasitic disease. The Institute for OneWorld Health, a San Francisco nonprofit pharmaceutical firm, will use the UCSB discovery to accelerate drug development for treatment of schistosomiasis. Two UCSB researchers discovered that calcium channel blockers may be an inexpensive alternative for controlling schistosome infection, a serious global health problem that afflicts more than 200 million people annually in developing nations.

DEVELOPMENT AND DISCOVERIES

Two new elements … Scientists at the *Lawrence Livermore National Laboratory*, in collaboration with researchers from the Joint Institute for Nuclear Research in Russia, have discovered the two newest super heavy elements, element 113 and element 115. In experiments conducted with a Russian cyclotron, the scientists observed atomic decay patterns, or chains, that confirm the existence of element 115 and element 113. In these decay chains, element 113 is produced via the alpha decay of element 115. The discovery expands the fundamental principles of chemistry.

Pulmonary fibrosis and heart disease … A new study from *UCLA* and colleagues shows that patients with pulmonary fibrosis, a progressive lung disease, are more likely also to develop heart disease. The study may lead to a greater understanding of both diseases and the role of inflammation, as well as help develop new treatments. The study showed that patients with pulmonary fibrosis were four times more likely to have extensive coronary artery disease compared with patients without this type of lung condition. This is the first study of its kind, and researchers note that pulmonary fibrosis and coronary artery disease may prove very similar – both cause inflammation that leads to scarring and/or plaque development.

Born to smoke … Why are some people hopelessly addicted to cigarettes, while others seemingly can quit at will? A *UC Irvine College of Medicine* study reveals for the first time the underlying brain mechanisms that link personality traits to nicotine addiction. It has been long established that hostile personality traits are related to cigarette dependency and smoking cessation difficulties. Now UCI researchers have found that in people who have aggressive personalities nicotine triggers significant brain activity in the areas that help control social response, thinking and planning. In turn, non-hostile people showed no brain activity increases at all to nicotine. These findings suggest that some people are born with a predisposition to cigarette addiction and helps explain why quitting for some is practically impossible.

Science outreach … The *California Nanosystems Institute* at *UC Santa Barbara* has been awarded a $2 million educational outreach grant from the National Science Foundation. With the grant, the institute will work with local community colleges and high schools to increase the number of students who complete undergraduate degrees in science, technology, engineering and mathematics. It will address the issues of education, mentorship and retention for students in the science and engineering disciplines that underpin work in nanosystems. The institute is a partnership between UCSB and *UCLA*.

THE CUTTING EDGE

Fighting car smog … The nation's largest station car project using advanced technology vehicles is being tested in Irvine. Managed by *UC Irvine's National Fuel Cell Research Center*, ZEV-NET offers commuters zero- and low-emission Toyota vehicles to get from the commuter train station in the Irvine Transportation Center to their job. Once there, fellow employees share the cars during business hours. At the end of the business day, the cars are driven back to the transportation center, where they may be used by a returning Irvine resident for the commute home. ZEV-NET eliminates the pollution associated with a one-person-per-car freeway commute, and solar panels and fuel cells at the transportation center generate zero-emission electricity on site to charge the electric vehicles.

Transplanting tissue … Researchers at *UC Davis* and colleagues have successfully produced monkey sperm by transplanting tissue from the testicles of rhesus macaque monkeys onto the backs of mice in a study that has implications for biomedical research, human medicine and endangered-species conservation. The researchers took small tissue fragments – less than one millimeter in diameter – from the testicles of sexually immature rhesus macaque monkeys and grafted them onto the backs of male mice. In as little as seven months, the grafts began to produce mature sperm. The sperm was used to fertilize eggs from rhesus macaque monkeys, demonstrating that it was capable of supporting embryo development.

Patient safety … Nearly five years after an Institute of Medicine report put medical mistakes on the public's radar screen, two *UC San Francisco Medical Center* physicians have published a groundbreaking discussion of why errors occur and what health care providers and leaders must do to cure this epidemic. *Internal Bleeding: The Truth Behind America's Terrifying Epidemic of Medical Mistakes* was written by *Robert M. Wachter*, also a UCSF professor of medicine, and *Kaveh G. Shojania*, a UCSF assistant professor of medicine, pioneers in a case-based approach to teaching doctors, nurses, administrators and patients about medical mistakes. The book includes a checklist of questions that patients should ask their hospital, doctor, or health plan to be sure their providers are focusing on patient safety.

Next-generation computers … With a three-year, $4.2 million U.S. defense department grant, *Los Alamos National Laboratory* scientists will try to predict how the supercomputers of the future will perform. They will look at performance analysis and modeling, system architecture analysis, software tool creation and networking evaluations. Los Alamos was selected because of its expertise in advanced supercomputer architectures, including pioneering work in performance modeling.

PLANET AND ENVIRONMENT

Satellite data … Finding better ways to handle satellite data as it pours down to Earth is the aim of the GeoStreams research project at *UC Davis*, funded by an $800,000 grant from the National Science Foundation. Satellites produce huge amounts of image data daily. That volume will rise as a new generation of weather satellites are launched over the next decade, said *Susan Ustin*, director of Davis' *California Space Institute* and a principal investigator on the grant. Usually, the data is stored and processed to pull out information of interest. More effort needs to go into extracting data in real-time and processing it on the fly, she said. Faster processing of satellite data would be especially useful for following fast changing events such as storms.

Laser guide … A team of astronomers affiliated with *UC Santa Cruz's Center for Adaptive Optics* have obtained sharp, twinkle-free images of the faint dusty disks of distant massive stars using a recently mounted laser guide star system at Lick Observatory. The images clearly show that stars two to three times larger than the sun form in the same way as solar-type stars – inside a swirling spherical cloud that collapses into a disk, like that from which the sun and its planets emerged. Without adaptive optics, the astronomers – from *UC Berkeley*, *UC Santa Cruz*, *Lawrence Livermore National Laboratory* and Caltech – would see a fuzzy blob from the ground and could be unable to detect any of the fine structure around the sources.

Airborne bacteria … They're finding botulism-causing bacteria in the air near Davis. In other cities, they're finding Escherichia coli and cousins of the bacteria that causes anthrax. But they're not alarmed. It's all part of the first nationwide census of naturally occurring airborne bacteria, a $1 million study funded by the federal department of homeland security and conducted by researchers at *Lawrence Berkeley National Laboratory's Center for Environmental Biotechnology*. Their goal is to catalog the thousands of types of bacteria drifting and swirling in the nation's cities, and how each bacterium's relative concentration changes week by week. When completed, the census will help researchers differentiate between natural and suspicious fluctuations in airborne pathogens, which can help deter false alarms. It will also help scientists refine tests that identify disease-causing bacteria. The census relies on air samples culled from about 300 air monitors positioned in 30 U.S. cities and surrounding areas.

INSIGHTS ON SOCIETY

End-of-life care … Physicians have five areas of opportunity to be of service to family members caring for patients at the end of life, according to a *UC San Francisco Medical Center* palliative care expert. These interventions include promoting good communication with family members, encouraging appropriate advance care planning and decision-making, supporting home care, demonstrating empathy for family emotions and relationships, and attending to family grief and bereavement, says *Michael Rabow*. With the aging U.S. population and increasing number of diseases managed over many years in outpatient settings, physicians need training in how to assist families with end-of-life care, he says.

Studying ADHD … A $900,000 federal grant will help researchers at *UC Berkeley* understand the economic issues and policy decisions surrounding the use of medications to treat attention deficit hyperactivity disorder, the most commonly diagnosed behavioral disorder in children today. More than 3.5 percent of school-age children in the country are diagnosed with ADHD, and more than half of them regularly take psychostimulant medication, predominantly Ritalin or its longer-acting formulations. Between 1990 and 2001, the number of people, mostly children, diagnosed with ADHD grew fivefold from 900,000 to 4.5 million, with a concurrent growth in the use of psychostimulant medications to treat the disorder. The research is expected to provide data so that parents, educators and clinicians can better meet the needs of children with ADHD.

Countering spam … Although *UC Santa Cruz* computer scientists are hopeful about the prospects for eventually bringing the plague of computer spam under control, they say relief is likely to come slowly. Eliminating spam is difficult, one reason being it's hard to precisely define spam, says *Martin Abadi*, professor of computer science and an expert on computer security issues. But he said he's somewhat optimistic on controlling it. Filters are currently the main weapon in the war on spam, but their effectiveness is limited by the ability of spammers to counter the filtering technology. Filtering at different levels of the network will always be necessary, but other approaches, both legal and technological, will also be needed to win the war on spam, says the researchers.

LOOKING TO THE FUTURE

Snow-penetrating radar … A concept for a snow-penetrating radar device has been patented by research scientists and engineers at *UC Davis' Advanced Highway Maintenance and Construction Technology* research center. The radar system is being developed as part of a project aimed at automated operation of snowblowers, allowing them to locate and avoid objects buried within snowbanks. The patent sets out concepts for combining a narrow beam with a signal frequency that can penetrate up to six feet into the snowbank and provide the driver with an intuitive image of buried objects. Snow-penetrating radar could potentially also be used for avalanche rescue.

New research center … *UC San Diego* has announced the creation of the Kavli Institute for Brain and Mind, a new research center that crosses academic disciplines to explore the relationship of the brain's cellular make-up and the resulting behaviors of the mind. The institute is funded through a $7.5 million endowment from the Kavli Foundation of Oxnard. Institute members will work together to address many of the central questions of the field, such as how genetics influences behavior, how brains repair themselves, the biochemical mechanisms of memory and the neural bases of learning, consciousness, memory and attention.

Technology transfer … A consortium of 15 major universities and nonprofit research institutions in Southern California – including *UC Irvine*, *UCLA*, *UC Riverside*, *UC San Diego* and *UC Santa Barbara* – have formed Network T2, which is aimed at connecting research innovations with the marketplace. It will seek to attract federal and corporate funds to California to stimulate commercialization. The member institutions, which include Caltech, USC and the Beckman Research Institute, generate more than $2.23 billion each year in R&D, forming one of the world's largest research networks and one of the nation's leading engines of economic growth.

Nano development … *UC Irvine* scientists have found that dynein – an enzyme that, like a molecular "cargo truck," transports cellular parts within a cell – operates with the biological equivalent of an automatic transmission system that shifts gears to adjust to its external load. Along with providing new details on how molecular objects move inside a cell, this may help scientists develop microscopic nanotechnologies that can make similar adjustments when moving through the human body.

KUDOS

Most cited researchers … The Institute for Scientific Information recognized 11 *UC Riverside* scientists as among the world's most highly cited researchers for making fundamental contributions to the advancement of science and technology between 1981-1999. Researchers are listed in 21 broad subject categories including life sciences, medicine, physical sciences, engineering and social sciences. These researchers are the most highly cited in each category and comprise less than one-half of 1 percent of all publishing researchers. The UCR researchers are *Janet Arey*, *Roger Atkinson*, *Rajiv Banker*, *Laxmi Bhuyan*, *William Carter*, *William Frankenberger*, *William Jury*, *Noel Keen*, *Albert Page*, *Natasha Raikhel* and *Nickolas Waser*.

Patent leader … For the 10th consecutive year, the *University of California* is the leader among the nation's universities in developing new patents, according to a report from the U.S. Patent and Trademark Office. The report, presenting a preliminary list of the U.S. universities receiving the most patents for invention during the 2003 calendar year, found that UC recorded 439 patents. Academic researchers and their inventions are integral to the progress of the science and technology that strengthen the economy, create new jobs and enhance the health and welfare of Americans, noted Jon Dudas, acting under secretary of commerce for intellectual property.

President, University of California

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