

FUSION

SDSU COLLEGE OF SCIENCES

fusion |'fyoō zh ən|

noun

the process or result of joining two or more things together to form a single entity : *a fusion of an idea from chemistry and an idea from psychology* | *the chemistry of emotion.*

- new hope for the heart : the links between cardiovascular disease and inflammation resulting from infection.
- the process of causing a material or object to melt with intense heat, esp. so as to join with another : *physics' and astronomy's study of atomic and nuclear reactions that fuels stars.*
- a mixture of different mathematical styles, esp. deterministic and stochastic.

adjective

referring to curriculum that incorporates elements of diverse disciplines : *their fusion fare includes a bit of biology, geology, and computer science.*

DERIVATIVES

fusional |- zh ən| adjective

ORIGIN mid 16th cent.: from Latin **fusio(n)**, from **fundere** 'pour, melt.'



SAN DIEGO STATE
UNIVERSITY

FUSION

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SAN DIEGO STATE
UNIVERSITY

The background of the entire page is a faded, sepia-toned photograph of the San Diego State University (SDSU) campus. It shows several large, multi-story buildings with classical architectural features like arches and columns. In the foreground, there are palm trees and a road with some vehicles. The overall tone is warm and institutional.

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FUSION IS PROGRESS

*Background image
courtesy of Laboratorio
Nacional de Fusión,
part of the Centro de
Investigaciones Energéticas,
Medioambientales
y Tecnológicas*



MESSAGE FROM THE DEAN

DR. PATRICK PAPIN (INTERIM)

As tide and time will have it, the college has experienced an interesting evolution. You last heard from us around three years ago through our formal publication, "Sciences Review." In the spirit of change, adaptation, and coalescence, "Sciences Review" has changed to "Fusion." Our new publication represents our continued commitment of striving towards excellence as we blend teaching, research, and innovation into a strong academic foundation with the pursuit of enhancing lives. Fusion defines our direction as we stand, merge, and move forward together to plan future growth that will allow us to better serve our students and goals of the college.

On the following pages, you will learn of the major news and accomplishments of our departments, programs, and centers. Notably, two major long-term plans came to fruition during the past year. In March, we saw the opening of the BioScience Center, a unique facility to explore the link between

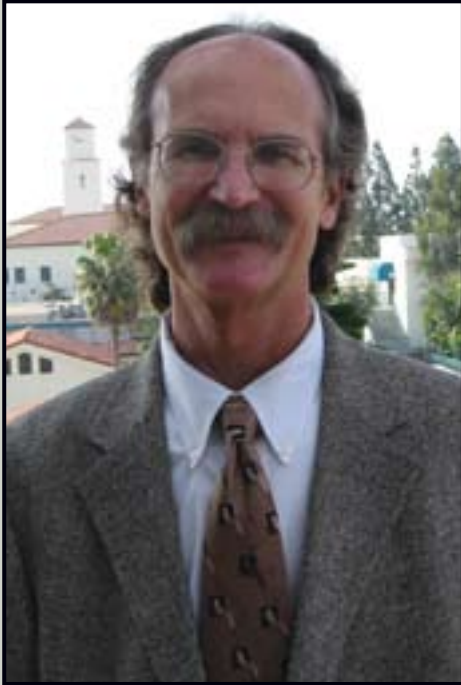
infection and heart disease— and to find ways to defeat it. Second, was the arrival of the Nu Plasma 1700, a high-resolution mass spectrometer used to identify the proportions of isotopes of an element. Our Nu 1700 is the second of its kind in the world, and first in North America.

Within this inaugural edition of Fusion, you will have the opportunity to hear from various students, faculty, and staff describing their experiences here at the university and abroad. As you review our new publication, you will come away with a sense of where we have been and a glimpse of where we are headed.

Come join us on our concrescent journey.

A handwritten signature in blue ink, reading "Patrick Papin".

INTRODUCTIONS ARE IN ORDER



COLLEGE OF SCIENCES NEW DEAN STANLEY MALOY

Dr. Stanley Maloy will start his appointment as the new dean of the college on July 10. Dr. Maloy has already been active in promoting the research and education goals of the college through his work on the development of our new BioScience Center. He has also served as director of the college's Center for Microbial Sciences and Center for Applied and Experimental Genomics. He is currently the president of the American Society for Microbiology, a nationwide organization with more than 42,000 members. Prior to joining SDSU in 2002, Maloy was the director of the Biotechnology Center at the University of Illinois, Urbana.

Dr. Maloy has won numerous teaching-excellence awards and is a leading researcher in his field. His research includes bacterial genetics, phage biology, microbial physiology, microbial pathogenesis, and genomics. His work could help lead to better detection and identification of bioterrorism agents and finding new ways to fight problems ranging from antibiotic-resistant bacteria to food-borne illness. Dr. Maloy is a native San Diegan and received his Ph.D. in molecular biology and biochemistry from the University of California, Irvine.

THOMAS SCOTT NAMED VICE PRESIDENT FOR RESEARCH

Dr. Thomas Scott, who served as dean of the College of Sciences at SDSU since 2000, was appointed vice president for research in the fall of 2005. Scott said, "the additional position presents exciting challenges. San Diego State has exceeded the research expectations of a traditional CSU, yet research and scholarship are not in full parity with the teaching mission of the university. My goal is to raise the research profile and to establish circumstances in which faculty members will have the time and resources to become leading scholars in their disciplines."

Previous to Scott's tenure at SDSU, he served as a professor of psychology at the University of Delaware, where he also held positions as department chair of psychology and associate dean for research and graduate studies in the College of Arts and Letters. Scott, a neuroscientist, has published extensively, received numerous federal research grants, and served as president of professional organizations related to his discipline. He holds a bachelor's degree from Princeton University and a doctorate from Duke University.





Kathleen McGuire Appointed Interim Executive Director of CSUPERB

Kathleen McGuire accepted the position of the interim executive director of the California State University Program for Education and Research in Biotechnology (CSUPERB), replacing A. Stephen Dahms.

She said she's looking forward to serving CSUPERB as we search for a new executive director and helping the new leader meet the challenges and enhance the rewards that are a part of this dynamic organization.

Created in 1987, CSUPERB is a multi-campus program that integrates system-wide resources and catalyzes interdisciplinary, inter-campus endeavors involving biology, chemistry, engineering, agriculture, and computer science. CSUPERB serves as liaison between the CSU and industry, government, Congressional Biotechnology Caucus, and the public in biotechnology matters.

McGuire received her Ph.D. from the University of Texas Health Science Center in Dallas. As a professor of biology at SDSU, she continues to guide graduate and undergraduate students in research. She was a recipient of the Fulbright Lecture/Research Scholarship Award in 2004.

DAHMS DEPARTS



Stephen Dahms (left) is presented an award of appreciation at the 2006 CSU Biotechnology Symposium

Dr. A. Stephen Dahms, a member of the BIOCOM Board of Directors; executive director of the California State University Program for Education and Research in Biotechnology (CSUPERB); and director of SDSU's Center for Bio/Pharmaceutical and Biodevice Development (CBBD), accepted the position of president and CEO of the Alfred E. Mann Foundation for Biomedical Engineering (AEMFBE).

Alfred E. Mann, an industrialist-philanthropist who made his fortune in a number of very successful aerospace and biomedical companies, created the AEMFBE in 1996. He committed the vast bulk of his estate to the foundation, which in its first \$2 billion phase, will be creating 12 to 15 new biomedical applied research and development institutes at selected U.S. universities.

Dr. Dahms will oversee the creation and operational elements of these biomedical translational research and commercialization Alfred Mann Institutes (AMIs) that will be funded at \$150 million to \$200 million each.

Dahms came to SDSU in 1972 and was a tenured member of the chemistry department. For the last six years, he held a management position in the 23-campus CSU System at the helm of CSUPERB, an organization he spearheaded in 1985 and has lead from that time.

Since 2004, Dahms has been chair of the 12-member national AMI Selection Committee that selected 16 universities early in 2005 as potential sites for an AMI. The first 16 universities include Stanford, CalTech, Penn, Boston University, Michigan, Purdue, Minnesota, Utah, Duke, North Carolina, Georgia Tech, Johns Hopkins, Case-Western Reserve, and Washington, as well as the Technion University— the Israeli equivalent of M.I.T.

While Dahms is resigning from a number of board positions, including BIOCOM, he remains active with several other boards, including the new CONNECT Board of Directors and the Rees-Stealy Research Foundation Board.



THE CENTER FOR RESEARCH IN MATHEMATICS AND SCIENCE EDUCATION

DR. KATHLEEN FISHER, DIRECTOR
DR. DONNA ROSS, ASSOCIATE DIRECTOR

Commission, and Qualcomm. CRMSE members won numerous awards and served in national roles.

Members and associates are active in research, teaching, and professional development. You might find them in their offices on Alvarado Road, out in public schools, in the field with students, or teaching classes on campus. CRMSE provides a base for busy scholars to collaborate and share ideas.

In addition to its support of faculty research efforts, CRMSE also houses the SDSU-UCSD Mathematics and Science Education Doctoral (MSED) Program. All doctoral students have office space at the center and many conduct research there. Six doctoral students were recently accepted to begin in the 2006-07 academic year.

CRMSE often hosts colloquia by prominent researchers and informal brown bag discussions of current research in math and science education. Anyone interested is invited to participate. For more information, please see our website. [http:// www.sci.sdsu.edu/CRMSE](http://www.sci.sdsu.edu/CRMSE)

Advancing mathematics and science education is the purpose of the Center for Research in Mathematics and Science Education (CRMSE), an interdisciplinary community of scholars. This is achieved through leadership in research, materials and program development, and professional development for K-16 educators. Director Kathleen Fisher is from the College of Sciences and Associate Director Donna L. Ross is from the College of Education. In September, Ricardo Nemirovsky takes over as the new CRMSE director.

CRMSE's 28 members include faculty from the departments of Mathematics & Statistics, Biology, Geological Sciences, Physics, and Psychology in the College of Sciences, and from the School of Teacher Education and Policy Studies in the College of Education. The center has seen steady growth since its inception in 1985. Current-funded projects employ approximately 45 full- and part-timers, in addition to student assistants.

Selection of members and associates is based on evidence of scholarly activities and serious interest in the field. Many faculty members who work at CRMSE are nationally known researchers with extramural funding from a variety of sources. Some of the agencies supporting this research are the National Science Foundation, Office of Naval Research, Ford Foundation, California State Department of Education, San Diego County Office of Education, California Postsecondary Education



FIELD STATION NEWS

Sedra Shapiro stepped down as executive director of Field Station Programs at SDSU to become the director of Science and Technology Analysis and Strategy at the San Diego Foundation.

<http://www.sdfoundation.org>

Ms. Shapiro was elected as president of the Organization of Biological Field Stations and Marine Labs (OBFS/ML) for a two-year term beginning April 1, 2004. The OBFS/ML represents 180 field stations throughout the U.S. dedicated to supporting and facilitating modern field biology. As executive director of the SDSU Field Station Programs, she was involved in all aspects of the development, administration, and management of the Field Station

Programs and managed facilities, financial resources, and staff for SDSU's four reserves.

Serving as interim executive director following Ms. Shapiro's departure is Dr. Matthew Rahn, who is also the new SDSU Santa Margarita Ecological Reserve director. Dr. Rahn received his Ph.D. in ecology from the SDSU/U.C. Davis joint doctoral program in 2005.

Congratulations James Starrett, recipient of an SDSU Field Station Programs Graduate Student Research Award. James is pursuing a master's degree in evolutionary biology. The \$2,500 award supports his research on heat shock proteins in spiders from the Fortuna Mountain



Sedra Shapiro

Research Reserve, the Santa Margarita Ecological Reserve, and the Sky Oaks Field Station. James is supervised by Dr. Liz Waters with assistance from Dr. Marshal Hedin.

NEW DIRECTOR APPOINTED TO MICROCHEMICAL CORE FACILITY

Joan Chen is the new director of the Microchemical Core Facility at San Diego State University. Chen, who earned her Ph.D. at UCLA, has been working in the bioinformatics field for more than five years, specializing in areas such as microarray and proteomic data analysis, and comparative genomic analysis. Her research interests include studying transcriptional regulatory networks in plant stress response and genome-wide mapping of transcription factor binding sites using experimental and computational approaches.

NEWS FROM PERL

After years of training coastal wetland restorationists, the Pacific Estuarine Research Lab (PERL) moved from the SDSU campus to the Tijuana Estuary Visitor Center. Michelle Cordrey and Michael Keinor continue to monitor environmental conditions at the estuary, which is also an auxiliary field station of SDSU. Although now at the University of Wisconsin-Madison, Joy Zedler maintains her salt marsh research program at the estuary. This year, three UW doctoral students are involved in field studies, explaining how topographic heterogeneity adds diversity to salt marshes and accelerates development of their restoration. NSF funds research at this valuable site.



ELECTRON MICROSCOPE FACILITY

DR. TERRY FRY, DIRECTOR

DR. STEVEN BARLOW, ASSOCIATE DIRECTOR

San Diegans of all ages have the opportunity to marvel at the wonders revealed by microscopes and telescopes. "Inner Space/Outer Space," an annual event created by Steve Barlow, SDSU staff scientist who serves as associate director of the SDSU Electron Microscope (EM) Facility, is a chance to get a close up view of the university's research and science education laboratories.

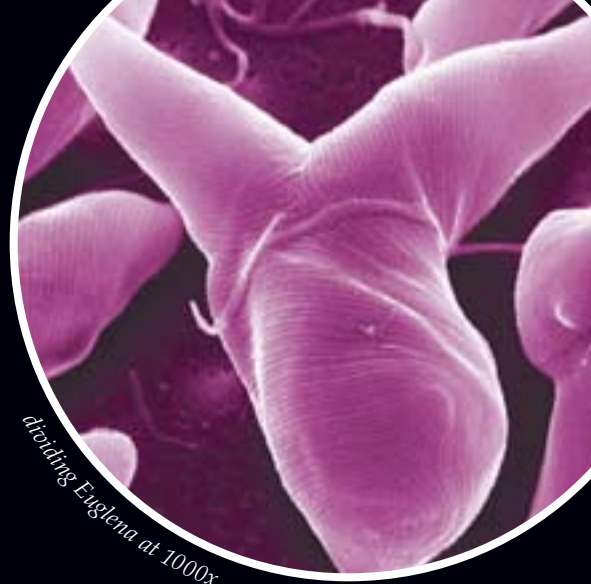
Visitors see plants and creatures magnified as much as 100,000 times on Barlow's transmission and scanning electron microscopes and specialized light microscopes. The lab's new computer-controlled transmission electron microscope, with a digital imaging system and fully-motorized tilting stage, can also create 3-D models from tilted slices of samples.

Those more interested in looking outward rather than inward can take advantage of the resources of the astronomy program. On the rooftop of the Physics-Astronomy building, several telescopes focus on the stars. A planetarium show demonstrates how San Diegans can identify the patterns of heavenly bodies from their own back yards over the course of a year.

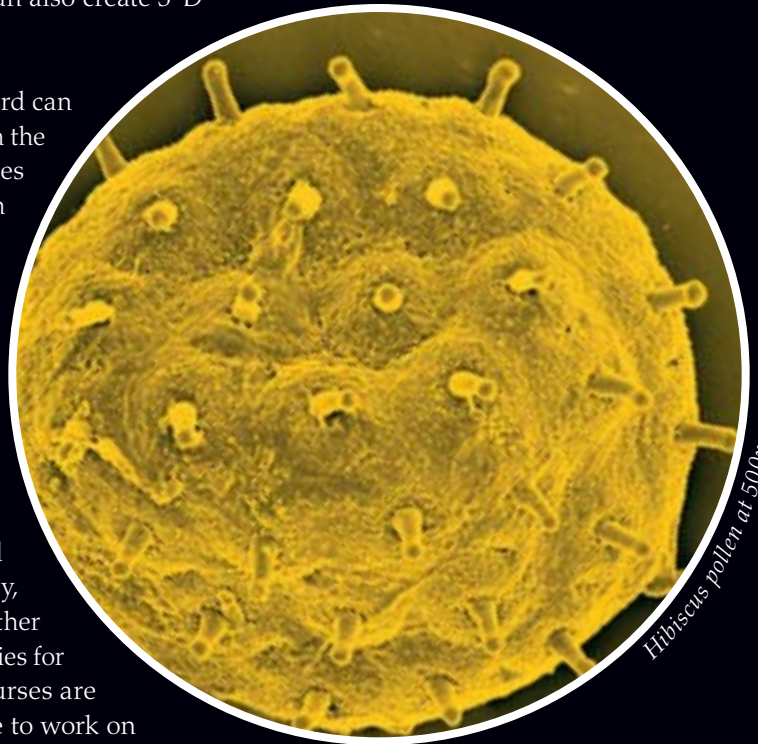
Over the 12 years since the program began, a number of hands-on exhibits from departments throughout the college have been added, bringing richness to Barlow's vision of an event that shows people that science is fun and accessible to all, particularly at SDSU.

Creating and running Inner Space/Outer Space is just a small part of what Barlow does. In addition to running the EM Facility, he teaches classes on using the facility and its equipment. Other universities often don't provide students with the opportunities for hands-on experience. Students who complete Barlow's courses are qualified as research assistants for the facility and are able to work on their own projects, using cells and performing research using the equipment in the EM Facility.

The capabilities of the facility are always changing as Barlow gets funding to acquire new instruments and software, all of which are then available for users. It's not only SDSU students and researchers who reap the benefits of equipment in the EM Facility. Software advances have now made it possible to access both the scanning and the transmission electron microscope from remote locations. For years, students from Clearview Elementary School have viewed their samples on the SEM via a remote link that sends images directly to their classroom and allows them to direct the examination and recording of images of samples they prepared. Summer 2006 marks the debut of the transmission microscope online as well. As a result, Barlow's efforts, teaching and training (core missions of SDSU) extend beyond the physical limits of the campus.



dividing Euglena at 1000x



Hibiscus pollen at 500x



clam sperm and egg at 2500x



FREDERICK

The idea of seeing his alma mater, San Diego State University, explore new frontiers in scientific research brought out the philanthropist in Fred Henry. Fred completed his bachelor of arts degree in 1950 with a strong emphasis in physics, but with a major in psychology. When he learned that SDSU was planning a BioScience Center to study the connections between infections and heart disease, he pledged an estimated \$3 million to permanently fund a director's position. "The BioScience Center would be adrift without his contribution," said Tom Scott, vice president for research at SDSU. "He has given us the capacity to hire the person who will largely define the center's purpose, goals and the funding sources that will support it."

Born October 22, 1923, Fred grew up waterskiing and sailing in San Diego waters. He joined his older brother Bill in adventurous water sports, including using three-foot-long plywood skis in an activity they called "surf skiing." Fred later raced a 38-foot sloop for years as a member of the San Diego Yacht Club. He gave up water skiing in the early 1980s, but snow skied until he was 80.

A heart defect kept Fred out of the military in World War II, so he joined the Merchant Marines. For 27 years, Fred worked at Navy Electronics Laboratory. His specialty was adapting technology to human needs and engineering solutions to communications problems. His projects included the Navy Tactical Data System, which incorporated the first shipboard digital computer. Fred also played an important technological role in improving the Navy's Command Control and Communications Systems. During Fred's tenure at the Navy Electronics Laboratory, he assisted in the development of a cross-polarized lighting system for use at radar and flight control positions and codeveloped an air traffic control visual communication system. Both systems were put into permanent use at Miramar and Radar Air Traffic Control Center installations as they were constructed.

Understanding the potential of wireless technology, he invested early in Qualcomm, the San Diego telecommunications giant. The investment earned him millions. Fred's donation to SDSU created the Frederick G. Henry Chair in Life Sciences. Fred's goal of establishing the chair was to foster and encourage emerging areas of science research at San Diego State University through the recruitment of a highly respected individual to oversee the enterprise as the director.

G. HENRY
1923–2006

SDSU DEDICATES NE

The new \$14.3 million BioScience Center fosters a collaborative research program committed to better understanding the causes of heart disease. Pairing cardiac scientists with microbiologists and experts in infectious diseases, this project focuses on investigating the connections between infections and heart disease. The university's particular approach to attacking heart disease could be unique throughout the world, said Dr. Robert H. Eckel, president of the American Heart Association.

Heart disease is the leading cause of death in the United States. Over 900,000 Americans die of cardiovascular disease annually. The traditional belief is that heart disease is caused by a combination of genetics and environmental factors. More recently however, researchers are looking at the relationship between viral and bacterial infections with heart disease and heart failure.

"Right now, we are on the tip of the iceberg. There are some people here and there who work on this topic, but it's a really big problem that is in dire need of people to understand what's going on," said Stanley Maloy, president of the

American Society for Microbiology, commenting in the San Diego Union-Tribune on the new BioScience Center's interdisciplinary approach. Maloy is also the director of SDSU's Center for Microbial Science.

SDSU's BioScience Center is the first facility built on any California State University campus that will concentrate entirely on research, according to Steve Bloom, chief operating officer for the SDSU Research Foundation. To build the new facility, the San Diego Research Foundation committed \$500,000 annually for 30 years to finance an \$8 million bond. The university is working to raise the rest to complete the second and third floors of the center. So far, SDSU has collected over \$625 thousand through private donations and an additional \$3 million for an endowed chair to pay for the salary of the center's director. A national search is under way and the administrators hope to name the director later this year.

The first researcher to take up residence in the new center is Roger Davis, a heart researcher at SDSU. Dr. Davis' lab is studying how Salmonella bacteria turn off a human gene that protects against heart disease.



Stanley Maloy and Jesse Brooks, Senior Director of Development

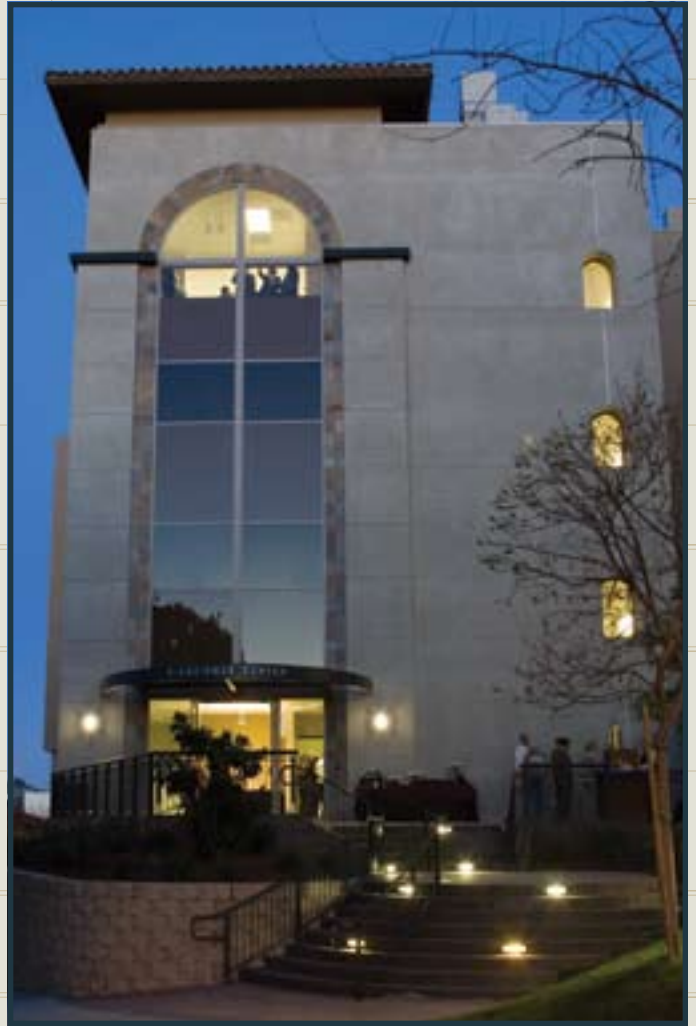


Roger Sabbadini, Paul Paolini, Chris Glembotski, and Marilyn Newhoff

W BIO SCIENCE CENTER



President Weber, Robert Eckel, Roger Davis, and Chris Glembotski



BioScience Center



Gerald & Una Yakatan, Kimberly Heller, Ruth Stern, Linda & Steven Mento



Alan & Debbie Gold

ED CENTER ON COMPUTATION ENGAGES PEOPLE IN CYBERIN

DR. KRIS STEWART, DIRECTOR

For over eight years, the Education Center on Computational Science & Engineering (ECCSE) promoted the use of high performance computing and its support systems at San Diego State University. The ECCSE originally formed in 1997 as a partnership activity with the San Diego Supercomputer Center's National Partnership for Advanced Computational Science Infrastructure (NPACI) grant from the National Science Foundation (NSF). When NPACI ended in 2004, we seized the opportunity for a new partner with Boston University and its efforts to support science education. We received NSF funding as part of the Engaging People in CyberInfrastructure (EPIC) grant, which is one of the first funded projects from the NSF Office of CyberInfrastructure (OCI).

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0520146>

For our participation we proposed researching how to use the current game engines as a platform to develop education modules to support high school science instruction. We collaborated with two science teachers from Hoover High School, a part of the SDSU Education Collaboratory. Mr. Robert North teaches chemistry and Mr. Hal Cox physics. Both teachers were asked to identify a concept from their curriculum, along with its corresponding California State Standard, that they felt would be aided by a three-dimensional, computer-generated interaction module. We also explored the wide world of computer game engines and chose the Torque Game Engine (TGE) from GarageGames.com based on its broad user community, its effectiveness as a development platform on the personal computer, and its attractive cost of \$100 for an Independent Developer License. We also had a partnership with the Visualization Team at the San Diego Supercomputer Center, who used the Torque Game Engine to develop modules to explore science.

Our development team at SDSU included a professor of computer science, Kris Stewart, staff resources specialist, Kirsten Barber, and two computer science majors as programmers, John Nguyen and Skylar Hayes. Our first project was to visualize a simple molecule to demonstrate the power of the nuclear force, a required topic from the California State Chemistry Standard. Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion. As a basis for understanding this concept, students know protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.

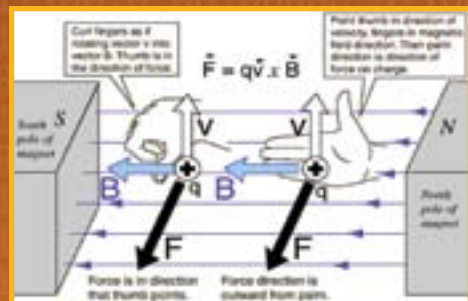
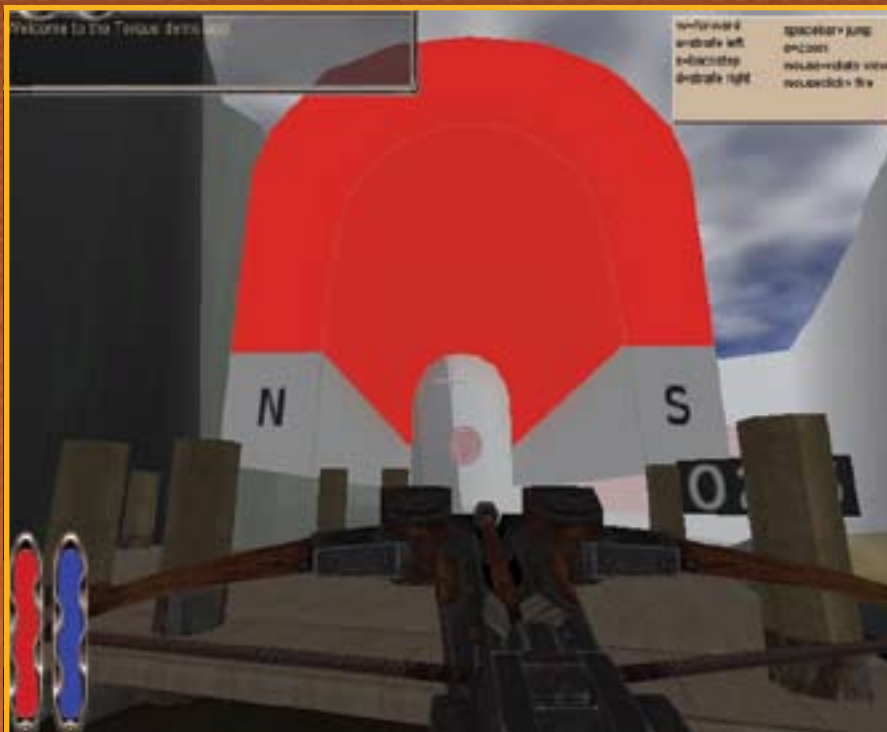
<http://www.cde.ca.gov/be/st/ss/scchemistry.asp>



NAL SCIENCE & ENGINEERING FRASTRUCTURE

After establishing what would be beneficial for Mr. North's students, our student programmers began developing a module for a "Virtual Field Trip to the Lithium Battery." After several iterations with Mr. North, the computer model was refined. The Ed Center team accompanied Mr. North during his presentation regarding our partnership at the August 2005 Chemistry Teacher In-Service workshop for San Diego City Schools.

Mr. North used this module in the computer labs at Hoover High School for his students to learn about nuclear force.



Next we worked Mr. Hal Cox to find an appropriate 3-D model to support concepts his students had difficulty with in physics. Electric and magnetic phenomena, the required topic Mr. Cox selected, are related and have many practical applications. As a basis for understanding this concept, students know the magnitude of the force on a moving particle (with charge q) in a magnetic field is $qvB \sin(a)$, where a is the angle between v and B (v and B are the magnitudes of vectors v and B , respectively), and students use the right-hand rule to find the direction of this force.

<http://www.cde.ca.gov/be/st/ss/scphysics.asp>

Our preliminary modules are available for download to an IBM PC computing platform as a zip-file from Virtual Field Trip to a Lithium Battery:

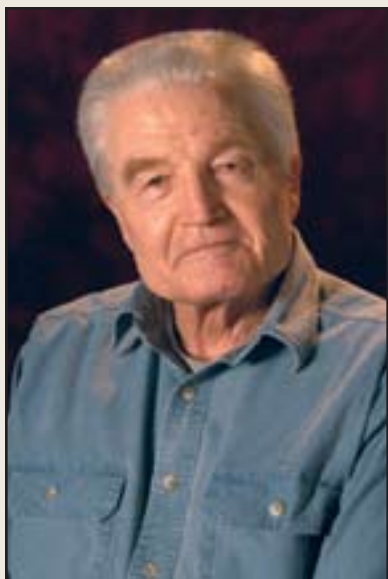
<http://visservices.sdsc.edu/projects/explore/LitBattery.php>

Hosted by the Visualization Services Group at the San Diego Supercomputer Center.



TORQUE
GAME ENGINE

MILESTONES & AWARDS



Dr. Richard Morris



Dr. Diana Verzi

Richard Morris, Ph.D., and Diana Verzi, Ph.D., were chosen to receive Monty Awards, given by the SDSU Alumni Association in recognition of outstanding contributions to the university. Dr. Morris, a professor of physics, came to SDSU in 1957. An exceptional teacher and mentor, he's extremely dedicated to his work and his students—they benefit greatly from

the extensive hands-on

COLLEGE OF SCIENCES SHINES AT SDSU MONTY AWARDS

research opportunities

Morris provides,

funded by numerous

government and corporate

grants. His typically heavy

teaching schedule includes undergraduate and graduate courses, plus supervision of numerous graduate projects.

Representing the Imperial Valley campus, Dr. Verzi, an associate professor, is founder and coordinator of the Mathematics Program there. Her area of expertise is mathematical biology, which entails applying mathematics to nonlinear problems. Verzi's commitment to involve students in mathematical research has improved the quality of mathematics teaching and learning in the Imperial Valley.

COLLEGE OF SCIENCES STAFF MEMBERS CELEBRATE MILESTONES

Exceptional staff. A number of College of Sciences staff members celebrated significant milestones in their careers at SDSU. Receiving their 10-year award for service were Medora Bratlien and Michael Van Patten of the biology department and Denis Poon and Sedra Shapiro of the College of Sciences. Marlene DeMers and Constance Gramlich of the biology department were recognized for 15 years of service as were Bob Harper of the College of Sciences and Virginia Anderson of the psychology joint doctoral program. Several staff members were recognized for 20 years of service including Susan Adams of the astronomy department, Maria Penalosa and Ratnasamy Somanathan of the chemistry department, Joan Kimbrough of the geological sciences department, Darlene Pickrel of the psychology department, and Murray Finegold and Eric O'Hare of the physics department. Two brave souls reached the quarter-century mark of service to SDSU and the college: Bob Mangan of the biology department and Mark Hatay of the physics department. These individuals have dedicated their professional lives to the success of the students and faculty of SDSU's College of Sciences. All too often they are the unsung heroes of this institution. They deserve our heartfelt recognition and thanks.

RESEARCH

ROGER SABBADINI AWARDED CSU'S TOP BIOSCIENCE RESEARCH AWARD

San Diego State University biology Professor and Researcher Roger Sabbadini received the Biotechnology Faculty Research Award from the CSU Program for Education and Research in Biotechnology (CSUPERB). Sabbadini was awarded at the 18th Annual Biotechnology Symposium in recognition of his work on sphingolipids, molecules that stimulate growth during wound healing but also are associated with the spread of cancer in the body. His

research led to the creation of an artificial antibody

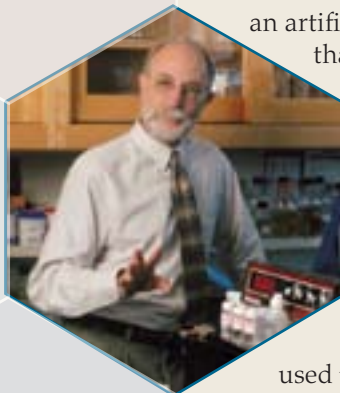
that neutralizes the sphingolipid's cancerous effects, helping to retard and/or eliminate growth of tumors in experimental animal models. His research

is also being used to help discover new ways to fight heart

disease and macular (eye) degeneration.

Lpath Therapeutics Inc., the first public biotechnology company created based on research done within the CSU system, was founded on the research conducted by Sabbadini and his team. Lpath is a theranostics company focused on bioactive signaling lipids as targets for treating and diagnosing important human diseases.

Each year the CSUPERB Award for faculty research is given to a California State University faculty member who demonstrates outstanding scientific achievement in the CSU's molecular life science and biotechnology research effort. Since the award's inception in 1991, four other SDSU biology faculty members were recognized for their research by CSUPERB: Sanford Bernstein, Chris Glembotski, Skaidrite Krisans and Judith Zyskind.



San Diego Union-Tribune article featuring Dr. William Tong

As a physical and analytical chemist, Dr. Tong has patented novel nonlinear laser methods sensitive enough to detect and identify parts-per-quadrillion levels of contaminants, both biological and chemical. Dr. Tong's methodology is perhaps one of the world's most sensitive systems for the detection of minute quantities of foreign materials. Most recently, Dr. Tong has been awarded funding to develop this ultrasensitive nonlinear laser technology to detect the chemicals used in improvised explosive devices of the type that confront troops in Iraq or are used in suicide bomb attacks. Preliminary results of this application are promising. As powerful chemical sensors, laser techniques can potentially lead to the development of an instrument that would be small enough to be carried in a backpack, yet powerful enough to detect explosive material from 110 yards away and specific enough to distinguish between the radiation that people carry in their bodies after a medical procedure from the kind used in a radioactive "dirty bomb."

COMPUTATIONAL SCIENCE RESEARCH CENTER



JOSÉ CASTILLO
DIRECTOR

"Computational Science—the use of advanced computing capabilities to understand and solve complex problems—is now critical to scientific leadership, economic competitiveness, and national security," said John H. Marburger III, Science Advisor to President Bush and Director, Office of Science and Technology (HPC Wire, June 17, 2005).

Promoting development and advancement of computational science is the mission of the Computational Science Research Center (CSRC) at San Diego State University. Established in 1999 within the College of Sciences, the CSRC is as an outgrowth of the Interdisciplinary Research Center. The CSRC brings together researchers in

different areas who have a common interest in using modern scientific computation to advance the solution of problems in science and engineering.

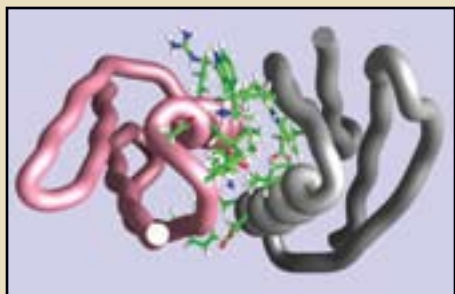
"Computational science is one of the most important technological fields of the 21st century because it enables investigation of extremely complicated phenomena and processes—such as nuclear fusion, folding of proteins, the atomic organization of nanoscale materials, and the global spread of disease—that other methods cannot characterize fully, if at all," states a report entitled "Computational Science: Ensuring America's Competitiveness" released by the President's Information Technology Advisory Committee (PITAC).

The CSRC has two degree programs designed to prepare students for the computational challenges of today and the future. We offer a master of science degree, with an optional concentration in professional science (first offered in 2005), and a Ph.D. in Computational Science. The program curricula emphasizes developing scientific database techniques, problem-solving skills using computers, improving

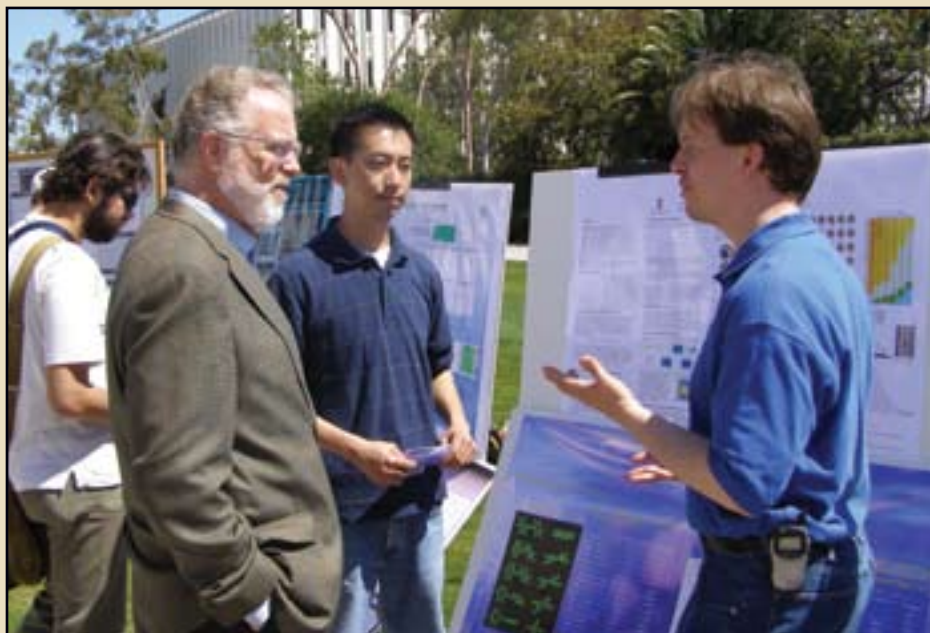
communication skills, and improving math skills for creating mathematical models. Through its interdisciplinary approach to graduate training, the CSRC produces the broadly educated, capable scientists and engineers that 21st century research and industry demand.

Twenty-four graduates have earned their master's degree in computational science and 24 students are currently enrolled in the degree program. An additional seven students have chosen concentration in Professional Science. There are also 24 predoctoral students and five postdoctoral fellows training under CSRC faculty members. In the spring of 2005, the CSRC celebrated its first graduate of the Ph.D. program, Patrick Longhini.

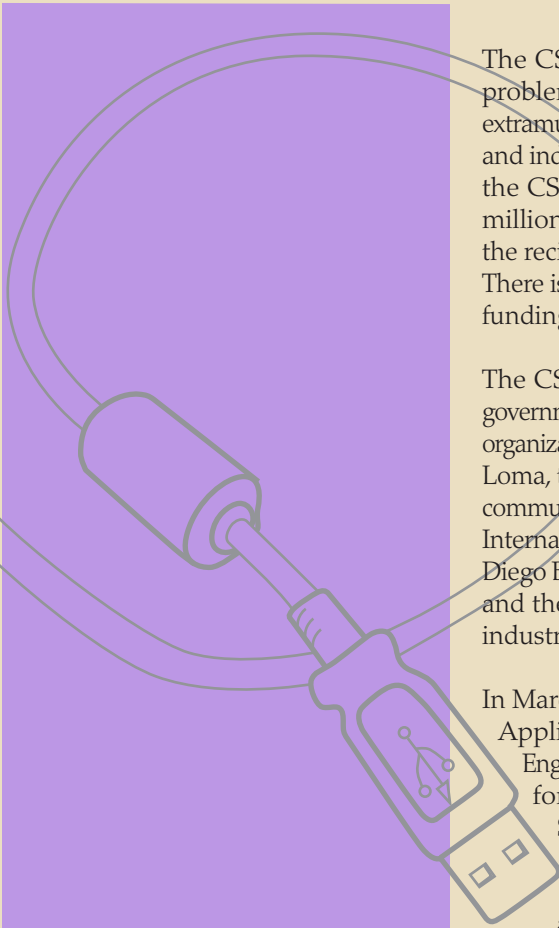
Our success comes from many sources including Director Dr. José Castillo and Associate Directors Dr. Paul Paolini, Dr. Andrew Cooksy, Dr. Eugene Olevsky and Dr. Valafar Faramarz. Many affiliated SDSU professors from various departments within the College of Sciences and Engineering also share their time and expertise to the promotion and growth of the CSRC.



Rendering by Dr. John Love



President Weber with the program's Ph.D. students: Rodrigo Negreiros, Dong Xu, and Raymond Moberly



The CSRC's focus on interdisciplinary problems enhances its ability to attract extramural funding from both government and industry sources. In the last five years the CSRC faculty generated over \$12.4 million in extramural funding. Most of the recipients are new and junior faculty. There is enormous potential for increased funding in the near future.

The CSRC has avid supporters in both government and private (commercial) sector organizations: the U.S. Navy facilities in Point Loma, the Systems Integration contractor community, including Science Applications International Corporation (SAIC), the San Diego Biotechnology research community, and the San Diego telecommunications industry (e.g., Qualcomm).

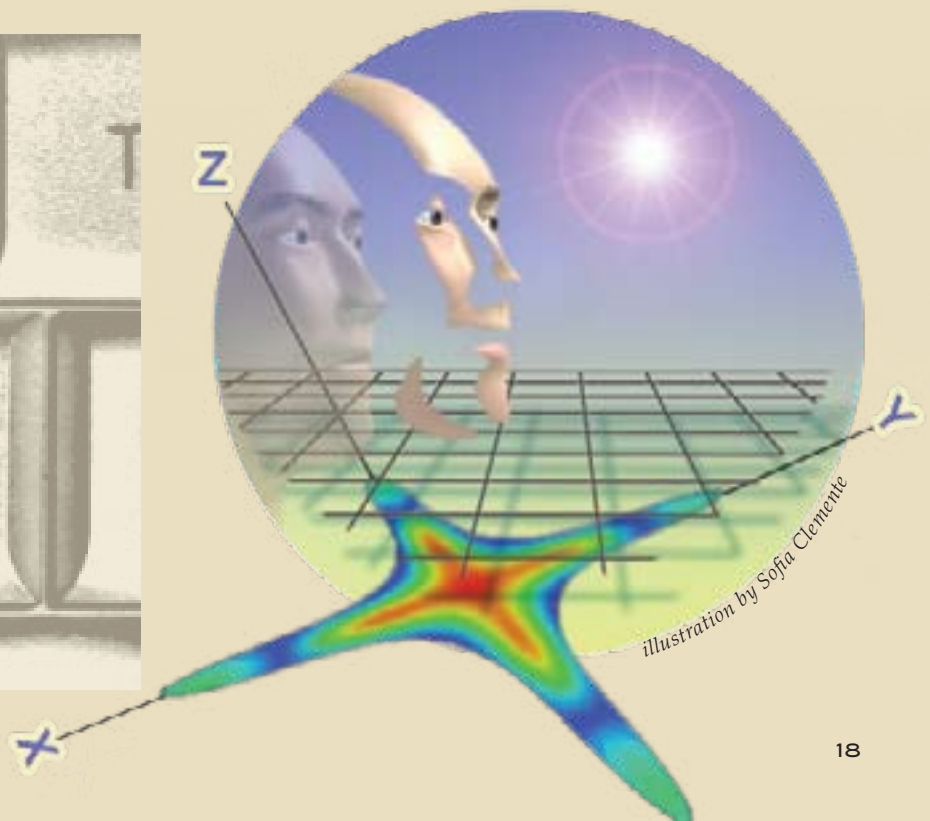
In March CSRC hosted the third annual Applied Computational Science and Engineering Student Support (ACSESS) for Industry and Computational Science Curriculum Development Forum. The program is designed to create a bridge between industry and academia and show how computational science and engineering can be used to efficiently solve critical industrial problems.

ACSESS is a proven success with an exciting environment, a vast collection of ideas, research, and talent. Over 100 people attended, including SDSU graduate and postdoctoral students, professors, staff, and representatives from local industries. Resources available to corporate supporters through the ACSESS program include use of its several high performance computer clusters, its new scientific visualization laboratory, and the talents of our graduate student pool available for internships and privately funded fellowships.

For additional information or participation in next year's event scheduled for March 7, 2007, please contact Dr. José Castillo, Director of the Computational Science Research Center at (619) 594-7205 or at castillo@myth.sdsu.edu.



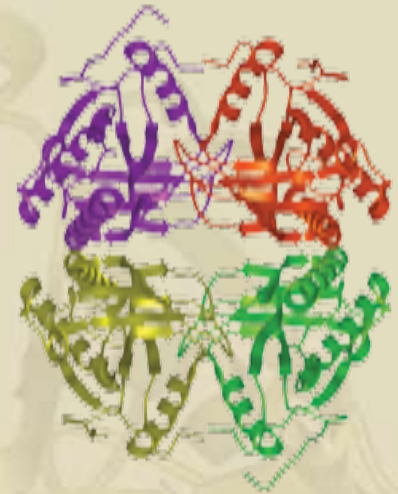
Graduate student: Aaron Linsdau in CSRC VizLab



THE CELL & MOLECULAR BIOLOGY DOCTORAL PROGRAM



DR. SANDY BERNSTEIN, DIRECTOR



The Cell and Molecular Biology Doctoral Program is offered in conjunction with the University of California at San Diego. There are currently 37 students within the program. Nearly all are performing their research projects in the biology or chemistry departments at SDSU. All students receive a stipend and tuition remission and are supported from a number of university and grant sources. Four students receive stipends from a Minority Biomedical Research Support training grant provided by the National Institutes of Health. Six receive support for cardiovascular research from the Rees-Stealy Research Foundation. Five receive support from biotechnology industry donations (most notably from Invitrogen) so that they can concurrently pursue a master's of business administration degree at SDSU. Two students have individual fellowships, one from the Environmental Protection Agency and one from the American Heart Association. Students meet weekly for graduate student research presentations and annually at our graduate student symposium, where they present posters highlighting their research efforts and listen to a seminar from an eminent research scientist.

One of our students, Mya Breitbart,

joins the University of South Florida as a faculty member in the College of Marine Science. She is Professor Forest Rohwer's first Ph.D. graduate. Mya has the very unusual situation of taking on a faculty position without performing postdoctoral research. She has been extremely prolific in data gathering and publishing at SDSU, including a first author paper in the prestigious Proceedings of the National Academy of Sciences. Her USF website provides some insight into her future research direction: "Marine viruses, the majority of which are phage, have enormous

influences on global biogeochemical cycles, microbial diversity, and genetic exchange. Despite their abundance and importance, little is known about marine viral diversity or biogeography. My research uses metagenomic approaches to study uncultured marine viral communities. In particular, my lab will focus on: 1) viral diversity and dynamics in the mesopelagic zone, 2) viral-mediated lateral gene movement among microbial symbionts of marine organisms, and 3) environmental reservoirs of viruses that cause disease in marine mammals and sea turtles."



Dr. Mya Breitbart and Dr. Forest Rohwer

PH.D./M.B.A. PROGRAM

The Ph.D./M.B.A. program merges a doctorate in cell and molecular biology in cooperation with the University of California, San Diego, along with a biotechnology-oriented M.B.A. from San Diego State University. Over 100 faculty members from 11 departments are collaborating with biocommerce scientists and business experts to produce a new generation of research scientists who excel in communication skills, technology transfer, entrepreneurship and management. These skills are consistently in demand by the biotechnology and pharmaceutical industries, but standard Ph.D. graduates are not trained in them.

The goal of the Ph.D./MBA program is to produce globally engaged cell/molecular biologists who can use multiple skill sets to think integratively and move scientific discovery into scientific application. Basic research results are applied to solve real-world problems by partnering with scientists, business faculty members and industry experts. Technology transfer, intellectual property issues, and commercialization potential are emphasized. Trainees put these experiences into practice through student mentoring, use of team-based approaches to research and learning, and by interaction with a broad spectrum of scientists and industry mentors in academic and non-academic settings at local and international sites. The synergism arising from the integrated program will provide a research and educational experience that is far superior to those obtained by enrolling in separate Ph.D. and MBA programs.

The rigorous requirements of the two degree programs are met through mentoring by highly qualified faculty, interdisciplinary collaborations, and training in San Diego's extraordinarily well-developed biocommerce sector. Training in state-of-the-art research facilities falls along two interdisciplinary themes: microbial sciences and molecular/cellular physiology. These research themes will be united in the new BioScience Center, which also provides interaction with start-up biotechnology and pharmaceutical companies. Student research and coursework are integrated with an innovative life-science-oriented business curriculum. Practical research, business and managerial experience are provided by industrial internships, mentoring of student research teams and international collaboration. The program trains students for both academic and non-academic employment, with an emphasis on meeting the urgent needs of the biotechnology and biopharmaceutical industries.

Invitrogen, a local biotechnology company with strong ties to SDSU, sponsors an annual fellowship in support of a student in this program.



College of Business Dean: Gail Naughton, Student: Matthew Giacalone, Dr. Leroy Hood, and VP of Research: Thomas Scott



DEPARTMENT OF PHYSICS

Saul Oseroff, Department Chair

In spite of the fact that the Department of Physics has only ten active current faculty members, we're doing extremely well in training students, conducting research, attracting external funds, and publishing their research in peer-reviewed journals. Most of our faculty members have external support; six of them have current support from NSF. Last year the department published 34 papers, and most important, 20 of them include students as coauthors including many undergraduates, an outstanding record considering we do not have a standalone Ph.D. program. Another example of the excellent success of the department in training students for industry and Ph.D. programs is that the 2006 College of Science winner, Tim Day, is a former student from the department.

NEW FACULTY MEMBER

Dr. Michael Bromley joined the Physics Department in August 2005. He most recently held postdoctoral research positions at the Charles Darwin University in Darwin, Australia, and at Kansas State University in Manhattan, Kansas.

The brief Bromley story... I hail from the rugged lands of Crocodile Dundee, sport, beer, more sport and, these days, lots of bloody good wine. I grew up in Darwin, at the top of Australia, amongst some of the most ancient landscapes and cultures on Earth. Charles Darwin never actually visited there, but the Beagle, on which he was previously traveling on around the Pacific, did. The city was bombed by the Japanese fleet after they'd done Pearl Harbour and massive cyclones seem to trash the city every fifty years or so. The city also (I think) holds the record for the most lightning strikes per year, its record max temp is 38.9C [102F], min temp 10.4C [51F], average yearly rainfall of 1.7m [675in] (mostly during the monsoonal wet season). Darwin is closer to the capitals of three other countries than to the capital of Australia, and 1,000 miles drive to the next city of 25K people.

Sometimes I wonder how growing up in one of the least populated parts of the world I ended up being fascinated by how the world worked, and I marvel that the hours spent playing computer games as a child paid off by ending up as a computational physicist. Mostly I was fortunate that Darwin is a magnet for unique people, particularly inspiring science and math teachers. After high school, unsure of what to study, I chose to do a bachelor of science at the local university. The three physics lecturers did a fantastic job of keeping a major in physics there. So I was gradually lured away from computer science, which all my friends were doing, and into physics research. Firstly, I went on a summer research program down to the Australian National University in Canberra where I worked in an experimental lab (I helped on a rig built for electron scattering from detestable helium). Following a year earning too much money in IT (Data Communications), I quit and moved to do my (fourth year) honors study at the University of Melbourne. This is the hardest year in the Australian system, and I enjoyed working on a hybrid experimental/computational optics research project by fabricating optical waveguides and devices using a Me ion beam (Pellet Ron).

So, how did I end up building atoms on computers? At the end of that year I went on a three-month trip with seven Australians in two Volkswagen Kombi buses from L.A. through Mexico down to Guatemala (my wife and I are still driving the



1976 Kombi!). At some point I made the decision to cut my hair, stop drinking cheap beer and bumming around on foreign beaches, and go back to Australia to do a Ph.D. with the one computational physicist back in Darwin. The main reason was that I just didn't understand this whole quantum-physics-thing and figured the best way to learn more would be to do a theoretical research project! So I chose to do a project on how anti-matter interacts with matter. In particular, looking at how the positron interacts with neutral atoms, forming intricate 'stable' positron atoms. The methods employed are primarily Configuration Interaction-based, involving digitalization of very large matrices.

Post-Ph.D., I spent a couple of hard but rewarding post-doc years at Kansas State University (in Manhattan, Kansas, 'the little apple') researching atom optics and learning how to do physics the American way. Manhattan was a nice enough little town, as there was a big atomic physics laboratory there, and I got a lot of work done, computationally researching the wave properties of Bose-Einstein condensates in waveguides (mostly time-dependent Crank-Nicholson calculations). The

interest being in designing 'atom chips', these are microchips in vacuum that trap, cool, and manipulate clouds of atoms in the magnetic fields above the surface of a small chip. The goal of this research is to do everything (and more!) that we can do with modern (light-based) optics with cold atoms as the wavelengths involved are highly controllable. (More details on my research is up at <http://www.physics.sdsu.edu/~mbromley/research.html>)

My wife Emma, a Kiwi (New Zealander), has a Juvenile Diabetes Research Foundation fellowship to do immunology research at the Scripps Research Institute. She dragged me to San Diego, whereupon arrival in May 2005 I interviewed for/accepted the vacant assistant professor position, all within a record time. We're currently settled into the P.B. rental existence, trying to convince ourselves that the water is warm enough to learn to surf. I have previously spent entire weekends trying to be English, i.e. drinking tea, playing cricket and (field) hockey. These days, in between the physics, our spare time is spent indoor rock climbing and eating sushi (see our San Diego Sushi Blog <http://www.expolife.com/sushiblog/>). Finally, thanks to all the faculty and staff for making me feel welcome here at SDSU.



1931-2006
Celebrating 75 years
of academic excellence

DEPARTMENT OF GEOLOGICAL SCIENCES
DR. GARY GIRTY, DEPARTMENT CHAIR

In 1931, the San Diego State Teachers College moved to its present location. Baylor Brooks, now Professor Emeritus of geology, organized a one-person Department of Geology in the Division of Physical Sciences. Baylor received his B.A. from Stanford and did graduate work at Oxford and the University of Arizona.



His enthusiasm for geology influenced many students although only beginning courses and a minor in geology were offered, the department became well known because of the caliber of students that Baylor sent to U.C. Berkeley, Stanford, UCLA, and USC to complete their undergraduate and graduate education.

ROME'S FIRST 3-D SEISMIC MODEL

Dr. Kim Bak Olsen and his Italian colleagues used data from more than 1,000 boreholes to constrain a 3-D model of subsurface Rome. After building the first-ever 3-D computer model of the historic city's underground geology, the international team modeled two types of earthquakes that struck Rome in the past. They used the model to predict ground shaking from two scenarios: one of a magnitude five earthquake originating in the Alban Hills district and another of magnitude seven originating in the Central Apennines. U.S. and Italian geophysicists discovered that Rome's ancient structures are vulnerable to a wider range of earthquake hazards than previously believed. Researchers discovered that some earthquakes are likely to cause ground shaking in central Rome that will last up to one minute—much longer than earlier 2-D models indicated. This 3-D model concluded that Rome's 2000+-year-old buildings are in danger of crumbling when a temblor of magnitude seven or larger strikes.



JOINT PH.D. PROGRAM IN GEOPHYSICS

The joint Ph.D. program in geophysics with UCSD is proceeding through the various campus bureaucracies and has a tentative startup date in 2007. Thanks to Professor George Jiracek for leading the charge on this program.

STUDENT CONGRATULATIONS

Tim Middleton, Audrey Reznik, and Jennifer Perez for job offers from Chevron, and to Melanie Biggs for selection as a participant in the Exxon Mobil short course on salt dome tectonics recently held in Mexico.

Early in the spring semester, students Maureen Moses and Sarah Johnson joined a Scripps Institution of Oceanography (SIO) cruise to retrieve ocean-bottom seismometers deployed the previous year around Hawaii. This is the third cruise invitation for students in the department. Previous participants include Audrey Reznik, Jennifer Perez, Chris Martinez, Melanie Biggs, Melanie Lindsey, Julia Clark, and Heather Ford.



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Additionally, two of our students, Jennifer Perez and Audrey Reznik, have received the Phi Kappa Phi award for academic excellence.

FACULTY BOOKS

"Follow the Sun" by Gordon Gastil (Sunbelt Publications). This epic tale of exploration and discovery tells the story of a young man talented in language, science, and diplomacy, whose patron is the Pharaoh, Rameses II. He travels around the earth by boat, horse, and on foot in 1278 BCE.

A special volume of the Pacific Section of the Society for Sedimentary Geology (SEPM), was dedicated to Patrick L. Abbott and published on Saint Patrick's Day. The title is "Using Stratigraphy, Sedimentology, and Geochemistry to Unravel the Geologic History of the Southwestern Cordillera: A Volume in Honor of Patrick L. Abbott."

COMMUNITY

"Sharing the Land: Building Tribal Earth Science Expertise" is a community-wide effort designed to increase the number of Native Americans who have access to a well-rounded, place-based education in the earth sciences at SDSU and collaborating institutions. The program seeks to increase the number of local American Indian students who gain formal education and work experience in the geosciences with the long-range goal of improving the workforce available for tribal resource management in the coming years.

With new support from the National Science Foundation's Opportunities for Enhancing Diversity in the Geosciences Program, the SDSU Indigenous Earth Sciences Project has been able to launch this new collaborative venture. It's directed by Dr. Eric Riggs and Dr. Eleanor Robbins from the Department of Geological Sciences.

SDSU IS THE SECOND INSTITUTION IN THE WORLD AND THE FIRST IN NORTH AMERICA TO ACQUIRE A NU PLASMA 1700



The 1700 is a unique High-Resolution Multi-Collector ICP-MS providing the ultimate in high-resolution isotope ratio measurements. This mass spectrometer will be used to identify the proportions of isotopes of an element, i.e., atoms with the same number of protons but differing numbers of neutrons. Distinctive ratios of isotopes can be used as fingerprints or tracers to indicate the origin and evolution of the rock or earth material from which the element came.

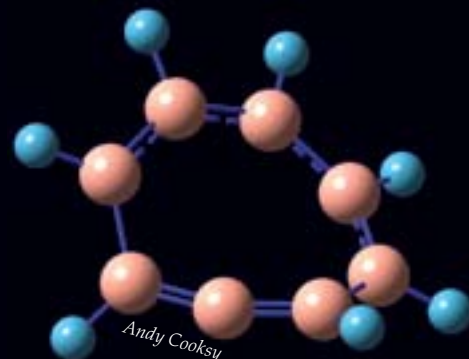
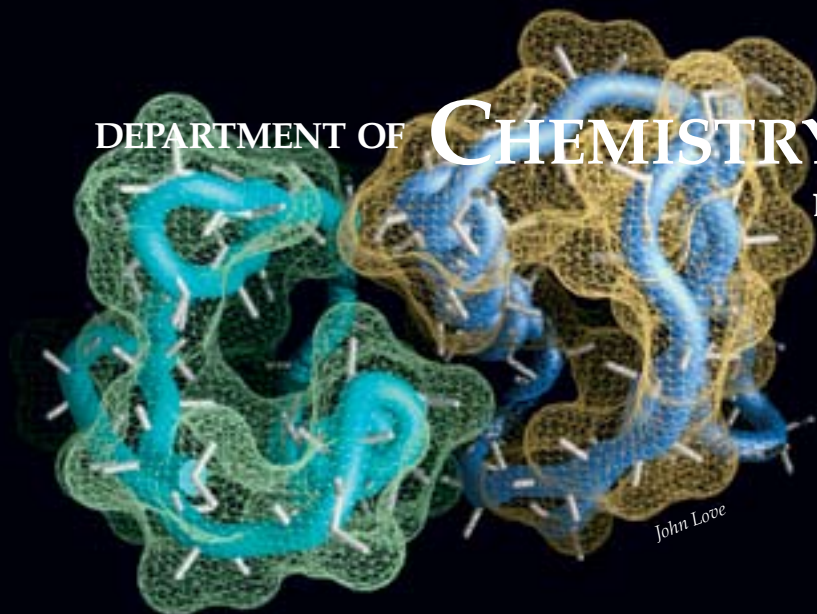
The first instrument was installed in Zurich in March of 2002. Our instrument was manufactured in Wrexham, Wales, UK by Nu Instruments LTD., the only company making instruments like the 1700. The Nu 1700 took three years to build and test. It is very large, occupying about 400 sq. ft. of lab space. The magnet alone weighs 5 tons. For vibration interference protection, the instrument was installed in a specially built laboratory on a concrete and steel pedestal, sunk into the earth beneath the GMCS building.

Dr. Barry Hanan (Department of Geological Sciences), the administrator for the Isotope Geochemistry Laboratory for the past 16 years, along with Dr. Bill Tong (Department of Chemistry and Biochemistry) secured through a combination of SDSU internal funding, National Science Foundation grant money, and corporate cost sharing, the funds to acquire the \$1.2 million instrument.

The SDSU geochemistry labs serve as a world-class center for isotope geochemical research. Researchers from as far away as Japan, Germany, France, and Turkey come to SDSU for collaborative projects involving exotic places like Iceland, Hawaii, the Pacific-Antarctic Ridge, the Galapagos Islands, and many other places of geologic importance. We believe that the interaction between visiting world class scientists and SDSU students and colleges fosters an intellectually challenging climate focused on identifying global problems in the Earth sciences and their resolution through isotope geochemistry.

DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY

DR. CARL CARRANO, DEPARTMENT CHAIR



The department officially changed its name from the Department of Chemistry to Department of Chemistry & Biochemistry to reflect both the increasing interest in biochemistry as a degree option among our majors, and to provide a clear institutional “home” for this important sub area.

Education and research training of students in molecular science is our main mission in the SDSU Department of Chemistry and Biochemistry.

As advances in understanding at the molecular level become the primary basis for new developments in all fields of science, health, and technology, no modern university can fulfill its mission without a dedicated and vigorous chemistry department and SDSU certainly has that!

The department increased its full-time equivalent students (FTES) by greater than 13 percent since 2001. The department now has 232 undergraduate majors and has increased its graduate enrollment to 77, of which 21 are doctoral candidates. In a recent Chemical and Engineering News (American Chemical Society publication) survey, SDSU was ranked as the 25th largest producer of ACS certified B.S. chemistry majors in the USA.

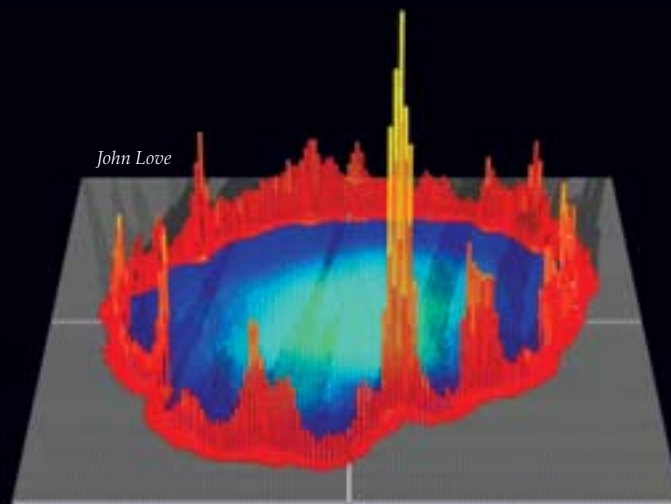
Departmental external grant funding in force has gone from an average of \$590 thousand in 2001 to over \$3 million in 2005-06. This is a doubling from as recently as two years ago.

With the combined help of the College of Sciences, a National Science Foundation (NSF) Major Research Instrumentation (MRI) grant headed up by Doug Grotjahn, and a major gift by former student Al McLeod, the department has made impressive strides toward its goal of setting up comprehensive facilities

for an initiative in “Structural Biology” by acquiring major instrumental capabilities in both small molecule and macromolecular crystallography and high field (600 MHz) Nuclear Magnetic Resonance (NMR). Having such combined facilities is unique within the CSU.

Four new faculty members joined the department: in 2004 were Tom Huxford, protein crystallography, and Peter van der Geer, cell signaling, both biochemists and both hailing from UCSD; Laurance Beauvais, an inorganic chemist from MIT, and Gregory Kalyuzhny, an electro analytical chemist from UNC, both arrive this summer.

Andrew Cooksy spent the 2005-2006 year on sabbatical with Professor John Brown, FRS, at the University of Oxford. Among other projects, they have been reexamining the NCO molecule, known to every general chemistry student as the textbook example of non-equivalent Lewis structures. Cooksy discovered two new terms in the quantum mechanical energy expression for this molecule, extending work that dates back to Edward Teller’s lab in the 1930s.





Dr. Christopher Glembotski and Dr. Terrence Frey

DEPARTMENT OF BIOLOGY

DR. TERRENCE FREY, DEPARTMENT CHAIR

Change has definitely been a constant in the biology department—mainly with our faculty. Starting at the top, Dr. Christopher Glembotski stepped down from the chairmanship. Dr. Terrence Frey accepted the challenge to lead the department. Dr. Frey researches structural cell biology, centering on the three-dimensional structure of mitochondria revealed by electron microscope tomography. His research explores the physical principles that control mitochondrial structure and function and the changes that occur in mitochondria during apoptosis or programmed cell death. He joined SDSU in 1986, and was associate chair of the department for six years beginning in August 1995.

Dr. Frey's move created a vacancy for graduate coordinator, a position that oversees the five master's programs within the department: ecology, evolutionary biology, microbiology, molecular biology, and physiology. Dr. Dave Archibald filled the void in the fall of 2005.

Setting the course schedule, making teaching assignments, and hiring graduate teacher assistants and lecturers are just some of the duties of the associate chair of the Department of Biology. Annalisa Berta steps down from this position after five years of

service with Janet Franklin taking over.

The department's office staff also experienced significant changes. Mary Coleman retired as our administrative assistant. We welcome her replacement, Azizi James. Angie Parkhurst is the new department administrative support coordinator and Sandra Talley took the position of administrative support coordinator for the graduate programs.

Congratulations Professors Andrew Bohonak and Brian Hentschel—both promoted to associate professor and tenured.

We welcome Rebecca Lewison to the department. Her current research explores the impact of fisheries by catch (incidental take) on seabirds, sea turtles, and marine mammals worldwide. She received her Ph.D. in ecology at the University of California Davis, then was a postdoctoral research associate at Duke University.

Our future brings further change. The department hired five new faculty members in addition to a BioScience Center director in the past year and will search for two additional faculty in the next year.



Angie Parkhurst



Sandra Talley



Dr. Ricardo Nemirovsky



Dr. Carmelo Interlando

DEPARTMENT OF MATHEMATICS & STATISTICS

DR. DAVID LESLEY, DEPARTMENT CHAIR

Two new faculty members joined the Department of Mathematics and Statistics: Dr. Ricardo Nemirovsky, a full professor in mathematics education, is co-PI of a two-year National Science Foundation catalyst grant for the development of a proposal toward a Science of Learning Center, focusing on embodied mathematical cognition research. Next is Carmelo Interlando, assistant professor of mathematics who works in coding theory. Dr. Interlando earned his Ph.D. in mathematics at Notre Dame University and also has a Ph.D. in electrical engineering. Ricardo and Carmelo are originally from Argentina and Brazil respectively, so we expect to hear shouts during the World Cup soccer tournament.

Five new faculty members join us in the fall 2006. Sam Shen, the new chair, comes from the University of Alberta and replaces David Lesley, who is retiring after 36 years in the department. Sam is an applied mathematician, specializing in climatics, in particular, the measurement of global warming. Vadim Ponomarenko, a specialist in algebra and combinatorics, joins us from Trinity University in San Antonio, Texas. Barbara Bailey comes from the University of Illinois at Urbana-Champaign to work in applied statistics. Kristin Duncan recently finished her Ph.D. at Ohio State University and joins us as an applied statistician. We will also be gaining a new specialist in biomathematics.

“with a total of \$2,586,000, this was a higher ranking than Duke, UCSD, Harvard, or the University of Maryland.”

We’ve had success attracting external funding and earning awards for the work of the faculty. The National Science Foundation (NSF) compiles data on total and federally financed research expenditures in the mathematical sciences at universities and colleges in the USA. As ranked by total expenditures in 2002 (the latest year tabulated), our department ranked number 40, with a total of \$2,586,000. This was a higher ranking than Duke, UCSD, Harvard, or the University of Maryland.

Here are some of our individual achievements:

Joanne Lobato received a three-year, \$1.3 million grant from the National Science Foundation to examine the relationships among: (a) teacher knowledge and goals, (b) the mathematical focus that develops in a classroom, and (c) the ways in which individual students generalize their mathematical learning experiences.

Chris Rasmussen received the Mathematical Association of America’s inaugural Annie and John Selden Prize for significant contributions to research in undergraduate mathematics education.

Richard Levine was selected for a Fulbright award to visit China in spring 2007 to teach environmetrics and perform research in Monte Carlo methods for public policy applications.

Juanjuan Fan has a National Institutes of Health (NIH) grant to develop statistical classification methods in periodontal research.

Ricardo Carretero received an NSF grant to study topological excitations in Bose-Einstein Condensates.

Antonio Palacios and **Peter Blomgren** have an NSF grant to study flame patterns.

Our graduate and undergraduate programs are growing steadily, although the M.S. programs in statistics have shrunk this last year because of a paucity of faculty. Susan Nickerson, advisor for the master of arts in teaching service degree, reports that the program over the last several years has increased by nearly 50%. Total number of current master’s students is 22. The first Ph.D. awarded in the College of Sciences program in computational science was earned by Patrick Longhini, who was advised by Antonio Palacios.



DEPARTMENT OF COMPUTER SCIENCE

DR. LELAND BECK, DEPARTMENT CHAIR

Increased focus on research is what's new in the computer science department. To enhance collaboration and communication among faculty, we initiated regular department lab visits in which faculty visit colleagues' laboratories. We established an undergraduate research course for high achieving undergraduate students. An increase in collaboration with other departments within the college is a priority. In particular, we are participating with the biology department in the form of a "bioinformatics discovery team."

To attract more high-quality graduate students to the program, we're offering limited assistantships and facilitating conference travel for faculty who are presenting papers at conferences. Longer-term research-related goals include establishing a joint Ph.D. program in computer science, closer collaboration with local industry, and international research collaborations.

We have some interesting research underway. Dr. Faramarz Valafar works jointly with Dr. Zeller of the biology department on a project

entitled "Reconstruction of Gene Regulatory Networks using Pattern Recognition Techniques." Artificial neural networks are used for the reconstruction of the regulatory network that patterns the chordate nerve cord in Ascidians (a type of chordate, like fish, frogs, and humans). Gene expression levels of the organism were recorded through a temporal microarray experiment throughout the developmental stage from embryo to a tadpole-like larva, an 18-hour process. The goal is to identify the

mechanism through which chordate nerve cord in Ascidians is developed.

Dr. Marie Roch's work on efficient search techniques for large population speaker identification was recently published in "Speech Communication." She was also awarded two grants for work in bioacoustics and remote sensors, conducted jointly with the Scripps Institution of Oceanography and the High Performance Wireless Research and Education Network (HPWREN) at UCSD.

The Intelligent Machines and Systems (IMS) Lab, directed by Dr. Mahmoud Tarokh, is engaged in several research projects in robotics (www.rohan.sdsu.edu/~tarokh/lab/research.html). The latest is the Agile Autonomous Rover (A2R) project. Goals are to develop theory, concepts and methodologies, and conduct experimentation for low cost agile rovers traversing distances of up to 20 miles over rough terrain autonomously, with minimal or no human intervention. Rovers can be used in a number of applications such as scientific investigations (e.g. observation and sample collection), planetary explorations, and information gathering in hostile environments. Because of the low cost, a number of such rovers can be deployed to explore the environment in a collaborative manner.

Koli is the first generation in the series of A2Rs being developed at the Intelligent Machines and Systems (IMS) Lab. It's a small rover, approximately 60 centimeters long, designed for autonomous traversals of about five miles. Currently, all mechanical design and assembly of electronic components, including various sensors such as GPS, vision, and gyros, have been completed. Algorithms and software for intelligent autonomous navigation are being developed and implemented. Navigation will be achieved through a combination of several sensing technologies and intelligent control for robust path following and collision avoidance. Despite its small size, the challenges to overcome are similar to ones found in larger scale autonomous vehicles. Yaboo, the next generation of A2R, capable of traversing up to 20 miles, is currently at the design stage.



The National Society on Fetal Alcohol Syndrome (FAS) named Edward Riley most outstanding scientist in the study of FAS. This award was the result of Riley's significant studies over the past 25 years. He researched changes that occur in the brains of children with FAS and how their behavior is affected. Riley, who received a B.A. from Rutgers University and a M.Sc. and Ph.D. from Tulane University, has served the SDSU community for 16 years.

The American Psychological Foundation awarded Dr. Jerry Sattler the Gold Medal for Life Achievement in the Application of Psychology. The honor recognizes his exemplary contributions to the field of psychology.

In 2005, Dr. Sattler began his 41st year at SDSU. Although he retired in 1994, he continues working at the university as an emeritus professor. Dr. Sattler is nationally known for his book, "Assessment of Children," which has sold over 250,000 copies. He's also published over 100 articles and monographs, and given over 200 speeches, workshops, and symposia in the fields of clinical and school psychology and related areas. In addition, Sattler coauthored the fourth edition of the Stanford-Binet Intelligence Scale and served as a Fulbright lecturer in Malaysia from 1972-73.

Garnering a lot of buzz in the popular media is "Generation Me: Why Today's Young Americans Are More Confident, Assertive, Entitled—and More Miserable than Ever Before" by Jean M. Twenge, an associate professor in the psychology department. According to Kristine Huntley of the American Library Association, the book "tackles the 18-to-35-year-old generation's problems—those they face and those they create. Twenge's book is comprehensive and scholarly, filled with statistics and thoughtful observations about the group she's dubbed "Generation Me." These young people were raised with the idea of self-esteem being more important than achievement, which has caused them to place the self above all else.



Dr. Jean Twenge (on right)

DEPARTMENT OF PSYCHOLOGY

DR. CLAIRE MURPHY, DEPARTMENT CHAIR

Such beliefs have also created a generation of young people who believe every dream is attainable, but who aren't prepared to deal with discovering it isn't so. Twenge notes that today's young parents are especially lenient with their children and reluctant to discipline them, suggesting that perhaps the next generation will be even worse off. Twenge believes "Generation Me" would benefit from a heavy dose of realism. Accessible and a must-read for the generation they address."

San Diego State University and the psychology department hosted the annual conference of the Society of Experimental Social Psychology (SESP) last October. Over 300 social psychologists from the United States, Europe, Asia, and Australia met for two intensive days of symposia and professional interaction.

Dr. Jeff Bryson coordinated the conference with the assistance of social psychology graduate student Jennifer Filson, who developed the conference website and organized invaluable activities for numerous graduate student volunteers from SDSU and UCSD. Dr. Radmila Prislin was a member of the program committee and Dr. Jean Twenge cochaired a symposium on rejection and ostracism, presenting some of her recent research.

Professor John Martin of the psychology department conducts HIV/AIDS action research in Africa. On his seventh trip to southern Africa to work on an AIDS clinical research project, Professor John Martin was accompanied by undergraduate student, Alejandra (Alex) Mijares, who was supported by two international research fellowship grants funded through the SDSU College of Sciences.

In previous trips, Professor Martin was a visiting teaching-scholar at two South African Universities (Rand Afrikaans University; University of Stellenbosch) as well as the lead behavioral scientist on a NIH/South Africa Department of Defense AIDS training project.

During his recent seven-week trip, he participated with a team from the University of Stellenbosch and University of Cape Town Schools of Medicine in a large HIV/AIDS transmission prevention project. They trained nurses, physicians, and community lay counselors from South Africa, Namibia, and Swaziland in the newest science of motivational counseling for HIV+ pregnant mothers. Professor Martin now awaits funding of an NIH Fogarty Fellowship to return to southern Africa for further HIV/AIDS action research.

DEPARTMENT OF ASTRONOMY

DR. ALLEN SHAFTER, DEPARTMENT CHAIR

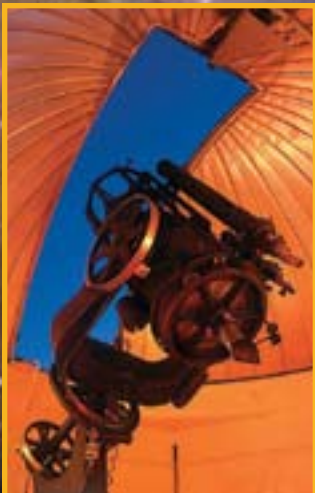
Planetarium shows and telescope viewing are a couple of the exciting outreach activities the Department of Astronomy hosted during the past year, which is part of the department's contribution to "Inner Space/Outer Space," a joint venture with Dr. Steven Barlow of the Biology Department.

Last summer the department initiated the National Science Foundation (NSF) sponsored Research Experiences for Undergraduates Program. It's designed to provide a research intensive experience for a dozen students. The program runs for 10 weeks during the summer at the SDSU campus and Mount Laguna Observatory.

There were several noteworthy personnel changes in the Astronomy Department during the past year. The department chair/observatory director, previously held by Paul Etzel, was split into two positions. Allen Shafter took over as department chair and Etzel remains

as director of Mount Laguna Observatory. Doug Leonard joined the department in the spring of 2006. Doug's research focuses on the study of supernovae, the explosive events that mark the deaths of certain varieties of stars. He's particularly interested in probing the geometry of the explosions (are they spherical?) and using these bright beacons as cosmological distance indicators to constrain models of the evolution and fate of the universe. Before joining the SDSU faculty, Doug received his doctorate from the University of California at Berkeley in 2000 and served post-doctoral stints at the University of Massachusetts and Caltech.

Fred Talbert, who joined us in 1968 after receiving his doctorate from the University of Texas at Austin, ends his Faculty Early Retirement Program (FERP) at the end of this academic year. Although Fred is retiring, we look forward to seeing him around the department as an emeritus faculty member for years to come.



Reginald Buller 21" Visitor's Telescope



Existing 40" Telescope w/CCD Spectrograph



Four domes seen at SDSU's Mt. Laguna Observatory

RENEWAL AT MT. LAGUNA OBSERVATORY

DR. PAUL ETZEL, DIRECTOR

The Ultra-Lightweight Technology for Research in Astronomy (ULTRA) project is moving from the development phase to the installation phase. This \$1.4 million National Science Foundation (NSF) funded project joins SDSU, the University of Kansas, Composite Mirror Applications, Inc. (CMA), and Dartmouth College in the development of a new 40-inch telescope based upon graphite composite materials for the optical mirrors and telescope tube structure. Development of optical quality has progressed and the 40-inch mirror is now being fabricated. The ULTRA telescope tube assembly has been fabricated and will be fitted to a fork-mount completed by Astronomical Consultants and Equipment, Inc. (ACE).

The NSF awarded SDSU \$380 thousand for the project, "Transforming Mount Laguna Observatory into a Regional Astronomical Research Facility." Most of the funds are for renovation of the existing 40-inch and 24-inch Smith telescopes. Currently, the opto-mechanical systems of the 40-inch telescope are undergoing significant upgrades by ACE and observatory staff. Another important phase is the installation of a new telescope control system. A new CCD camera, dual filter wheel with integrated finder-guider, and new optical filters are also provided for compatibility with the ULTRA telescope. Telescopes represent a big up-front investment for an observatory. Periodic improvements maximize their use. As part of the NSF project, up to 20 percent of the telescope time is allocated to qualified visiting astronomers.



Paul Etzel with existing 40" Telescope



New ULTRA dome at MLO



ULTRA telescope undergoing testing at CMA in Tucson



Rendering of ULTRA telescope in new dome

PATRICK AVILA

UNDERGRADUATE STUDENT

Patrick Avila is a familiar figure to many in the College of Sciences. You could say that they watched him grow up. His father, Vernon Avila, now an emeritus professor of biology, for years made a name for himself as something of a Renaissance man: scholar, researcher, publisher, and mystery novelist. Patrick took on the challenge of earning his undergraduate degrees at a university of which his father was a faculty member. Through hard work and enthusiasm, Patrick made a name for himself and people are as apt to refer to Vernon Avila as Patrick's father as the other way around.

A double major, biology and philosophy, Patrick makes the most of his time at SDSU. He's on the Dean's List every semester and is currently doing research in the lab of Dr. Christopher Glembotski. Capitalizing on the emphasis placed on international study, Patrick spent the winter session as a visiting student at Magdalen College, Oxford University, in England. This summer he's researching at Harvard.

Patrick said, "I had many positive experiences while pursuing my undergraduate education at SDSU in the College of Sciences. I found the professors to be outstanding researchers and excellent teachers with a sincere passion for not only their area of study, but more importantly, for the transmission of knowledge. For example, the wonderful experience I had with Dr. Shelli McAlpine's organic chemistry course. Her problem solving sessions after class displayed her enthusiasm for the subject and her desire to create an environment in which students could inquire, engage, and truly absorb the material.

Another important quality of professors in the College of Sciences is that of cutting-edge research and their willingness to facilitate and immerse students in hands-on research activities. Last year I was accepted into the Minority Access to Research Careers (MARC) program as a MARC scholar. The MARC program is funded by National Institutes of Health (NIH) and its major objective is to encourage talented underrepresented students to pursue careers in the biomedical realm. This program allowed me financial support so that I can focus solely on my research education, in addition to the



Patrick Avila at Oxford University, England

opportunity to interact with students and faculty from all over the world.

As a MARC scholar, I am currently conducting research at the SDSU Heart Institute with Dr. Chris Glembotski. The primary research focus in this laboratory is to better understand the biochemical signaling pathways that mediate cardiac protection during stress. I work on a specific project related to the overall goals of the lab and feel like part of a team. In weekly meetings we discuss our progress in the lab and each member is responsible for presenting an article from the current literature related to our studies.

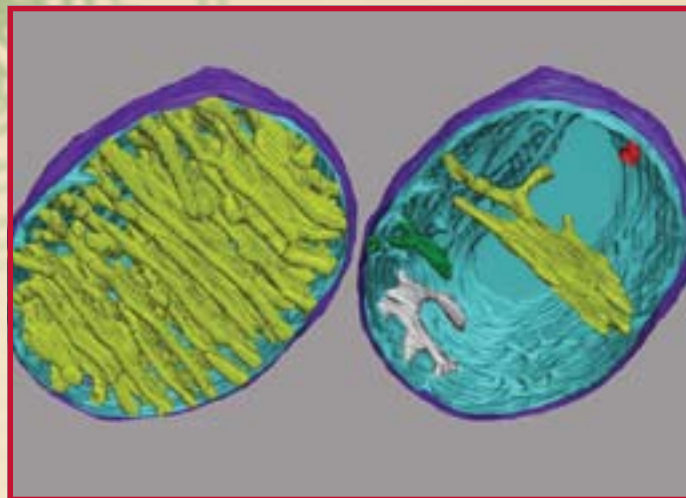
All of the opportunities that the College of Sciences provide reaffirm that my education is of the highest quality and will help me attain all of my career ambitions and fulfill the important goal of becoming a well-rounded, learned individual."

DANNY FLYNN

UNDERGRADUATE STUDENT

“Simply put, mitochondria are amazing entities; yet most students only know them as the powerhouse of the cell, not about the key role its membrane plays in apoptosis. I have been given the opportunity to become one of a select few students to have a deeper understanding of its mechanisms, but I am not a biology major, I am a physics major.”

At first glance, a physics major participating in biological research may seem incongruous, but that's far from the case. The ability to understand the inner workings of complex systems stems from our ability to understand their many parts. Mitochondria are no exception. By singling out variables and manipulating them in computer simulations, we are able to understand which parts of the mitochondria are responsible, and to what extent, for specific processes taking place within. In effect, we are able to take the information attained by the biologists and quantitatively and qualitatively analyze it. We also go beyond this and carry out theoretical simulations resulting in predictions which may be observed in



Electron microscope tomogram of a mitochondrion in chick cerebellum

biological experiments. To have a complete understanding of the mitochondria, we study it through the analogy of mathematics and from this research we gain significant insights. Even in theorizing, such computational analogies can only come from an already preexisting knowledge of the biology of mitochondria. Biologists such as Dr. Terry Frey go to great lengths explaining the mitochondria's biology at weekly meetings. I also get the perspectives of physicists and mathematicians such as Dr. Arlette Baljon, Dr. Nulton, and Dr. Peter Salamon. These interactions allow me to transform from student to physicist.

Physics is a broad science with applications that go well beyond the traditional problems taught in the classroom. It is not only necessary, but vital, for all physics majors to participate in research outside of the classroom. I am able to transcend the bounds of my major and participate in the research of the physical biology of mitochondrial membranes because I receive a stipend from the National Institutes of Health (NIH) training grant, and the New Interdisciplinary Workforce (NIW) program, managed by Dr. José Castillo of SDSU's Computational Science Research Center. I work alongside professors and graduate students from differing disciplines who challenge and guide me in ways not possible in a classroom. I also apply the mathematical theories I have learned in my classes to nontraditional problems. Through this process I now understand what it would be like to have a career in my field of study.

SDSU offers students a strong undergraduate program in physics. Simply doing well in these classes would be incomplete, however, if the knowledge gained could not be applied to the various problems one encounters outside of the classroom. The NIW program allows me to step up to the challenge of applying what I have learned, thereby giving me the confidence to take what I learned in the classroom and make a career for myself.



Sharon Epps in Ghana, Africa

SHARON EPPS

GRADUATE STUDENT

As an older, returning student I didn't fit the typical profile of a successful undergraduate. I constantly struggled against an earlier, unsuccessful attempt at a university education. While I was a very different person than the one who had not completed the earlier attempt at a degree, I still had to deal with the consequences. I didn't have a high grade point average, but I had an enormous determination to succeed. SDSU gave me the opportunity I needed.

My experience within the College of Sciences at San Diego State University (SDSU) began in the summer of 2002. I was a student in the SDSU Bridges to the Future program, which prepares community college students to successfully make the transition to university and to be on track to graduate—ready for whatever post-baccalaureate plans they may have. Through Bridges I was introduced to the various programs available at SDSU in the College of Sciences. I also had the opportunity to participate in the Louis Stokes Alliance for Minority Participation (LSAMP) program, preparing students for success in calculus.

I transitioned to SDSU in the fall of 2003, participating as a protégé in the College of Sciences Faculty Student Mentoring Program (FSMP). Already I was benefiting from the cooperative environment fostered by what is now called

the Center for the Advancement of Students in Academia (CASA). CASA brings the various programs within the College of Sciences together with the goal of creating an environment where students can receive maximum benefit from the opportunities available to them. Taking an important step toward my goal of earning a Ph.D., I became a Ronald E. McNair Scholar. In the summer of 2004, I was accepted into the Minority International Research Training program (MIRT) and was able to travel to Ghana, Africa, to evaluate various plants for properties involved in fighting diabetes. During the 2004-05 school year, my involvement with College of Sciences programs continued as I became a mentor in FSMP. This past year, I became the co-lead mentor in the College of Sciences FSMP. After sitting on the College of Sciences Student Council as a representative during the 2004-05 school year, I became the CSSC vice president last year and am also the current president of the Black Student Science Organization (BSSO).

Participating and working in leadership roles in programs and organizations within the College of Sciences helped me to become a well-rounded individual. Most importantly, it contributed to my acceptance into the Texas A&M biochemistry & biophysics doctoral program. This fall I start my doctoral studies.

At SDSU I found people who worked with me to achieve my goals, maximize my strengths and gain the experience necessary to succeed. Within the College of Sciences, I found the support necessary to realize my dream.

OFF CAMPUS TO A LARGER CLASSROOM: INDONESIA JOURNEY

ERIC PETERSON

GRADUATE STUDENT

As a graduate student at San Diego State University, I was privileged to receive a first-class educational experience from the many fine teachers in the Department of Geology, as well as the opportunity for a research experience in Indonesia. With the assistance of the San Diego State Foundation and funding provided by The Chevron Corporation, I set about preparing for the month-long trip which included numerous vaccinations at the SDSU Health Center, the necessary paperwork for a visa, and a short course in digital field mapping at U.C. Berkeley. After a thirty-hour flight and ground trip, I arrived at the University of Gadjah Mada in the city of Yogyakarta on the island of Java. SDSU Adjunct Professor Tom Heidrick led me and fellow SDSU students Jennifer Pérez and Jaime Marso into the countryside, collectively mapping several tens of thousands of square kilometers over the nearly year-long project. Joining us were about two dozen students and faculty from the University of Gadjah Mada. Professor Eric Frost from SDSU joined in a portion of the field work and worked with us at SDSU as our thesis advisor. The goal of our team was to evaluate the hydrocarbon potential of the East-Northeast Java Basin and unravel the geology of this portion of the Indonesian archipelago. Each SDSU graduate student had his/her own individual thesis project within the research area.

My thesis was entitled “Interactive Digital Field Mapping and Neogene Tectono-Stratigraphic Evolution of the Kendeng and Rembang Deformed Zones, East-Central Java, Indonesia.” My task was to determine how the mountain ranges in these two zones formed by using newly acquired field data, digital mapping software, global positioning, and landsat satellite imagery. The hours were long—10 to 16 hours a day, seven days a week for approximately five weeks—but productive. We drove about 10,000 kilometers through remote villages, dense tropical forests, and cultivated land in search of outcrops, which we investigated in order to understand the source of deformation of the rocks.

The weather was hot and humid. Temperatures reached 95 degrees daily, thunderstorms were frequent. When traveling through villages, our team created quite a stir. As many as 30 villagers gathered around and observed us while we collected our data. No doubt they wondered what these foreigners were doing picking up rocks and digging holes in the ground. Then it was into our cars and off to the next interesting geological formation.



Eric Peterson with local water buffalo herdsman of Java

Our diet consisted of the local cuisine and varied from tropical fruits like durian, rambutan, and a small banana called pisang, to other delicacies such as frog leg soup, goat sate, and buffalo tail. Since Indonesia is the world’s largest Muslim country, prayer is an important aspect of the people’s lives. I learned much from observing the religious practices and customs of my co-workers from Indonesia. Also, one of the interesting aspects of Indonesia is the assimilation of American culture into their society. There are KFC fast-food restaurants and television shows like American Idol and Fear Factor. Teenaged boys can be seen wearing Britney Spears T-shirts as they zoom along on their motor scooters.

As a result of my research I was able to disprove previous theories on how the Kendeng and Rembang mountain ranges formed. It was previously believed that they formed as a result of gravity sliding off the volcanic arc of Java. Instead, I was able to show that the formation of the mountains is similar in manner to those found along coastal California as a result of the strike-slip motion of the San Andreas Fault.

The international research I performed while at San Diego State University provided me with great memories of the people, places, and geology of Indonesia. I have grown closer to the SDSU faculty and graduate students that participated in this project and feel this experience helped prepare me for the international business of petroleum exploration. The opportunity to work with and be advised by a world-class geologist such as Tom Heidrick will, no doubt, greatly impact my future career as I saw how one of the best geologists in the world solves massive problems with creativity and staggering amounts of hard work. This collaboration between San Diego State University and the University of Gadjah Mada is hopefully the first of many future projects to come.

MY RESEARCH TRIP TO ENGLAND

DORI ROSENBERG DOCTORAL STUDENT

I loved my undergraduate studies abroad, but as a student in the rigorous five-year SDSU/UCSD doctoral program in clinical psychology, there was little time for international endeavors. That was until one of my research mentors, Dr. James Sallis, encouraged me to apply for an SDSU international travel scholarship. Dr. Sallis, professor of psychology at SDSU, collaborates with researchers on nearly every continent. My efforts to have such an experience for myself were successful and I headed off on a five-week research adventure at the University of Loughborough in England in the spring of 2005.

Loughborough is a tiny town about 90 minutes northwest of London. The university is well known for being the UK's hub for research on the built environment, social science, and sports science. I worked with Dr. Fiona Bull, a prominent international researcher in physical activity and public health (and colleague of Dr. Sallis), who coordinates the International Physical Activity Prevalence Study. The purpose of the study is to test the International Physical Activity Questionnaire (IPAQ) in 20 different countries, including the U.S., South Africa, the Netherlands, England, Brazil, and Guatemala. The IPAQ measures can compare the prevalence of physical activity across countries, helping researchers gather information in fighting the obesity epidemic.

My work focused on the part of the IPAQ that measures sedentary behavior. I found there are very few measures that focus specifically on time spent in sedentary activities, such as like watching TV, being on the computer, and just sitting around. Additionally, most studies examined children and looked specifically at TV watching. The few studies in adults tended to focus more on a lack of physical activity rather than actually measuring sedentary time. My analyses showed that the

items addressing sedentary time are reliable and valid for both men and women in a variety of countries. I am currently working on publishing my findings.

One of the best parts of the trip was the opportunity to see what it's like to live in another country. The everyday stuff—like being surrounded by people who have great accents, drinking tea like it's water, seeing old buildings and pubs everywhere—was so enjoyable. I took side trips to Edinburgh, Scotland, hiked in the English countryside with my co-workers, and took in the sights of London and surrounding areas. I encourage all students to seek out opportunities to travel internationally for their studies and research. Thank you, Dr. Sallis, for helping make this experience a reality for me.



Dr. Fiona Bull and Dori Rosenberg in the Peak District, England





Trainer, Kitty, and Alex

MY SOUTH AFRICAN EXPERIENCE

ALEJANDRA (ALEX) MIJARES

UNDERGRADUATE HONOR STUDENT

It has only been ten years since apartheid ended but South Africans are still feeling its effects as evidenced by racism, unemployment, and HIV/AIDS. During my time in Africa, I stayed in Stellenbosch, a town located in the Western Cape, in the wine country. Here each race still has its own community: only whites live in the downtown area, only coloreds (mixed race) live in Ida's Valley and Clottesville, and only black South Africans live in the Jamestown and Kayamandi townships. Even though all races in this country have been affected by the HIV/AIDS pandemic, one can't deny that the black community has been hit the hardest.

While in Africa, I participated in the training of counselors and nurses in collaboration with SDSU Psychology Professor John Martin and researchers from the University of Stellenbosch and the University of Cape Town for prevention of HIV mother-to-child transmission. I visited a hospital in Paarl on a Friday, the only day of the week that they treat adult HIV/AIDS patients. When it comes to the important issues of privacy and disclosure, it's glaringly obvious that here, for low-income black Africans, there is none. If you attend the hospital on Friday, you know that the people around you in the waiting room are likely to be HIV positive.

It was here that I got my first glimpse of the true suffering of HIV/AIDS patients as I sat in on doctor/patient consultations and heard many heartbreaking stories. One story that haunts me still is that of a 21-year-old woman with AIDS and the opportunistic disease of meningitis that had damaged her peripheral nerves— I can still hear her screams when someone barely touched her. Even sadder than the affects of disease was that she had to go through it alone. Her only family member was an alcoholic mother, who didn't seem to care or take the time to visit. Her story illustrates the critical need for empowerment of women by women, which is one of

the goals of the training we were conducting. This experience left me incredibly grateful to have a family who loves and supports me every step of the way.

As part of my community involvement, I was assisted by the Stellenbosch Lion's Club in distributing clothes to children in need. I recall the faces of two little sisters whose mother passed away two years before and they were left with a neglectful and abusive father. Each sister received two bags of clothes and their faces lit up, especially when they saw the new clean underwear. Seeing those faces light up is one of the best feelings I have ever had. During a visit to Kayamandi (a very poor 'shanty town' on the outskirts of Stellenbosch), we stopped in front of a school to buy lunch, my friend's way of showing me what the diet of these hungry kids consisted of. Lunch was purchased from a small shack that sold two chicken feet for two rand (about 30 cents), one of the most disgusting things I have ever seen or smelled.

On a more positive note, I must add that I was overwhelmed by South African hospitality. Every time I met a friend of a friend, I made a new friend. I was often invited to lunch and supper. I was spoiled by lovely home-cooked meals that left me wondering if I was going to walk or "roll out" of South Africa.

The important work to be done in HIV/AIDS research, the need to empower women, and the lifelong friendships I made give me more than enough reasons to look forward to returning to South Africa and the people that hold a special place in my heart.



Alex giving clothing to African child

PREPROFESSIONAL HEALTH ADVISING

BARBARA HUNTINGTON, DIRECTOR
JILL BAUMGARTNER, COORDINATOR

Advancing the education of caring health professionals is the purpose of the Preprofessional Health Advising Office (PPHA). This is done by providing opportunities for students to participate in their community while they continue to strive for academic excellence. Students gain knowledge, skills, and understanding through community service, internships and club projects. Leadership ability is gained through experience as class coordinators and peer advisors.

ACTIVITIES

A group of pre dental students peered through goggles, delicately extracting teeth that were embedded not in human gums, but in clay. The students were developing valuable skills that they'll use when they enter dental school. For several years Dr. Tamara Schneidmiller, a graduate of SDSU and UCLA dental school, has been leading future dentists through a series of hands-on workshops as part of a comprehensive pre dental program. Dental schools throughout the United States recognize this program as one of the best in the country. In addition to the workshops with the Pre dental Club, preventive dentistry students provide oral hygiene instructions to orphans in Tecate, residents of the Home for Guiding Hands, and preschool and elementary school classes throughout the San Diego area. Community service does not stop there. The students team up with volunteer dentists (Brian Hill, Tamara Schneidmiller, Thomas Olinger, Joel Berick, Thomas Scarfe, and Adam Raschke) to provide free dental exams for SDSU students at our Student Health Services. Other dentists volunteer their time to speak to the Topics in Dentistry class.

Highlights during the past year included our third Preprofessional Health Conference, "Catch the Wave to Success," in December, participation in Explore SDSU in April, and evenings with the deans of medical and dental schools.



Stephanie Martin and Matt Hankerson with speaker Carlos Sanchez, MD

In February, AED Prehealth Professions Honor Society held a fund-raiser for Team Parkinson, which provides seed money for important research for Parkinson's Disease. Donated treasures, including works by the artist Morten E. Solberg, were auctioned off. Several students also joined Team Parkinson in the Los Angeles Marathon.



Barbara Huntington, Chad Naylor, Liljana Trenova, Miranda Slater, and Monet Solberg

STUDENT PREHEALTH ORGANIZATIONS

SDSU Prehealth Clubs are continually involved in community service programs. Alumni and community businesses help in these endeavors. Clubs that work with the office include AED honor society, a premed chapter of the American Medical Student Association (AMSA), the Armed Forces Preprofessional Association (AFPA), the Association of PrePharmacy Students (APPS), the Black Student Scientists Organization (BSSO), Chicanos and Minorities for Community Medicine (CCM), the Council of Prehealth Organizations (CPO), the Dental Club, the Physician Assistant Student Association (PASA), the Preoptometry Club (FOCUS), Preventive Dentistry, the Postbaccalaureate Premed Club, the Preveterinary Club (PVMA), the San Diego Students of Naturopathic Medicine (SDSNM), the Society for Advancement of Chicanos and Native Americans in Science (SACNAS), the Student Health Advisory Board (SHAB), the Student Osteopathic Medical Association (SOMA), and Unite for Sight.

AND THE FUTURE...

Although acceptances are far from over, 44 SDSU students will go to health professional schools this year.

CENTER FOR THE ADVANCEMENT OF STUDENTS IN ACADEMIA

DR. ESTRALITA MARTIN, DIRECTOR / ASSISTANT DEAN

DECOLA GROCE, COORDINATOR

Promoting academic development of the next generation of underrepresented research scientists and health professionals is the mission of the Center for the Advancement of Students in Academia (CASA). This includes students who, for example, are low income, first generation, or from a particular cultural group. CASA provides opportunities to participate in faculty research, faculty and student mentoring, and course enrichment workshops. The center offers travel to scientific meetings and doctoral degree-granting institutions for further graduate study. Research experiences at National Institutes of Health (NIH) are made available as well as at other research institutions and laboratories in foreign institutions. There are 14 support programs working collaboratively to achieve this goal:

Bridges	Bridges to the Future
FSMP	Faculty/Student Mentoring Program
GAP	Graduate Access Program
HCOP	Health Careers Opportunity Program
IRACDA	Institutional Research and Academic Career Development Award
LSAMP	Louis Stokes Alliance for Minority Participation
MARC	Minority Access to Research Careers
MBRS	Minority Biomedical Research Support
McNair	SDSU McNair Scholars Program
MHIRT	Minority Health Disparities International Research Training
MSP	Maximizing Science Potential
NIW	New Interdisciplinary Workforce
PREP	Post-baccalaureate Research Education Program
PPHA	Preprofessional Health Advising

Several undergraduate students in our college have taken their knowledge from the classroom into the laboratory to apply to research projects. Many of these students participate in one or more of the CASA programs. To highlight their efforts, undergraduate students who undertook a research project are invited to participate in a one-day event known as the Undergraduate Research Symposium (URS), a joint effort by CASA and the College of Engineering. This year there were 59 undergraduate student projects presented at the URS, which moved from the lobby of the Life Science building to the Aztec Center because of its continual steady growth since its inception.

Not only are CASA students actively participating in research, they're accepted into graduate and professional programs across the nation. In addition to California, this year's graduates are attending 1) Ph.D. programs in Arizona, Illinois, Massachusetts, Michigan, Nevada, Texas, and Washington, 2) Master's programs in Georgia, Massachusetts, and New York, and Washington D.C. and 3) professional schools in Arizona, Colorado, Connecticut, the District of Columbia, Illinois, Indiana, Kentucky, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Mexico, Nevada, New York, Ohio, Pennsylvania, Tennessee, Vermont, and Virginia. We also have students going to Dominica to undertake their professional studies.

The various opportunities for student development improve student retention and bring post-doctoral students to our campus. If you're interested in becoming a mentor, please contact any of the programs individually or Dr. Estralita Martin, director of CASA, and the assistant dean for student affairs.



Dr. Estralita Martin



Alma Bravo and Feion Gillis



Gertrudis Vargas



Sharon Epps, Yessenia Ibarra, and Veleka Boyd



Veronica Bejar (front-right corner) and the 2006 McNair Scholars

McNair Scholars Program

DR. ROBERT POZOS, PRINCIPAL INVESTIGATOR
VERONICA BEJAR, DIRECTOR

The SDSU McNair Scholars Program prepares first-generation college students and students currently underrepresented in graduate education to become university professors. The U.S. Department of Education TRIO programs fund it.

The collaboration of all the Center for the Advancement of Student in Academia (CASA) programs is a unique characteristic that benefits the students participating in one or more programs. The SDSU McNair Scholars Program is one of the participating programs under the umbrella of CASA, led by Dr. Estralita Martin, assistant dean of the College of Sciences.

A wonderful example of the CASA programs at work is the success history of Sharon Epps, who was admitted to the Ph.D. program in biophysics and biochemistry at Texas A & M. Sharon transferred to SDSU from Grossmont College as a biology major. She participates in Bridges to the Future, Louis Stokes Alliance for Minority Participation (LSAMP), McNair Scholars, and Minority Health Disparities International Research Training (MHIART) programs. Sharon is the co-lead mentor in the College of Science's Faculty-Student Mentoring Program (FSMP) program, president of

the Black Student Science Organization, a member of Sigma Xi, Louis Stokes AMP scholarship recipient, spring 2005, and vice president of the College of Sciences student council. She conducted research for the past two-and-a-half years with Professor F.S.K. Tayman of the chemistry department at the University of Cape Coast, Ghana, and with Dr. Robert Metzger of the chemistry department at San Diego State University.

The McNair Program has several scholars accepted into Ph.D. programs: Veleka Boyd, Basic Sciences Program at the University of Texas, Southwestern; Christina Campbell, Ecological and Community Psychology Program at Michigan State University; Sharon Epps, Biophysics and Biochemistry Program at Texas A&M, Starlyn Hawes, Clinical Psychology Program at Washington State University, Pullman; Blanca Torres, Cultural Anthropology Program at Cornell University; Jorge Urbina, Clinical Psychology Program at the University of Nevada, Reno, and Ian Villalta, Clinical Psychology Program at Arizona State University.

In addition, the following scholars were accepted into master's degree programs: Elizabeth Abou, psychology at SDSU; Alfonso Clemente, Spanish

and Latin American literature at New York University; Jennifer Davis, public health at Emory University; Damion Donaldson, education psychology at the University of Southern California; and Sarah Zanartu, school counseling at SDSU.

Each summer, 24 McNair Scholars receive stipends to conduct at least 300 hours of research with a faculty mentor, write a research paper, and present their findings at regional and national conferences.

Our highly regarded summer research program contributed to the scholars' success getting accepted into graduate school programs. Many of the graduates of the SDSU McNair Scholars program have matriculated at the various graduate schools including Stanford University, Harvard University, Columbia University, Yale University, Brown University, and others.

Of the past McNair Scholars, 14 have completed doctoral programs, two are physicians, one is a lawyer, and one is a doctor in physical therapy. In addition, two McNair alumni, Dr. Diana Verzi and Dr. Vu Anh Lee, are in faculty positions at SDSU. In the pipeline, the McNair Program has 26 doctoral students and one M.D./Ph.D. student.

GRADUATE ACCESS PROGRAM

MAUREEN GIBBINS, DIRECTOR
JIM NEEL, DIRECTOR

Designed to encourage undergraduates to consider advanced degree programs early in their undergraduate careers and provide a central location for access to information and advice is the purpose of the Graduate Access Program (GAP). The program was initiated in 1995 and provides College of Sciences' students with general assistance in planning for graduate work leading to advanced degrees in the sciences, mathematics, and computer science.

GAP manages a GRE preparation course for the General Test that is available to all College of Sciences majors. The course is given three times-a-year and offers meetings in the Love Library computer facilities to provide practice in taking the current computer-adaptive General Test under test office conditions. Each course is available to students at a cost of \$200. Approximately 130 students enroll each year.

Each fall semester, the program offers a formal course (Biology 247) to provide support and assistance to students preparing applications to graduate schools throughout the country. Taught jointly by Maureen Gibbins and Jim Neel, the entire application process is addressed, including preparation of applications to national fellowship programs and recruitment visits from major universities to describe their graduate programs. Some of the graduate programs that have issued acceptances to student participants over the past three years include Harvard, Columbia, Yale, Washington University in St. Louis, the University of Texas, Southwestern Medical Center at Dallas, U.C. Davis, U.C. Santa Cruz, U.C. Riverside, U.C. Irvine, and the University of Arizona.

College of Sciences faculty, staff, and graduate students are encouraged to refer undergraduate students who may have an interest in achieving an advanced degree to one of the codirectors (Maureen Gibbins, mgibbins@sunstroke.sdsu.edu, or Jim Neel, neel@sciences.sdsu.edu) to discuss possible assistance in meeting graduate school admission requirements.

BRIDGES TO THE FUTURE

DR. PAUL PAOLINI, PI / DIRECTOR
MAUREEN GIBBINS, COORDINATOR

As part of the SDSU Bridges program, students from Southwestern College, San Diego City College, and Grossmont College spent time during the summer attending workshops at SDSU on research methods and design, scientific writing, microbiology, calculus, and chemistry. They participated in hands-on research in the Rees-Stealy Research Foundation (RSRF) Laboratory, under the guidance of Frank Gonzales and Dr. Paul Paolini. During the academic year, they attended classes on the responsible conduct of research and minority health disparities.

Three "Bridges" were admitted to Ph.D. programs—one each at U.C. Berkeley, Harvard, and Texas A&M. Another student is waiting on the status of his application to programs for the doctor of physical therapy degree.

This past year SDSU Bridges students made up 10 percent of all the finalists for the National Institutes of Health Undergraduate Scholarship Program. We are proud that two of the 12 students selected to receive the scholarship were Bridges students. One of those students, already awarded other support, declined the scholarship. The other, Yessenia Ibarra, who was also supported by SDSU's Minority Access to Research Careers program, accepted the scholarship.

Yessenia excelled during her time at SDSU. She conducted stem cell research with Dr. Mark Mercola at the Burnham Institute. She was accepted to Ph.D. programs at Columbia, Harvard, and Yale and has decided to pursue her Ph.D. in neuroscience at Harvard. She was recently informed that she was selected to receive a National Science Foundation (NSF) Graduate Research Fellowship.

Bridges and Minority Access to Research Careers (MARC) scholar Zach McDonald was honored recently when he was selected for both Mortar Board, a campus honor society, and by Quest for the Best, the Vice Presidential Student Service Award. Each year 40 students are selected for Mortar Board from throughout the undergraduate body at SDSU. For Quest for the Best, only 10 students are chosen. Both programs stress academic excellence combined with service and leadership.

MBRS/IMSD Program

DR. EMILIO ULLOA, DIRECTOR
MICHELLE LOPEZ, ASSOCIATE DIRECTOR



Scholars: Christina Campbell and Veleka Boyd

The Minority Biomedical Research Support/Initiative for Maximizing Student Diversity Program (MBRS/IMSD) is designed to increase the competitiveness of underrepresented students and facilitate their progress toward careers in biomedical or behavioral research. Our focus is on research and professional development of students.

The program provides funding for up to 10 undergraduates, eight master's students, and five Ph.D. students to conduct research, travel to scientific conferences, purchase lab trainee supplies, and to develop manuscripts leading to publication. Professional development is acquired through year-round mentoring, GRE review, tutoring, scientific/technical writing, biomedical ethics training, personal statement and CV development, and fellowship application workshops.

Students are funded in research laboratories by the College of Sciences and College of Health & Human Services (speech, language, and hearing sciences, and public health). The MBRS/IMSD program is in its 15th year of National Institutes of Health/National Institute of General Medical Services (NIH/NIGMS) funding.

Veleka Boyd and Christina Campbell demonstrate just how successful this program is. Veleka Boyd is a Biology senior undergraduate who is a McNair Scholar supported by MBRS since 2004. Veleka conducts research in the laboratory of Dr. Greg Harris (<http://www.bio.sdsu.edu/faculty/harris.html>). They investigate the molecular genetics of Sphingolipid metabolism in *Drosophila*. During her development as an NIH/MBRS

scholar, Veleka presented her work at various conferences including the Annual Biomedical Research Conference for Minority Students (ABRCMS), the SDSU Annual Undergraduate Research Symposium, the Society for the Advancement of Native Americans and Chicanos in the Sciences (SACNAS), and most recently the 18th California State University (CSU) Biotechnology Symposium. She was recognized for her outstanding research, winning first place for the molecular and cellular division at the 2005 Society for Advancement of Chicanos and Native Americans in Science (SACNAS) Conference and named the 2006 CSU Glenn M. Nagel Undergraduate Student Research Award recipient. Veleka was accepted into Ph.D. programs at Northwestern University, Washington University at St. Louis, and at the University of Texas, Southwestern Medical Center. She earned her B.S. in biology with a cellular and molecular biology emphasis in May 2006.

Christina Campbell, a Psychology undergraduate who conducts research with Dr. Joseph Price and Dr. Wendell Callahan, began her first research placement on breast cancer fatigue with the McNair Scholars Program. She was selected into MBRS in September 2003 where she pursued her passion for social psychology. Christina's research focuses on social relationships and behaviors of maltreated children. Her professional portfolio includes over 12 presentations at national scientific conferences (APA, WPA, APS, ABRCMS, SACNAS, and the National Conference for Undergraduate Research). She conducted a 2005 McNair/Summer Research Opportunity Program (SROP) summer research fellowship at Michigan State University, received second place for her research paper by the National Council for Black Students, earned two student international study abroad scholarships, and is a member of the Mortar Board National Honor Society. She is a recipient of the Marcy May Scholarship and African American Faculty/Staff Student Scholarship. Christina earned her B.A. in psychology in May and begins her Ph.D. at the Michigan State University, Ecological-Community Psychology Program.

Both students are exemplary individuals and we congratulate them on their continued success. MBRS applications are accepted year round. Publications, presentations, additional information and applications can be found at <http://www.sci.sdsu.edu/mbrs> or by contacting 619-594-3744.



2006 MARC and MBRS Scholars

Minority Access to Research Careers

DR. CATHIE ATKINS, PRINCIPAL INVESTIGATOR / DIRECTOR
THELMA CHAVEZ, COORDINATOR



Dr. Cathie Atkins with MARC Scholars

The Minority Access to Research Careers program was established in 1975 to help develop the talent and increase the number of Ph.D. degrees awarded among certain ethnic groups that have long been underrepresented in the biomedical and behavioral sciences. These groups include African Americans, Hispanics, Latinos, Native Americans, and Pacific Islanders. By contrast, the demand throughout the nation for Ph.D.s in the biomedical and behavioral sciences from among these groups is unprecedented.

Sixty-five students completed the MARC program since its inception at SDSU in 1989. Thirty-three of those have matriculated into Ph.D. programs at institutions including Harvard, USC, SDSU/UCSD, Columbia, UT Southwestern, CalTech, University of Michigan, Stanford, and MIT. One of the main objectives of the MARC program, sponsored by the National Institute of General Medical Sciences, is to develop students who will return to academia. Currently, seven former MARC scholars are teaching at various universities across the country. Six former MARC scholars are post-doctoral fellows at National Institutes of Health/ National Institute of Allergy and Infectious Diseases (NIH/NIAID), Columbia, and Emory, just to name a few.

We are extremely pleased that several MARC scholars will be entering Ph.D. programs in the fall—Sonia Arteaga, computer engineering (U.C. Santa Cruz), Yessenia Ibarra, biology (Harvard), and Patricia Castillo, biology (U.C. Davis). Two continuing scholars were accepted to a summer research program at Harvard University.



Dr. Emilio Ulloa (left) with 2005 MARC and MBRS Scholars

IN MEMORIAM

DR. WAYNE DAUGHERTY

Wayne Daugherty, a colleague and friend, passed away December 2, 2005, following an extended battle with cancer. His wife and children were with him. Wayne received an A.B. degree in biology in 1960 from Long Beach State College and earned his Ph.D. in biology from Johns Hopkins University in 1966. He joined the Department of Biology at San Diego State College as an assistant professor in 1966 and remained here until his retirement in 2000, becoming a professor emeritus. His scientific interests centered on neurobiology and developmental biology.



DR. BILL SLOAN

Dr. Bill Sloan also passed away during the past year. He earned his Ph.D. from Tulane University and served in his early years as a member of the U.S. Merchant Marine. During his time at SDSU, he served as both department chair of the Department of Zoology and as associate chair of the Department of Biology. His research focused on marine invertebrate physiology, but his real area of expertise was life. A gifted storyteller and talented mentor, he will be sorely missed.

DR. HOMER PEABODY

Dr. Homer Peabody passed away December 16, 2005. He'd been an adjunct faculty member, a friend, and a great supporter of student biomedical research at SDSU. Through his activities as the past medical director and, most recently, executive director of the Rees-Stealy Research Foundation, he oversaw the training of numerous SDSU undergraduate and graduate students. Dr. Peabody, who earned his B.S. from Harvard in 1941 and his M.D. from Columbia Medical School in 1944, also served as medical director of the Rees-Stealy Clinic, San Diego's first group medical practice. Dr. Peabody left a legacy in many areas of San Diego life, in addition to the medical community.

DR. JACK GARRISON

John D. Garrison, "Jack" to his colleagues and friends, passed away in November at the age of 83. Jack received his Ph.D. from the University of California, Berkeley, in 1954 and joined the physics department at San Diego State University in 1956. Prior to that, he was an instructor at Yale University and a visiting scientist at Brookhaven National Laboratory. Jack was a nuclear physicist and later in his career became actively involved in solar energy. He was involved with several professional societies including the American Physical Society, American Nuclear Society, American Solar Energy Society, and International Solar Society. Jack retired in 1983 and joined the Faculty Early Retirement Program (FERP) until officially retiring in 1991. He kept a presence in the physics department up until the time of his death. Jack is survived by his wife Betty, a retired professor of mathematics at SDSU, and three children.



GLORIA ANN DYLEWSKI

MEMORIAL SCHOLARSHIP

It's hard to believe but it's been a year since this college lost a beloved member and friend, Gloria Dylewski. She loved students and spent the last 12 years at the university as the administrative assistant for the assistant dean for student affairs. Prior to that, Gloria served as secretary in chemistry, geology and physics. She spent 25 years at SDSU. The Dylewski Endowment, created in her honor, has just over \$14,000 and needs \$20,000 to become qualified. When fully funded, the endowment will offer the "Gloria Ann Dylewski Memorial Scholarship" in her memory.

The family worked with Dr. Cathie Atkins, Associate Dean of the College of Sciences, to establish the general criteria for students who may qualify for the scholarship:

Pursuing a program of study in the College of Sciences

An undergraduate level student with a minimum GPA of 3.5 out of 4.00 (or the arithmetic equivalent)

Demonstrate financial need, as defined by the SDSU Office of Financial Aid and Scholarships

College of Sciences scholarship committee selects the recipient(s) of the scholarship.

Donation checks for this memorial scholarship fund can be made to the Campanile Foundation, Gloria Ann Dylewski Fund. Please include the name of the fund somewhere on the check and envelope so it can be easily identified for this fund. Donors will receive a letter acknowledging their gift and a receipt for tax purposes.

Please send checks to:
Gloria Ann Dylewski Scholarship Fund
University Advancement: MC 8035
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-8035





Quilt made by Gloria Dylewski



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UNIVERSITY

Address Corrections Requested
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