

S STATE OF THE COLLEGE NEW DEVELOPMENTS AND NEW FACES

by Sheldon Axler, axler@sfsu.edu
Dean, College of Science & Engineering

As you surely know, the state of California has serious budget problems. As a result, state universities have been hit with budget cuts. Fees paid by students have been raised, although not by enough to make up for the shortfall in state funds. During the current fiscal year, San Francisco State University tightened its belt and used some one-time savings to help get through this year in reasonable condition (the fiscal year for SFSU, as well as for the state of California, begins on July 1 and ends on June 30).

In the College of Science & Engineering, we managed to serve more students than ever before. Total enrollment in courses offered by the College of Science & Engineering averaged over 19,000 students per semester this year. Average class size increased a bit to handle the extra students, but our faculty met the challenge and continued to offer high-quality educational experiences to our students.

The outlook for next year does not seem encouraging. Although the state has not yet passed a budget, we anticipate a further severe budget cut to SFSU on top of the cut that we received this year. This will require us to reduce the number of class sections offered, leading to increased class size for the remaining classes. Because we cannot expand class size beyond the point where students can effectively learn or beyond the physical size of the classrooms available, I expect that many students will be unable to get into the classes they want next year.

One bright spot is that the external (nonstate) funds coming to the College of Science & Engineering continue to increase. Last year we received over \$20 million in

external funds, up from \$10.6 million in the 1998-99 fiscal year. Most of these funds are grants from federal agencies in support of our research efforts, with a significant portion of these funds designated to support student research. The extraordinary grant success of our College is a tribute to our excellent faculty and their work in integrating research and teaching as they bring their research to our students.

Three outstanding new tenure-track faculty joined the College of Science & Engineering in January 2004:

Kathy Boyer, Assistant Professor of Biology with a research appointment at the Romberg Tiburon Center, received her PhD in Organismic Biology, Ecology, and Evolution from UCLA. She comes to us from the University of North Carolina, where she had a postdoctoral position. Kathy's research focuses on how species interactions influence ecosystem functions in wetland habitats.

Jay Storz, Assistant Professor of Biology, received his PhD in Biology from Boston University. He comes to us from the University of Arizona, where he had a postdoctoral position. Jay's research focuses on constraints on adoptive evolution imposed by the interplay between different evolutionary processes.

Kimberly Tanner, Assistant Professor of Biology, received her PhD in Neuroscience from UC San Francisco. She comes to us from the UC San Francisco, where she had a postdoctoral position. Kimberly's research focuses on biology education, the nature of teaching/learning processes, and partnership interactions between K-12 schools and universities.

A LUMNI DOMAIN: RICHARD D. LASKY, PH.D., SENIOR SCIENTIST, ANALYTICAL CHEMISTRY

After receiving his B.A. degree from Occidental College, Richard earned a Master's Degree in Biology (1981) at San Francisco State University. Richard then went on to obtain his doctorate in Biochemistry from the University of California at Davis in 1983. He was a postdoctoral fellow in the Laboratory for Carbohydrate Research at Harvard/Mass General Hospital from 1983 to 1985 followed by a second postdoctoral position in Biochemistry at the University of California at Berkeley. In 1987 he took a Staff Scientist position at the Barnett Institute for Analytical Chemistry at Northeastern University to investigate the capillary elec-

trophoresis of carbohydrates. In 1988 Richard started his career in industry with a Research Scientist position at Imreg, Inc, a small biotech company, where he developed novel methods of analysis for very small quantities of the company's proprietary products. Richard then moved on to the Hyland Division of Baxter Healthcare Corporation, where he served in several positions



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Special to this Issue: Steve Bollens

ASSOCIATE DEAN FOR RESEARCH AND DEVELOPMENT

Dr. Steve Bollens is thrilled to be taking on the responsibilities of this new position within the College of Science & Engineering (COSE). "I am delighted to be given the opportunity to work with all of the college's faculty and staff to promote the research and development agendas of COSE. This is an exciting time for the college, and indeed for science and engineering nationally, as interdisciplinary projects and programs are becoming increasingly important to advancing the frontiers of science. The opportunity to work with individuals from many different disciplines—ranging from astronomy to computer science to zoology—is extremely exciting." Steve's broad training within science, and his many years of successful grantsmanship and fundraising, make him an excellent choice to serve in this challenging new position. Moreover, his eclectic upbringing may have set the stage for what was to follow.

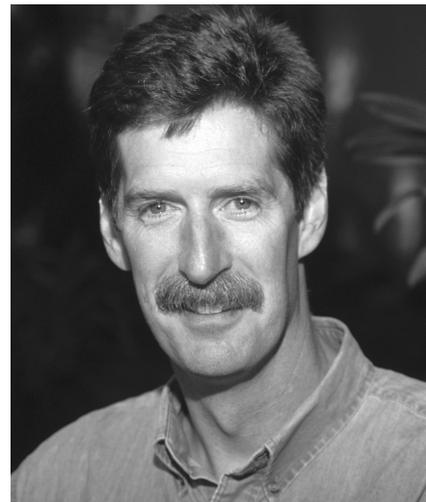
Steve was born in Chicago, Illinois in 1959, the youngest of three children. When Steve was 12 years old his parents decided that the family was in need of a change. So they packed their belongings into a station wagon and drove south to the then sleepy town of Key West, Florida. There they purchased a commercial fishing boat and opened a small gallery specializing in arts and crafts from around the world. This was Steve's first introduction to the ocean and the culture of a maritime community. Steve and his siblings assisted his parents with all aspects of the family's two enterprises, including serving as deck hand on the fishing boat and working behind the counter in the art gallery. But it was the snorkeling, spearfishing and exploring in and around the coral reefs and mangrove islands of the Florida Keys that most captured Steve's imagination. It was here that he learned about the diversity of marine life first hand. After high school, Steve attended Oberlin College in Ohio. He received a B.S. in Biology in 1981, took a year off to travel around the world (literally) and then moved to Seattle, Washington to begin graduate studies in Biological Oceanography at the University of Washington.

Steve's PhD dissertation research examined why some zooplankton (microscopic aquatic animals who drift freely in the ocean) "migrate" from the surface during the night to deeper depths during the day and back to the surface again the next night. This process, called vertical migration, had been recognized for many years, but Steve was the first to experimentally demonstrate that many zooplankton use this behavior to specifically avoid being eaten during the day by visually-orienting predatory fish in the surface waters. After completing his Ph.D. in 1990, Steve moved to the Woods Hole Oceanographic Institution (WHOI) in Woods Hole, Massachusetts, where he continued his research in oceanography and fisheries, first as a postdoctoral scholar, then as a tenure-track scientist. He received several honors during the early years of his career, including a prestigious Young Investigator Award from the Office of Naval Research, and published a series of much-cited articles on topics related to zooplankton ecology and fisheries oceanography.

Being a scientist at a world-renowned marine research institution and traveling to the far off reaches of the world's

oceans was exciting, however Steve wanted to expand his career to include more opportunities to teach at both the graduate and undergraduate level. In particular, Steve wanted to actively involve students in his cutting edge research. So in 1996 Steve joined the faculty in the Department of Biology and the Romberg Tiburon Center (RTC) at SFSU as an Associate Professor, where he could combine his passion for oceanographic research with a desire to teach and mentor students. Since arriving at SFSU Steve has taught a range of courses that have received high marks in student evaluations. He has also maintained a very active research program, mentoring more than 20 graduate students and publishing nearly 50 scientific papers. Steve received tenure and was promoted to Professor in 1998, and in 1999 became Assistant Dean in the Office of Research and Sponsored Programs, focused primarily on developing research opportunities at RTC, in addition to his faculty appointment. As Assistant Dean Steve helped RTC expand its extramural grantsmanship from \$1 million per year to over \$8 million per year.

In recognition of his contributions and skills in fundraising, in 2003 Dean Sheldon Axler appointed Steve as Associate Dean for Research and Development for COSE. In this position Steve now assists faculty and staff in all COSE departments with identifying funding sources and preparing grant proposals to federal and state agencies, as well as working with the SFSU Development Office to obtain contributions from private foundations, corporations and individuals in support of COSE research and education efforts. When he is not attending to his teaching, research and administrative duties, Steve enjoys relaxing with his wife, Gretchen (a Lecturer in the Department of Biology and an Assistant Research Scientist at RTC) and playing and exploring with his two young daughters, Laelani and Arianna. But he recognizes that there is a lot of important work to do, also. "The future of COSE is extremely bright, but with the increased costs associated with doing cutting-edge research comes the need to obtain additional resources to support our faculty and students in their endeavors," says Steve. "State support for higher education is already stretched thin, so we must all work together—faculty, staff, alumni and administrators—to identify and pursue alternative sources of support. In doing so we can help ensure that COSE students continue to enjoy first-rate research experiences, in addition to first-rate classroom instruction. What could be more important and rewarding than that?"



Luis Gino De Grandis



The College of Science & Engineering

cordially invites you and your guests to the

6TH ANNUAL Free Admission

ALUMNI RECEPTION & STUDENT PROJECT SHOWCASE

Friday, May 14th, 2004

SCIENCE BUILDING, Room 201

View projects any time after 4:00 pm

Program begins at 6:00 pm

The event features a variety of exciting student projects on display, highlighting our faculty's commitment to providing SFSU students with hands-on experience in problem solving and research.

During the showcase, students are competing for many monetary prizes.

(We still need more sponsors to increase the number of prizes.

Let us know if you can help!)

Program:

4:00 pm Viewing of Projects begins

6:00 pm Alumni Reception

6:30 pm Welcome from Dean Sheldon Axler

6:40 pm Guest Speaker: Dr. William Hsu,

Associate Professor of Computer Science

Topic: Electric guitars and virtual woks: from computer music instruments to sound effects. (An interactive tour of how computers are used to simulate music instruments and generate sounds for games and virtual reality environments.)

7:00 pm Door Prizes

Awards Presentation

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Please mark your calendar and RSVP to Lannie Nguyen-Tang.

In today's fast-paced business world portability significantly increases productivity. As the market for laptops and other mobile computing devices grows, so does demand for efficient, effective wireless local-area networks (WLANs).

Assistant professor of engineering Todor Cooklev is a voting member of the standardization committee developing WLAN technology. His upcoming book IEEE Wireless Communication Standards, to be published by IEEE Press in 2004, will be the definitive (and only) source on IEEE wireless standards, outlining the parameters, requirements and standards for wireless networks, software and hardware.

On the faculty since 2002, Dr. Cooklev teaches graduate courses in wireless communication standards and software radio and conducts research in wireless communications. Prior to joining SFSU he worked in private industry at Aware, Inc. and US Robotics (now 3Com Corporation), where he received the 3Com Inventor Award. He received his Ph.D. in electrical engineering from Tokyo Institute of Technology.

In the remainder of this article, Dr. Cooklev shares his thoughts about trends in wireless communication.

Wireless data communications is one of the fastest growing communications markets, and is the foundation of a number of new products and services, most of which are based on the standards developed by the IEEE project 802, called the Local and Metropolitan Area Networks Standards Committee (LMSC). The traditional view of wireless communication is that there are two network categories—voice-oriented and data-oriented—further subdivided into coverage area: local area or wide area. Within IEEE, 802.11 is a group for wireless local area networking (WLAN); group 802.15 focuses on short-distance wireless personal area networks (WPAN); and group 802.16 develops standards for broadband wireless access (BWA).

Wireless voice systems have been used in the U.S. since the 1930s when the first police vehicles were equipped with one-way (and then two-way) radios. Cellular telephony, while technically developed in the 1940s, was commercially deployed on a wide scale in the 1980s. Wireless data systems, introduced after 1990, rely primarily on external network adapters (NAs) and access points (APs), although the market is moving towards integrated devices within laptops and consumer electronics.

Clearly the fundamental long-term trend is the merger of voice and data, which will require seamless roaming between cellular and wireless local area networks. Current products en-

able single subscriber identity on these two different networks. And it is expected that third-generation cellular telephony will offer up to 2 Mb/s at a fixed location, although the real throughput will be much lower. Future wireless networks will likely combine several radio communication technologies and WLAN.

WLAN, with top speeds of 54 Mb/s, will continue to provide much superior bandwidth compared to any cellular technology. The interesting business question is: to what extent will WLAN compete and/or complement other wireless data technologies?

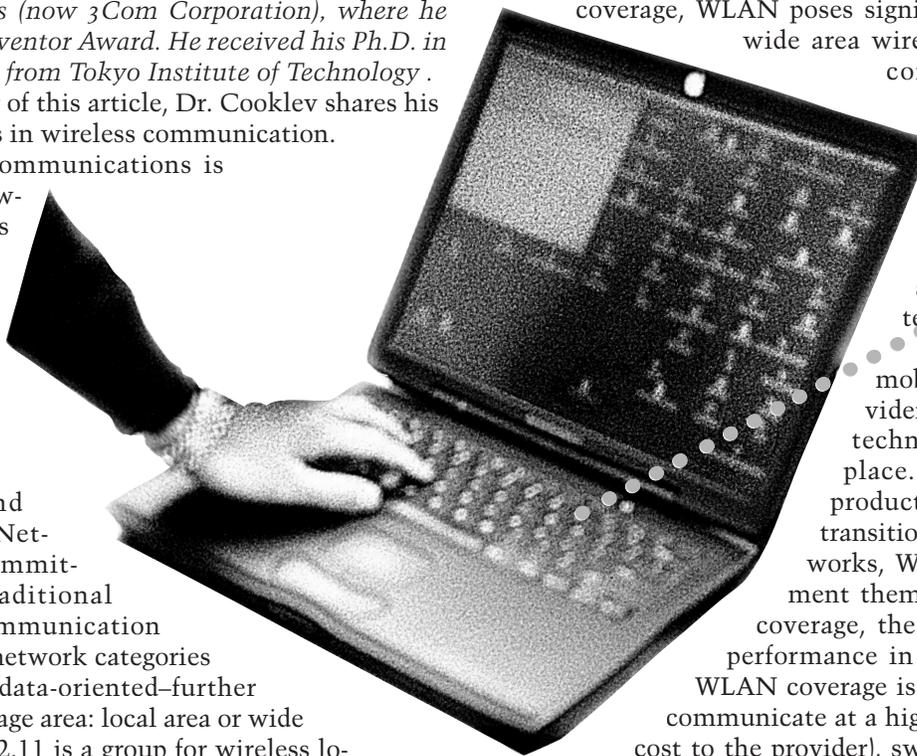
To some cellular providers offering high-rate data service, WLAN—a mature and low-cost technology with the benefit of operating in the unlicensed spectrum—may appear as a foe. Combined with directional antennas for extended coverage, WLAN poses significant competition to wide area wireless networks.

Many companies already are providing high-speed WLAN data services in such places as coffee shops, fast food restaurants, airports and convention centers.

At the same time mobile phone service providers are introducing 3G technology in the marketplace. When combined via products that offer seamless transition between the two networks, WLAN and 3G complement themselves—one with wide coverage, the other with enhanced performance in isolated areas. When WLAN coverage is available stations can communicate at a higher data rate (at lower cost to the provider), switching to higher cost 3G networks in their absence.

The next big wave in WLAN deployment is expected to be the “unwiring” of such consumer electronics devices as televisions, CD players and DVD players. This will unleash the long-awaited demand for video over the Internet and will likely have a significant impact on the entire communications industry.

While the growth and success of WLAN is due to the market growth of laptops, the main market demand for wireless personal area networking (WPAN) technology comes from the proliferation of such small consumer devices as cellular phones, personal digital assistants, personal music players and digital cameras. These devices are driven by a fundamental law of communications—the constant desire to increase the data rate. Even before 802.15.1 was completed, several companies initiated work on higher-speed WPAN technology—802.15.3



aimed at supporting high-bit-rate multimedia traffic in portable consumer electronics.

The first WPAN technology, known as Bluetooth, was developed because cell phone manufacturers wanted to increase the value of their main product by enabling it to communicate with devices other than phones.

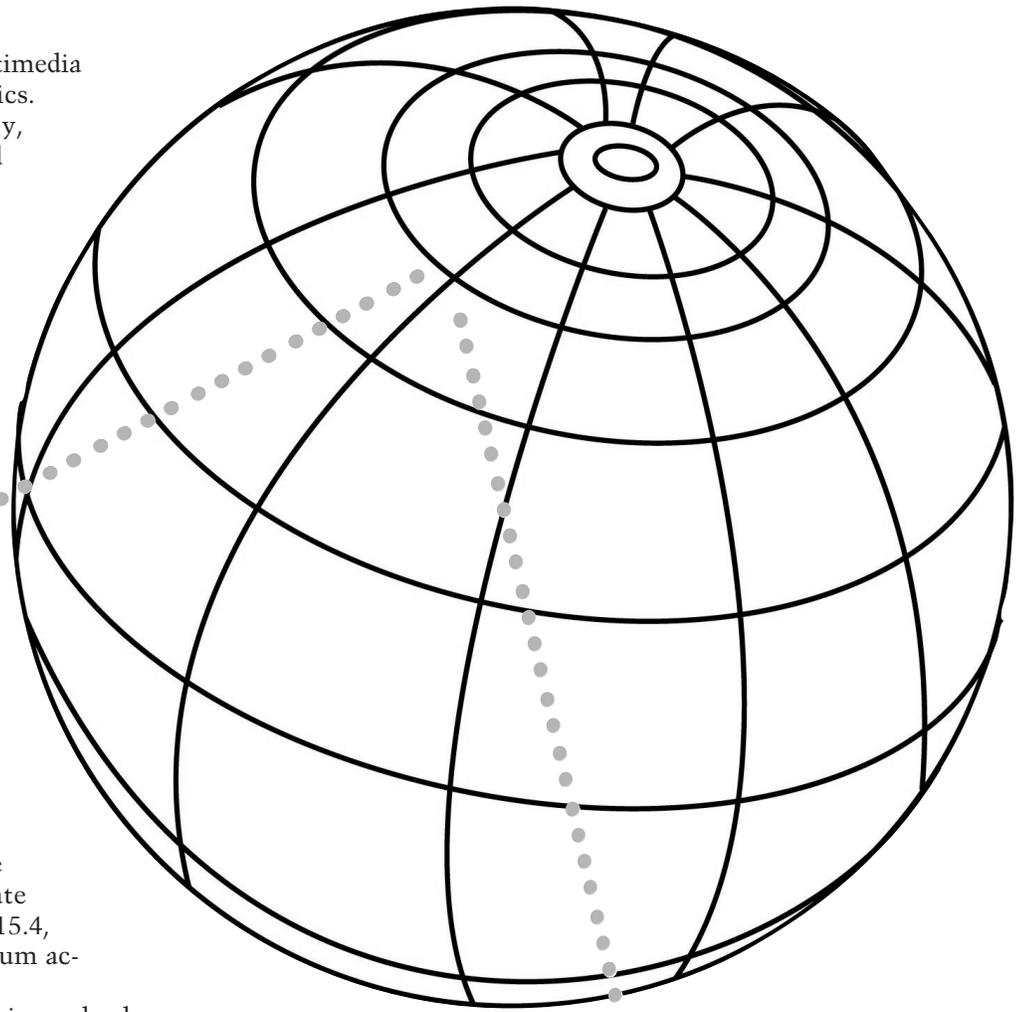
After Bluetooth's development it became clear that a one-technology-fits-all approach is not appropriate. Many industrial, agricultural, medical and vehicular applications such as sensors, meter reading, smart tags/badges and home automation require short-range wireless connectivity different from Bluetooth. Ultra low power consumption and ultra low cost are key for these applications, while data rate is not. Bluetooth or the high-rate WPAN technology cannot address these applications. IEEE 802 addressed these market needs by developing low-rate WPAN technology, called IEEE 802.15.4, which defines the physical and medium access control layers.

Products meeting 802.15.4 criteria can be designed to run on just two AA batteries per year, and will be strong competitors in the new and fast-growing market of wireless sensors. These products include cordless switches, intelligent remote controls (network-device) and security, lighting and heating, ventilation and air-conditioning (HVAC) controllers, along with sensors on buildings, bridges and other structures that can monitor seismic movements. Eventually wireless sensors will find a variety of applications in industrial control and monitoring, intelligent agriculture, supply chain management and asset tracking, health monitoring, security and military sensing.

Recently 802.15.3 began work on a new physical layer 802.15.3a, providing data rates in excess of 100 Mb/s, and up to 480 Mb/s. This physical layer will be based on ultra-wide band (UWB) technology and it seems reasonable that Bluetooth will succeed as a true cable replacement technology and, along with broadband wireless access (BWA) be a solid competitor in the broadband Internet mass-market.

As the IEEE 802 wireless standards continue to evolve, more innovations in architectures, spectrum allocations and protocols will result. A key goal will be toward convergence of standards and truly ubiquitous connectivity, with seamless operation between wireless networks, and even with wired networks.

What is the most exciting wireless development on the horizon? Look for the emergence of software-defined (SDR) radio as an enabling technology. Once fully developed SDR will offer the ultimate in flexibility, programmability, and cost.





By Shira B.

Despite recent and forthcoming educational budget cuts in the State of California, the College of Science and Engineering (COSE) continues to acknowledge academic achievement by providing financial assistance to outstanding COSE students, including the allocation of two new scholarships in the Fall 2003 academic semester. The generous awards are offered to both undergraduate and graduate students. This variety of options encourages academic growth and helps prepare students for cutting-edge scientific careers.

The COSE Scholarship committee awarded sixteen scholarships for a total of \$34,000—twelve graduate, four undergraduate—for the Fall 2003 Semester. The scholarship recipients comprise a diverse body of science and engineering disciplines, including Biochemistry, Biology, Chemistry, Computer Science, Engineering, Geosciences, Marine Biology, Mathematics and Physics. Many of the winners are active volunteers in their communities and have conducted top level scientific research.

Ten \$3000 Robert W. Maxwell Memorial Scholarships were awarded to outstanding graduate students, thereby ushering in the first annual Maxwell Scholarship allocation: **Diana Benner** (Conservation Biology) engages in habitat restoration work and wetland assessments in the San Francisco Bay Area. She is also the recipient of a research grant from the California Native Plant Society. **Joseph Bradley** (Mathematics) intends to pursue a doctoral degree after receiving his masters degree in mathematics and has taught science and mathematics at San Francisco public schools. **Tammy Campbell** (Chemistry) is studying the effects of compounds in prostrate cancer cells. **Arsham Hatambeiki** (Engineering) is researching wireless network security. **Zita Maliga** (Geosciences) is studying hot springs ecosystems in Mexico, research made possible in part by a graduate assistantship from the California Academy of Sciences. Zita presented her findings at the 2003 Annual Geologic Society of America meeting in Seattle. **Luping May** (Computer Science) is a teacher's assistant and tutor in the SFSU Computer Science department. She has been awarded several SFSU scholarships and plans on eventually pursuing a doctorate degree where she may further develop her interest in intelligent computer applications. **Laura Mendoza** (Cell and Molecular Biology) is studying bacteria in an effort to combat food-born illness. She has conducted research for the USDA and plans to assist in educating Native American communities in understanding biotechnology. **Daniel Thurston** (Physics) is an attorney pursuing a degree in Physics. He is a graduate research assistant at UCSF, where he works on medical imaging and organ marker tracking research for prostate cancer patients. **Hannah Wood** (Biology) researches insect biodiversity. She has volunteered at Hawaii Volcanoes National Park and plans on continuing to educate the public on conservation and ecology issues. **Haijie Xiao** (Computer Science) plans on building a career in scientific computing. She is the past recipient of several scholarships and tutors students in the SFSU Computer Science Department.

Two \$1000 David G.C. Cassa Scholarships were awarded to exceptional undergraduate students. **Lisa Yongyi Wu** (Chemistry) is researching new diagnostic procedures for prostate cancer. She has co-authored a manuscript for submission to the journal Analytical Biochemistry. Lisa also volunteers throughout the Bay Area. **Michel Lau** (Physics) is active in scientific outreach activities. She has been the recipient of the Jenny Low Chang Scholarship, an SFSU research fellowship, and has received support from the Chinese American Institute of Engineers and Scientists.

Two \$500 C.Y. CHOW Memorial Scholarships were awarded to undergraduates exhibiting academic excellence. **Mu Xian Xu** (Mathematics) plans on pursuing a teaching career and works with the Revitalizing Algebra (REAL) program to create better mathematics curriculums in schools. She has volunteered at the San Francisco Public Library and within the Bay Area Chinese Community. **Chelsea Jiang** (Computer Science) is researching database management systems with the

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Lannie Nguyen-Tang '97

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Alumni Domain continued from page 1
 in R & D, ending with Scientist in Technology Assessment. Richard then accepted a Methods Development Scientist position at Coulter Pharmaceutical in 1998. At Coulter, which became part of Corixa Corporation after a merger, Richard was in charge of methods development and validation for both protein and small molecule drug candidates.

Richard was also in charge of maintaining a GMP lab for assay validation work, and was eventually promoted to Senior Scientist. In April 2002, Richard accepted his current position as Senior Scientist, Analytical Development, at Theravance, Inc. His responsibilities include assay development, validation and transfer to support drug candidate development.

Advancement continued from page 6

goal of developing software applications.

The James C. Kelley Scholarship, new awards of \$500 each, recognized two students in the marine and environmental sciences. **Regan Long** (Geosciences) is a research assistant at the Coastal Oceans Project where she gathers data on ocean current circulation. Regan also works for a radar manufacturer where she assists in developing software that measures ocean surface currents. **Katherine Papastephanou** (Marine Biology) is studying biological oceanography and the manner in which human behavior effects the environment. She participated in a major research program on planktonic response to wind funded by the National Science Foundation and plans on becoming a marine studies educator.

The aforementioned scholarships and awards were made possible by generous donations to the College of Science and Engineering. The selection process was a difficult one, as the majority of applications were of superior quality. While COSE attempts to distribute as many awards as possible, the scholarship committee wished more financial

resources were available to acknowledge all of the outstanding applicants. State budget cuts have necessitated tuition fee hikes throughout the CSU system and have recently forced the university to shut its door to some qualified incoming students. This trend is projected to continue in the coming years and adversely affects students, faculty, and staff. In light of this negative economic impact on the university, the committee's primary aim for the upcoming academic semester is to expand the Scholarships and Awards program, a goal that can only be realized with the aid of your generous contributions.

Your donations would provide much needed financial support for students and foster the college's goal of awarding excellence in academics and community service. For more information on making a contribution, please contact Lannie Nguyen-Tang, Coordinator of Alumni Relations and Student Projects, at (415) 338-7662 or e-mail science@sfsu.edu. Your contributions are tax-deductible to the full extent of the law.



Private support from SFSU alumni and friends has become more important than ever as state budget cuts expand. You may direct your gift to a specific program, department, or purpose. You can be a sponsor for the prizes at the Student Project Showcase in our annual event (invitation can be found on page 3), start a scholarship for deserving students, or give unrestricted gift to the Dean's fund, which will be used wherever the need is greatest.

Please fill out this form and return your check (made payable to the SFSU Foundation) or credit card instructions. Thank you, again, for your generous support.



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Name when SFSU student _____

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Occupation _____

Address _____

Employer _____

City _____

Bus. Address _____

State _____ Zip _____

City _____

Home Phone _____

State _____ Zip _____

E-Mail Address _____

Bus. Phone _____

Degree(s) _____ Class Year(s) _____

Major(s) _____

I would like to donate \$ _____ to: • Student Project Fund ; • COSE Alumni Chapter (for newsletters and activities); • COSE Department of _____ (please specify); • My Favorite Scholarship/Fund _____ (please specify); • COSE Dean's Fund which will be used wherever the need is greatest.

• I am interested in establishing a new endowment scholarship (\$10,000 minimum), please contact me.

Enclosed is \$ _____ or charge to: Visa _____ Master Card _____ Expiration Date _____

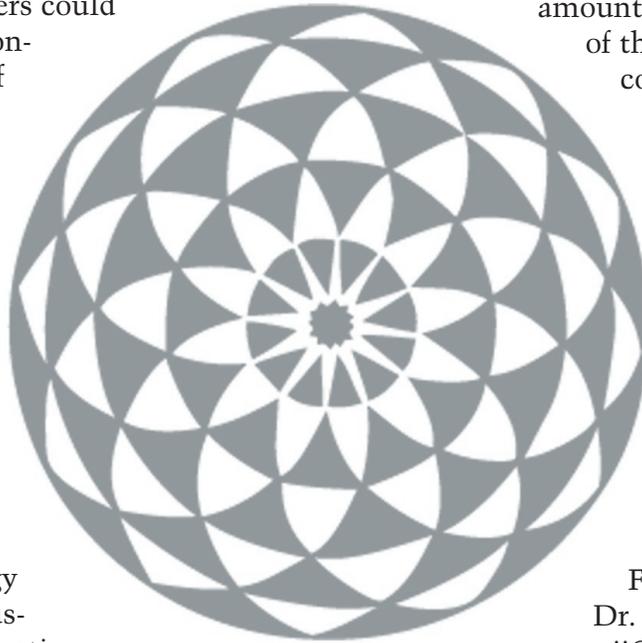
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FREE ENERGY & WASTE ASSESSMENT FOR MANUFACTURERS

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Facing the rising energy costs in California, manufacturers could save money on energy consumption through an audit of their energy use.

The San Francisco State University School of Engineering faculty and students conduct one-day site visits of small to medium-sized manufacturing plants and look at the details of their energy usage. After the site visit, manufacturers receive a detailed report recommending ways to save money on energy consumption, minimize industrial waste and improve productiv-



ity. On average, the recommended saving amount constitutes about 10 to 20% of the plant's total annual energy costs. While manufacturers are not obligated to implement the reports' recommendations, from the experience of the past twelve year, manufacturers usually implement about 50% of the recommended measures. Sponsored by the Department of Energy and in its twelfth year of operation, the program is offered at no cost to qualified manufacturers.

For more information, contact Dr. Ahmad Ganji (415-338-7736; aganji@sfsu.edu).

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