

## Research at San Diego State University Thrives

In spite of the challenges the budget situation creates, one area has continued to thrive. **SDSU faculty and staff, in the midst of a devastating budget crisis, were successful in attracting almost \$134 million in research grants and contracts during the 2008-09 year**, a \$3 million increase over the previous year.

## SDSU Researchers Improve Health and Save Lives

SDSU researchers secured a record number of awards from the National Institutes of Health (NIH), the primary federal agency for conducting and supporting medical research. Some examples:

NIH's National Cancer Institute funded chemistry professor **Shelli McAlpine's** work developing potent new anti-cancer agents. Her research addresses the urgent need to create an anti-tumor agent that can target drug-resistant cancers. SDSU's Technology Transfer Office has filed three patents to protect the anti-tumor compounds Dr. McAlpine has developed to allow for their eventual development into life-saving drug therapies.

An alarming but important study conducted by public health researcher **Dr. Joni Mayer** found that in the largest U.S. cities, the number of indoor tanning salons was higher than that of Starbucks or McDonald's. Her work is also funded by the National Cancer Institute.

Psychologist **Jim Sallis** published a study in the American Journal of Preventative Medicine which found urban dwellers are twice as likely to be physically active as those in the suburbs. The biggest single factor influencing physical activity world-wide is accessibility to sidewalks. The National Heart, Lung, and Blood Institute, The Robert Wood Johnson Foundation, Emory University, and Seattle Children's Hospital all contributed to Dr. Sallis' research program.

The Muscular Dystrophy Association joined NIH in providing support for biologist **Sanford Bernstein's** studies on myosin, the most common protein in muscle cells. Mutations in myosin can cause heart disease and skeletal muscle diseases. Dr. Bernstein's work could prevent myosin dysfunction/degradation and improve muscle structure and performance.

## Science Foundation Awards Increase

Last year saw an increase of more than \$1 million in awards to SDSU from the National Science Foundation, the federal agency that supports all fields of fundamental science and engineering research and education. For instance:

In the Solomon Islands, where in 2007 an 8.1 earthquake caused a devastating tsunami, anthropologist **Matthew Lauer** is working with an international multidisciplinary research team to examine and measure the social and ecological impact of large-scale environmental events. The results of this study will provide new methods for enhancing the ability of local communities to adapt to unpredictable events and ecological changes, especially those caused by natural disasters.

**Dr. Elizabeth Waters'** NSF-funded work focuses on the origin of land plants and the heat shock response. This response is found in nearly all organisms making it among the most ancient of biological processes. Dr. Waters' studies will provide important insights into the evolution of this crucial process.

**Dr. Fridolin Weber** and his physics students are exploring the properties of neutron stars which possess powerful electric and magnetic fields, rotate at incredible speeds, and have

temperatures much greater than the sun's. A thimble full of the matter contained in neutron stars would have a mass of one billion tons. Because of these most extraordinary properties, neutron stars have become fascinating laboratories for nuclear, particle, and astrophysicists. They hold the key to our understanding of the properties of matter at the most extreme physical conditions imaginable.



## Partnerships

**This year SDSU commemorated the 200th anniversary of the birth of Charles Darwin, who said this about the value of partnerships:** *In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed.*

The following collaborations highlight the important relationships between SDSU faculty and their academic, industrial, and military partners.

SDSU faculty and staff conduct joint research with their colleagues at other esteemed institutions from California (UCLA, Berkeley, USC) to the east coast (Duke, Emory, Boston University) and worldwide (Afghanistan, Italy, Japan).

The Comprehensive SDSU-UCSD Cancer Partnership builds on the long history of collaboration between San Diego State University and the University of California at San Diego. **Dr. Elizabeth Klonoff** and **Dr. Stanley Maloy** direct SDSU's component of this \$15 million program which studies why some ethnic groups have higher rates of certain cancers and trains minority students for careers in the field of cancer research.

## Industry Relationships Add Value To SDSU Programs

Biochemist **Tom Huxford** studies the X-ray crystal structure of a sphingosine-1-phosphate in complex with a humanized monoclonal antibody fragment, marking the first time that interfacial metals have been directly observed to bridge an antigen antibody complex. This work is carried out by students in Dr. Huxford's Structural Biochemistry Laboratory in collaboration with the San Diego-based pharmaceutical company Lpath Inc.

**Dr. David Pullman** works with corporate sponsor PURE Bioscience to develop new ways of synthesizing and manipulating silver nanoclusters to deposit them on glass or other surfaces. This could produce long-lasting anti-bacterial/anti-fungal/anti-viral films.

The Colgate-Palmolive Company provided support for a laser Doppler fluxmeter to be used in **Dr. Roberta Gottlieb's** lab. Her research is establishing a causal relationship between periodontal disease and atherosclerosis.

SDSU's Computational Science Research Center facilitates cooperation between the university and industry researchers in applied mathematics, computer science, astronomy, physics, geophysics, and engineering. Last year, director **Dr. Jose Castillo** and his colleagues **Dr. Paul Paolini** and **Dr. Marie Roch** received support from NIH, Medical Instrumentation and Diagnostics Corporation, and UCSD to support their work training the new interdisciplinary workforce.

## MESSAGE FROM THE PRESIDENT

### SDSU Partners with the Military

SDSU and the U.S. Navy partnered on a First Responder Technology Demonstration to assess the technical challenges of operating effectively during crises such as earthquakes, pandemics, and wildfires. One of five demonstration sites nationwide, SDSU teamed with SPAWAR to evaluate new technologies and to discover potential solutions for communications gaps during a disaster.

**Dr. Eric Frost** led the successful effort.

**Dr. Maryann Lyman-Hager**, director of SDSU's Language Acquisition Resource Center, and her colleagues train U.S. Marines, Navy SEALs, and ROTC personnel in critical foreign languages like Iraqi dialect and Pashto, and the culture of the countries to which these soldiers will be deployed.

**Dr. Caren Sax**, director of SDSU's Interwork Institute, leads the Military Family Support 360 Center, a new collaboration among Camp Pendleton families, youth with developmental disabilities, and professionals from related agencies. This program strengthens the capacity of military families to assist their developmentally disabled children and maximize their independence, productivity, integration and inclusion into the community.

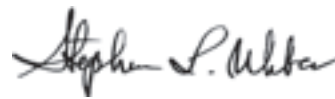
### Research Environment Flourishing

SDSU's second Student Research Symposium held last spring was a considerable success with 359 students presenting oral and poster sessions. The symposium provides a venue for recognizing and

sharing the academic excellence of SDSU students and demonstrates the university's commitment to provide students with exceptional research opportunities.

Our university has become nationally recognized for achievements in research and was ranked **the most productive small research university in America** (based on the Faculty Scholarly Productivity Index\*, which ranks universities with Ph.D. programs) **for the third year in a row**. This accomplishment is especially notable during a year of federal, state, and CSU system-wide cutbacks.

SDSU will eventually emerge from the current budget crisis; when we do, I am confident our research portfolio will remain a fundamental driver of excellence at San Diego State – attracting great faculty and staff, challenging students, and serving our society. My thanks and congratulations go to the scholars in this report who are developing innovative solutions for our region, the nation, and the world.



Stephen L. Weber, President

\* Fundamental Data provided by Academic Analytics, LLC



## MESSAGE FROM THE VICE PRESIDENT

Two cities, both living beyond their means. One, hobbled by a dysfunctional legislative system where the will of the majority is bent to that of an intransigent minority, imposes massive spending reductions. The other overspends because it can, because it can run presses and sell the paper to nations whose leaders still trust the number printed on it.

It is the worst of times for those who rely on Sacramento, the best for those who look to Washington.

SDSU is managing a massive reduction in state support. More than 600 faculty and staff have been lost; enrollment will decline 10.8%; faculty, staff and administrators are taking a 10% reduction in already astringent salaries; the faculty who drive the research agenda are being lost without replacement. Loud, energetic rallies are held, not to restore funding, but to establish a line of defense against further reductions.

Yet, the Research Foundation is enjoying a period of growth. It has liquidated properties, benefited from its investments, and administered the awards of a research-active faculty hired during the window of prosperity between the recessions at the beginning and end of this decade.

The dichotomy between state and federal resources is redefining the alliance between SDSU and its Research Foundation. SDSU is being forced to compromise its commitment to the future of California by leaving thousands uneducated so that other thousands may remain incarcerated, a formula for cultural dissipation. The Research Foundation is being nourished by the American Recovery and Reinvestment Act (ARRA), invigorated by an ambitious faculty who generate from extramural sources, on average, twice their own salaries.

And so resources flow, during this period, from the Research Foundation to the University. The RF is sharing in University

costs, moderating University leases of its space, and patching cracks in the University's research infrastructure.

It will not always be so. The faculty who collectively generate these resources represent declining numbers; the ARRA, successful or not, will end in months to be replaced by an ethos of deficit reduction that does not favor discretionary spending on basic research. The balance between our two institutions, each raising the other to scholarly and financial levels not seen before, must be restored by enlightened legislation and private philanthropy if SDSU and its RF are to thrive in this century's second decade.

But for the moment we celebrate a year of unprecedented research achievement and financial success documented in the pages that follow. Extramural funding is robust; we have taken full advantage of ARRA funding; the BioScience Center is thriving; publications are at historic highs. These are tributes to SDSU's talented faculty and to the exceptional financial management offered by the RF. For now, it is enough to take satisfaction in that over which we have control.



Thomas R. Scott  
Vice President for Research and Graduate Dean, SDSU

