



# CHEMISTRY & BIOCHEMISTRY

California State University, Long Beach • Fall 2009

## Save the Date: 2010 Alumni Reunion Banquet

On Saturday, April 17, 2010, our department will hold its first alumni reunion banquet. "Save the Date" post-cards were sent out in July to our alumni and to present and former faculty, asking everyone who might be interested in attending to respond at the department Web site. As we go to press, in September, 31 alumni and 7 faculty members have indicated they may attend.

We are currently working on securing a venue for the event, and those who have indicated an interest in attending will be notified of the details by e-mail.

If you haven't already responded, you can go to <http://chemistry.csulb.edu/alumni-banquet.html> to add your name and see a list of others who plan on attending.

We hope that this event will provide an opportunity for you to reunite with some of your old classmates and professors, and to find out what is happening in our department. See you in April!

## State Budget Impacts CSULB

by Jeff Cohlberg

CSULB IS FACING A SEVERE BUDGET CUT THIS YEAR AS A RESULT OF THE FISCAL CRISIS IN CALIFORNIA. The state budget deficit, which had increased steadily over the last few years, ballooned during the current worldwide recession triggered by the fall 2008 collapse of the financial sector. As a result, state legislators of both parties wrangled over the pros and cons of increasing taxes and cutting state services. Democrats in the legislature advocated tax increases to avoid drastic spending cuts, while Republicans insisted that tax hikes would chase businesses out of California and hurt the chances of an economic recovery.

To further complicate matters, California is one of three states that require a two-thirds legislative majority to pass a budget, while Democrats hold just over 60% of the seats in both the Assembly and Senate. In March, with a few Republicans crossing over to vote for tax increases, the legislature partially addressed the deficit by increasing the state sales tax and the automobile registration fee. Also, together with Gov. Arnold Schwarzenegger, they put a series of initiatives on the June primary ballot that would have raised \$6 billion in exchange for a spending cap on future budgets, but these were soundly defeated by the voters.

In July, faced with the defeat of the ballot initiatives, a two-year deficit that had grown to more than \$42 billion and a Republican front united against further tax increases, the Assembly and Senate agreed to a budget that slashed almost every area of state expenditures, including a wide range of social services as well as education at all levels.

The CSU system's budget was cut by about 20 percent (\$584 million), resulting in a \$42 million cut for CSULB. To address this cut, the CSU adopted a plan to reduce enrollment by 40,000 students over the next two years and raised student fees 32 percent over last year. In order to avoid massive layoffs, the system negotiated faculty, staff and administrative furloughs that require up to 24 unpaid days off through next June. At CSULB, this includes six campus-wide State Budget Closure Days.

CSULB dipped into its reserves to help mitigate the effects of the cut, but also greatly reduced faculty and staff hiring as well as expenditures for maintenance, services and travel. Several popular campus activities were suspended for this year, including the annual Kaleidoscope festival and the University 100 class for new students. But, since more than 85 percent of the university budget goes toward salaries, it was necessary to lay off many part-time instructors and consequently to reduce the number of classes offered.

Nevertheless, CSULB is focusing on keeping cuts away from instruction as much as possible and using cost savings to benefit students. Funds are being directed to courses that students need to progress in their majors and graduate. A portion of the student fee increase is being used for financial aid, supplemented by state and federal support for eligible students. Construction continues on the new Hall of Science, which is expected to open in 2011.

For the latest CSULB budget information, visit [www.csulb.edu/about/budgetcentral](http://www.csulb.edu/about/budgetcentral).

# Message by the Dean

Laura Kingsford

In looking back over the past few years, it seems that we have continually been dealing with budget cuts, fluctuations in enrollment and changing enrollment targets from the Chancellor's Office. Through all this, our priority has been to offer high-quality programs for both undergraduate and graduate students, and we have been successful in this. By all measures—such as increased retention rates, increased graduation rates, quality of graduate and professional programs accepting our students, faculty-student research presentations and publications, and job placements—our students continue to excel. It has been and continues to be a challenge to maintain excellence and strengthen our programs, but our faculty and staff have worked hard to make it possible. As you look through and read this newsletter, I think you will agree. Despite the economic downturn and worries about budgets, there are a lot of exciting things going on in the Department of Chemistry and Biochemistry and in the College of Natural Sciences and Mathematics.

The current state budget crisis, however, will have a major effect on what we may be able to do over the next few years. Most of the university's budget is tied up in permanent salaries, employment benefits, operation of campus facilities, etc., and cannot easily be cut. Thus, the first to go are the resources for operations within the departments such as supplies for department offices and classes, travel for faculty and students to professional meetings, purchase and maintenance of equipment, and reassigned time for faculty members to mentor research students. Class sizes are increasing, and students have fewer elective courses available. This starts having a negative effect on the quality of programs.

On the other hand, I'm pleased to say that we have outstanding leadership at CSULB and a collegial and effective resource planning process to deal with and mitigate budget cuts. This planning process has been forward looking and preparing for worst case scenarios. Our campus has also been at the front in developing models to manage enrollment and meet assigned targets each year. These processes mean that our campus is in a much better position than many other institutions for working through the additional budget cuts we will have for the next few years. Thus, although we are in for some very difficult times, we will get through it and continue to support the campus' priority of student success.

Our faculty and staff are seeking more external funding in support of teaching and research. They have been successful in acquiring federal and state grants as well as funding from private foundations. In the area of development, we have been working with a number of individuals and private companies to obtain support for student scholarships, to build programs, to name rooms in our new science building and to set up endowed chairs. Without knowing how much, if any, the State of California will return to higher education in future budget years, these external programs and partners become increasingly more important. Thus, we welcome those of you who are interested in gift giving to contact Maryanne Horton, our director of development in the college. Her e-mail address is [mhorton@csulb.edu](mailto:mhorton@csulb.edu) or you may call her at 562-985-1687.

As always, we thank you—faculty, staff, students, alumni and friends—who have contributed in some way. Your support helps make it possible to provide the high-quality programs for our students so they leave CSULB with highly valued degrees.

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# Remarks

## by the Chair

Jeffrey A. Cohlberg



Photo by David J. Nelson

It is my pleasure to greet you at the outset of my second year as chair of the department. As I write this in May, our department faces some exciting prospects for the future mixed with the uncertainty caused by the state's fiscal crisis. A number of the articles in this issue focus on our current financial climate and the likely prospects for the future.

### Enrollments and Curriculum

A few years ago, CSULB embarked on a plan to gradually increase the student population to 40,000. As the number of students increased from 32,000 to 36,000, enrollment in our classes by both majors and non-majors also increased sharply. We now have 522 majors—342 seeking a B.S. in biochemistry, 94 seeking a B.S. in chemistry and 86 seeking a B.A. in chemistry. Class sizes have increased as well. The enrollment growth project has been put on hold as a result of the financial crisis, and the CSU system will be admitting 10 percent fewer new undergraduate students next year, so it is possible that the number of majors may decline in the years to come. In spring 2009, our graduate program included 22 students seeking an M.S. in chemistry and 27 seeking an M.S. in biochemistry. The M.S. program in chemistry has seen a significant increase in the number of students during the last few years.

We recently made some changes in the structure of the graduate program, with the goal of facilitating student progress toward the degree and increasing the emphasis on thesis research. The number of placement examinations required for entering students has been reduced from four to two, with a concomitant raise in the minimum passing grade. The maximum number of research units taken by graduate students has been increased by three, thus effectively lowering the formal course work by three units. With the new program, we hope that fewer students will get bogged down by an excessive course load that slows their progress through the program. We have also introduced a new graduate course, Chemistry 580: Biomolecular Modeling and Simulation, taught by Professor Eric Sorin.

### New Faculty

We are pleased to welcome Professor Shahab Derakhshan, an inorganic chemist, to our department. You can read a profile of Dr. Derakhshan elsewhere in this newsletter. We now have 23 tenure or tenure-track faculty, including three analytical chemists (Anjo, Slowinska, Slowinski), five biochemists (Acey, Cohlberg, McAbee, Narayanaswami, Weers), three inorganic chemists (Bu, Derakhshan, Li), seven organic chemists (Berryhill, Buonora, Lopez, Martinez, Nakayama, Schramm, Shon) and four physical chemists (Brazier, McClain, Mezyk, Sorin). Tom Maricich is teaching in the early retirement (FERP) program, while Bob Loeschen is serving as associate dean for facilities during his FERP service.

### Research Grants

Our department has benefited from a number of grants to support student research. The College of Natural Sciences and Mathematics received renewed funding for our Beckman Scholars Program, which enables us to provide very substantial support over a 1½-year period to each of several outstanding undergraduate researchers. Our Research Initiative for Scientific Enhancement (RISE) grant, which supports research by a large number of minority students, both graduates and undergraduates, has been renewed by NIH. This year, both The Boeing Company and Allergan funded programs to provide research fellowships to our undergraduates. Several faculty have received new research funding from the National Institutes of Health, the National Science Foundation and Research Corporation. As a result, we are engaging record and increasing numbers of students in research; this past spring 64 undergraduate students received credit for doing research in faculty labs.

### Facilities

With PH3 demolished in summer 2008, our facilities were split this year between MLSC (Molecular and Life Sciences Center) and Peterson Hall 2 (PH2), with some faculty having to relocate to temporary quarters for up to three years. Construction on the new Hall of Science started in early fall 2008, was interrupted for three months when the governor ordered a halt on all state construction projects, and resumed at the end of March. We are now on schedule to open the building in spring 2011 (see accompanying article).

### An Uncertain Future

With the failure of the ballot propositions of the May 19 special election, California faces a two-year budget deficit of \$43 billion (see accompanying article on page 1). Student fees have been raised by 32 percent over last year, and university employees will be seeing an effective 10 percent reduction in pay as the result of furloughs, but the university may need to implement significant reductions in course offerings this year. The university administration is committed to offering sufficient classes to allow all students to make orderly progress toward their degrees, but the class reductions may make this goal unattainable.

At the same time, there has been a severe decline in the operating funds available to the department. With state support drastically reduced, support from private sources makes more of a difference to us than ever (see accompanying article). We are grateful for the support provided by our alumni and friends in the past, and we hope that you will be able to continue your generosity to help us through these difficult times.



# Dr. Carlos Bustamante

## 2008 Distinguished Lecturer

The Department of Chemistry and Biochemistry was privileged to host Dr. Carlos Bustamante from UC Berkeley as the 2008 Allergan Distinguished Lecturer. Bustamante received his B.S. degree from



Photo by David J. Nelson

Cayetano Heredia University in Lima, Peru, a master's degree in biochemistry from San Marcos University and a Ph.D. in biophysics in 1981 from UC Berkeley.

Since 1994, Bustamante has held an appointment as a Howard Hughes Medical Institute Investigator. In 1998, he became the director for the Advanced Microscopies Department at Lawrence Berkeley National

Laboratory as well as a professor of physics, chemistry, and molecular and cell biology at UC Berkeley. His research interests include single molecule manipulation methods and their application for the investigation of various biochemical processes: torque measurements on single DNA molecules, reversible folding of single RNA and protein molecules by force, and the mechanochemistry of nucleic-acid binding molecular motors.

He was nominated as "America's Best" in *Time* magazine (2001), received the Biological Physics Prize of the American Physical Society (2002) and accepted the Alexander Hollaender Award in Biophysics from the National Academy of Science (2004). He also received the Hans Neurath Prize of the Protein Society (2004), the Richtmyer Memorial Lecture Award by the American Association of Physics Teachers (2005) and an Honorary Doctorate (Honoris Causa) from the University of Chicago (2005).

While at CSULB, Bustamante gave two riveting lectures on the subject of single molecule manipulation methods and their application for the investigation of various biochemical processes. In his first lecture, titled "Biological Physics One Molecule at a Time," he outlined the importance of studying molecules one at a time. According to Bustamante, molecules behave quite differently as ensembles than as individual entities, and in a cell, more often than not, molecules are present in just a few copies. Thus, understanding the behavior of interactions among very few molecules is essential to understanding how things occur inside a living cell.

In the course of a reaction, the forces and torques that are developed at the molecular level are thought to be controlling factors in the attainment of the transition or "activated" state and thus play a significant role in influencing the rate at which reactions occur. Bustamante showed several experimental techniques that he developed

to directly measure or exert forces and torques on molecules. In one particular case, he presented results in which he wound up a single strand of DNA and was able to measure the torque required to wind the molecule. He showed that the torque was dependent on the DNA base-pair sequence and that torque at the molecular level displayed deviations from classical predictions of torque.

In his second lecture, titled "Grabbing the Cat by the Tail: Following the Packaging of DNA by a Tailed Phage One Virus at a Time," Bustamante discussed how the bacteriophage phi29 is able to package its 6.6 mm long double-stranded DNA into a 42 nm dia x 54 nm capsid space. He showed conclusive evidence that the phage uses a molecular motor based on five ATPases, which fire in a specific sequence to force the DNA into the capsid space to a pressure of six MegaPascals. Through a series of ingenious experiments—ranging from knocking out a single ATPase, modifying the turn per unit length and applying a resistance force on the DNA—Bustamante determined the step at which the chemical energy is converted into mechanical work by the enzyme as well as characterized the nature of the interactions between the motor and the DNA. Finally, and most amazingly, Bustamante demonstrated for the first time that the ATPases show distinct coordination during the overall cycle, thus demonstrating a mechanism of directed enzyme coordination rather than step-wise execution.

It was truly a privilege for the department to host Dr. Bustamante as our 2008 Allergan Distinguished Lecturer. The department would also like to thank the Allergan Corporation for their continued generous support of this outstanding lecture series.

# New Hall of Science Rises Between PH2 and MLSC

**O**ur new Hall of Science continues to rise between Peterson Hall 2 and the Molecular and Life Sciences Center. The new building will contain 22 research laboratories, 31 classroom laboratories, and two 180-seat and two 80-seat lecture halls. As we go to press, a steel building frame now rises from the construction pit. You can see time-lapse movies of Peterson Hall 3's demolition and the construction of the new building at <http://chemistry.csulb.edu/cameras/>. The building is slated for completion in spring 2011.

As our last newsletter went to press, construction on the project had recently been halted upon the orders of the governor. With the budget crisis, California was about to run out of cash to pay its bills, and in December 2008, a halt was ordered to nearly all state construction projects as of Jan. 1. If the project had stopped for more than 90 days, lawsuits would have ensued, and the work might have gone out for rebidding before resumption of construction. The university stepped in by lending \$22 million from its reserve funds to keep the project going, for as long as six months, until the

state resumed selling bonds. As a result, construction began again on March 30, 89 days after work was halted. By May, California had found buyers for its bonds, and the state renewed financing of the project.

We are grateful to President F. King Alexander and his administration for their willingness to take a substantial risk in supporting this project. We appreciate the fact that we have a university administration that realizes the importance of new science facilities to the university and the importance of first-rate science education to the university's mission.

**You can see time-lapse movies of Peterson Hall 3's demolition and the construction of the new building at <http://chemistry.csulb.edu/cameras/>.**



Photos by Victoria Sanchez

## Changes in the Instrumental Analysis Curriculum

by Kasha Slowinska

Our advanced analytical chemistry course recently underwent substantial modernization. I have broadened the topical coverage with emphasis placed on the physical principles of analytical methods and construction of scientific instrumentation. We are now fully compliant with the requirements of the standardized American Chemical Society test in instrumental analysis (measurements basics, atomic and molecular spectroscopy, electroanalytical chemistry, separation methods, surface analysis, and statistical evaluation of analytical data).

In addition to techniques covered by the standard ACS test, I have also introduced elements of electronics (diodes, transistors, operational amplifiers, etc.) and statistical methods for quality control: ANOVA, full factorial design and introduction to Six Sigma. In addition, students write an essay based on library research involving evaluation and analysis of published data.

The laboratory was also redesigned. I have introduced six new rotational experiments involving skills and concepts such as handling of large data sets, detection limits and determination of physical constants, complex procedures of sample preparation, errors associated with extremely high and low concentration of the analyte in the sample, performance optimization using statistical methods, and comparative analysis and quantitative analysis of natural samples.

Additionally, students participate in a tour of IIRMES (Institute for Integrated Research in Materials, Environments, and Society), the state-of-the-art analytical laboratory on campus. The tour includes a demonstration of the ICP-MS, electron microscope, laser ablation ICP, MALDI-MS, GC-MS and a discussion on quality control issues required by government agencies.

During the last three semesters, our students performed at or above the national average on the standard ACS test in instrumental methods. Congratulations to our students for all the hard work they put in for the new advanced analytical chemistry course!

## Inorganic Chemistry Professor Shahab Derakhshan Joins Department

by Dr. Douglas McAbee

In summer 2007, the department received authorization to search for an inorganic chemist, but the college suspended the search midway through the year due to state budget problems. The search was resumed in fall 2008 and very successfully concluded earlier this spring with the hiring of Professor Shahab Derakhshan, who will be joining the department in August.

Derakhshan completed his undergraduate studies at the University of Mazandaran (Babolsar, Iran), graduating with a B.S. degree in applied chemistry. In 1998, he completed an M.S. program in inorganic chemistry at Zanjaan University (Iran) before working as a manager and directing manager in the research and development division of Shouyan Shimie Co., a "cleaner chemistry" chemical company located near Tehran. He then resumed his graduate studies in Canada at the University of Waterloo (Ontario), working in the area of inorganic solid state chemistry under the guidance of Holger Kleinke. His dissertation research focused on various structural and thermoelectric properties of various heavy element pnictogen-containing compounds (i.e., nitrogen-group elements), in recognition of which he received the Doctoral Thesis Award from the university. Upon completing his dissertation in 2005, Derakhshan joined John Greedan's research group at McMaster University (Hamilton, Ontario) and focused his work on magnetic oxide materials.

Derakhshan has amassed a strong record of productivity in his doctoral and post-doctoral work, having published 19 research articles in peer-reviewed journals since 2001. He plans to extend his current work at Cal State Long Beach, studying the relationships between crystal structure, electronic structure and physical properties of novel materials that can be applied to energy conversion, storage and transfer. The timeliness of this work is very exciting, and it certainly complements and extends current expertise in the department as well as provides M.S. and undergraduate students with fresh opportunities for research.

Derakhshan is married and father to one son. He enjoys soccer, jogging and music. The department is very fortunate to have him join our faculty and college community. Welcome, Professor Derakhshan!

Photo by David J. Nelson





## Professor Bu Earns Prestigious NSF CAREER Award



Photo by Victoria Sanchez

Imagine creating porous crystals that can be used for hydrogen storage or carbon dioxide capture.

That is one of the research topics being pursued by Xianhui Bu, assistant professor in CSULB's Department of Chemistry and Biochemistry who is among recipients of the 2009 Faculty Early Career Development (CAREER) awards from the National Science Foundation (NSF).

The agency describes CAREER as the "most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations."

As a result of the CAREER award, Bu received \$597,707 for his five-year project titled "Synthesis, Structures, and Properties of Crystalline Boron-Based Porous Materials."

Bu joined CSULB in 2003 and earned his Ph.D. from the State University of New York at Buffalo and his B.S. degree from Fudan University in Shanghai, China.

In 2008, he co-authored articles that appeared on the covers of the journals *Angewandte Chemie International Edition* and *Chemical Communications*. He also has published in *Science*, *Nature* and *Journal of the American Chemical Society*, and received a \$676,118 grant from the National Institutes of Health to support his research on chiral materials. His latest manuscript, which is the basis for his CAREER award, was selected as a "hot paper" by editors of *Angewandte Chemie* "for its importance in a rapidly evolving field of high current interest."

His lab includes undergraduate and graduate students as well as a postdoctoral researcher, who are developing new forms of porous crystals that promote chemical reactions or gas storage by providing increased surface area or shape selectivity for separating different types of molecules. His CAREER project deals with potential uses of porous materials as adsorbents for hydrogen storage and carbon dioxide sequestration.

Last year, Bu was one of five national winners of the Henry Dreyfus Teacher-Scholar Award, presented by the Camille and Henry Dreyfus Foundation. The \$60,000 award recognizes faculty members from U.S. bachelor's and master's granting colleges who "have demonstrated leadership in original scholarly research of outstanding quality with undergraduates and excellence and dedication in undergraduate education."

## Department Adds Two New Inorganic Chemistry Courses

by Dr. Lijuan Li

Historically, chemistry and biochemistry majors learned some basic inorganic chemistry in their CHEM 111B: General Chemistry class and did not see inorganic chemistry again until their senior year, when they took CHEM 431: Advanced Inorganic Chemistry. Since fall 2005, two new courses are available: CHEM 331: Introduction to Inorganic Chemistry and CHEM 332: Inorganic Chemistry Laboratory. CHEM 331 is a three-unit class that covers molecular structure and bonding, acids and bases, solid-state chemistry, an introduction to molecular symmetry and coordination chemistry, and some physical techniques in inorganic chemistry. CHEM 332 is a two-unit lab class that covers synthesis, characterization and manipulation of inorganic compounds and materials. CHEM 331 is required for a B.S. or B.A. in chemistry and for the B.S. in biochemistry with a minor in chemistry. CHEM 332 is required for the B.S. in chemistry, only. With these new additions, CHEM 431 is now more focused on advanced topics such as electronic structure and spectra of d-metal complexes, organometallics, catalysis, bioinorganic chemistry and materials chemistry.

Since its inception more than 30 years ago, the Department of Chemistry and Biochemistry's advisory council has supported the department's mission to provide students with excellence and opportunities in chemical and biochemical education. The current group of 21 council members represents a variety of chemical, pharmaceutical and biotechnology companies in Southern California. This past year, the department welcomed three new members to the council.

**Shafiel Ahmed** is director at NHK Laboratories, Inc (Santa Fe Springs), a custom formulator, contract manufacturer and contract packager of private label dietary supplements, functional foods and pharmaceuticals. NHK Labs provides annual funds to support a six-week internship in their research and development lab for one undergraduate student, and the department is grateful to Ahmed for making this opportunity possible.

**Dr. Robert Rzasa** graduated from CSULB with a B.S. degree in chemistry in 1993 and has been a faithful and generous contributor for nearly a decade. Rzasa works in an organic synthesis lab designing new drugs for Amgen, Inc. (Thousand Oaks), a company that currently employs a number of former Chemistry and Biochemistry students.

**Ernie Valfre** graduated from CSULB with a B.S. degree in chemistry in 1978 and embarked on a career at Baxter BioSciences (Los Angeles) that has evolved from coagulant research to scientific systems management, to his current position in quality control as senior manager of Computer Systems Validation. Baxter also employs a number of CSULB graduates, some of whom work for him.

Ahmed, Rzasa and Valfre are great additions to the advisory council, and the department looks forward to their input and support of its students and faculty.



# Reports from Faculty

## Roger Acey

My research interests still remain focused on the biochemistry of development. In the past, we used brine shrimp as a model biological system and lovingly referred to ourselves as "artemiologists."

However, our current efforts are now directed more toward umbilical cord stem cells to understand cell differentiation. In particular, we are interested in the role of butyrylcholinesterase in developing neurons and how the enzyme is affected in neurodegenerative disorders. New students to the lab are Mike Brown, Felisha Cage, Joselyn Del Cid and Tiffany Chu. Mike, Felisha, and Joselyn have been working with Dr.



Photo by David J. Nelson

Standing from left to right: James Yano, Michael Brown, Paul Madera, Joselyn Del Cid, Dr. Roger Acey, Simon Moon and Gwen Jordaan. Seated in front: Tiffany Chu and Mary Han.

Nakayama's group, evaluating a variety of compounds for their inhibitory activity on butyrylcholinesterase. Mary Han, a student from Whitney High School, also continues to work on this project.

The compounds are potential therapeutics for the treatment of Alzheimer's disease. This summer they will begin working with the stem cells. Tiffany has been working with Paul Madera on the metallothionein project. They have been successful at expressing and collecting milligram amounts of pure protein. We hope to begin animal studies this summer to determine if the protein can be used to remove toxic metals from the bloodstream

*Back row: Dr. Eric Sorin, Dr. Christopher Brazier, Dr. Brian McClain, Dr. Young Shon, Dr. Stuart Berryhill, Dr. Marco Lopez, Dr. Roger Acey, Dr. Michael Schramm, Dr. Tom Maricich, Dr. Marco Lopez, Dr. Jeffrey Cohlberg, Dr. Douglas McAbee. Middle row, from left: Dr. Lijuan Li, Dr. Shahab Derakhshan, Dr. Vasanthi Narayanaswami, Dr. Krzysztof Slowinski, Dr. Paul Buonora, Dr. Eric Marinez, Dr. Kasha Slowinska and Dr. Ken Nakayama. Front row, from left: Dr. Dennis Anjo, Dr. Paul Weers and Dr. Stephen Mezyk.*

of living organisms. We are actively trying to commercialize this technology.

Sri and Chad both completed their M.S. degrees this year and are gainfully employed in the biotechnology industry. Simon and Wafa have finished their research and are currently writing their theses. Jim and Gwen's research projects are moving along nicely, and both will finish up this summer. Jim has determined that a novel macrophage protein identified and cloned by two former students, Judy Chapman and Brian Baker, is localized to the nucleus. Gwen has been working hard currently to clone the promoter for the metallothionein gene, using a new technique developed by a small biotech company.

## Paul Buonora

When times are tough, some people hunker down and wait for the cloud to pass. I am please to be part of a department that, even as we are concerned about the state of the economy and its effect on our programs, has chosen to prepare for the future.

This year, in addition to my teaching, I have been a member of the University Resources Council where, as a member of a task force on research infrastructure, I wrote a report assessing how the state of our facilities supports our ability to achieve the research goals of the university. As a member of the department's Retention, Tenure, and Promotion Policy Revision Committee, Drs. Weers, Bu, Brasier, Slowinski and I have been bringing the policies that impact faculty

careers in line with the direction the university is moving. As a member of the Web committee, Drs. Sorin, Shon, Weers and I, with the help of graduate student Emel Adaligil, have updated the department Web site to make it more user friendly and to better reflect the dynamic nature of the department. As a member of the team that included Dr. Lopez, Dr. Khatra from the Biosciences Department and Associate Dean Zed Mason, we wrote the college's successful NIH-RISE grant, which garnered funding to support the preparation of underrepresented minority students for graduate study in the physical and biological sciences through workshops and support of their research activities.

I have also been involved in our preliminary outreach toward developing Professional Science Master's Programs, here, at CSULB. Such programs are designed to provide both science and professional development training leading to the PSM degree. The programs maintain a close, cooperative relationship with local industries, with the goal of providing managerial personnel with strong science backgrounds. For those interested in learning more, I encourage you to contact Jeff Cohlberg or me.

Lastly, I was on sabbatical in the spring semester, working at UC Irvine in the lab space of my friend and graduate school housemate, Keith Woerpel. It has been a great experience from a personal standpoint, and results I obtained while working there have opened new avenues in the research program I have been working on for some time, now. My discoveries concerning dynamic kinetic resolution should open new funding opportunities for my research program.

## Jeffrey Cohlberg

I closed my research lab upon becoming department chair. Dr. Vas Narayanaswami now occupies my former space. I still have a freezer shelf full of proteins, and I may sneak into the lab to run a few more experiments.



Our lab published a paper this year: Oztug Durer Z.A., Cohlberg J.A., Dinh P., Padua S., Ehrenclou K., Downes S., Tan J.K., Nakano Y., Bowman C.J., Hoskins J.L., Kwon C., Mason A.Z., Rodriguez J.A., Doucette P.A., Shaw B.F., Selverstone Valentine J. (2009) "Loss of metal ions, disulfide reduction and mutations related to familial ALS promote formation of amyloid-like aggregates from superoxide dismutase," *PLoS ONE*. 4(3):e5004.

It reports several years of work, most of which was included in Zeynep Oztug Durer's M.S. thesis of 2005. Phong Dinh, Sean Downes, James Tan and Chris Bowman were undergraduates in my lab; Zeynep and Yoko Nakano were grad students; Shelby Padua and Krista Ehrenclou were technicians; Jessica Hoskins was a student in Chuhee Kwon's lab in the Physics Department, who did some atomic force microscopy; Zed Mason is a professor in Biological Sciences, who helped with metal analyses; and the other authors are in Joan Valentine's lab at UCLA.

I hope to publish a couple more papers on superoxide dismutase aggregation, based on the work of Chris, Yoko and Furkan Senal, if I can find the time to write them.

Two other projects for this summer: I am coordinating the writing of a department proposal to NSF to acquire a liquid chromatography system coupled to a quadrupole time-of-flight electrospray mass spectrometer (LC/QTOF). This will be used by the biochemists for protein characterization and by the non-biochemists for small molecule separation and characterization. Another project for this summer is to rewrite our molecular modeling manual for CHEM 441AB, Biological Chemistry, to switch from the program Rasmol to the newer program Jmol.

### Lijuan Li

In the last couple of years, I have taught the newly developed inorganic chemistry courses, CHEM 331 and 332 (see a separate report), and occasionally CHEM 431 or 531. I have also put much of my effort in working on the NIH-SCORE funded research, which resulted in six peer-reviewed publications. Together with my students, we presented seven papers at conferences, and I also presented five invited seminars at other institutions/universities.

Last fall, I was honored with the 2008 Faculty Award for Excellence, also known as the "Pretty Darn Good Professor Award," for excellence in research by the College of Natural Sciences and Mathematics.

Another time-consuming task was serving as chair of the Inorganic Search Committee for the 2007-08 and 2008-09 years. The 2007-08 search was cancelled

halfway because of the budget cuts, and the 2008-09 search resulted in the hiring of Dr. Shahab Derakhshan. I am also serving the department as a graduate advisor for chemistry. I am pleased to report that our chemistry graduate students have increased to approximately 30, and this year's application pool is very strong. Outside the department, I am actively involved in the university's Partners for Success Program and have mentored 25 first-generation college students. I have also been sponsoring two-to-three community college students' research under the NIH-BRIDGES program every summer.

My research group had many people come and go in the last couple of years. Ting (Nico) Hu (graduate student), who joined us from the Beijing Institute of Petrochemical Technology in China, went to UC Irvine to study for her Ph.D. two years ago. In the same year, Rosemary Tajiboy (graduate student) took a teaching position at El Camino Community College in Torrance. Last year, Wei Xu (graduate student), who co-authored two papers with me, went to the Department of Chemical Engineering at UCLA to study for his Ph.D. Miguel Camacho (graduate student), who originally was from Spain, has published one paper with me, with two others in preparation, and has gone to UC Irvine to study for his Ph.D.

Several undergraduate students have also completed their theses/research. Chaitali Sheth, who's research was sponsored by the Beckman Scholars Foundation and HHMI, completed her honors thesis and is currently studying for an O.D. at the Southern California College of Optometry in Fullerton; Jasmine Shaw, who was a President's Scholar and whose research was also sponsored by HHMI, went to the University of Florida to study for her Ph.D.; Heather Sanchez, who was also a President's Scholar and whose research was sponsored by NIH-RISE program, went to the veterinarian program at the University of Iowa; and Thomas Combahee and Peter Thuy-Boun joined my group around the same time and both received the Provost's Summer Research Award. Thomas has been admitted to the pharmacy school at the University of Arizona, and Peter has transferred to UCLA.

I had two community college students work with me last summer: Steven Bolivar from Cerritos College and Carlos Peinado from Long Beach City College. Carlos has just been admitted to UC Berkeley. This year's new graduates are Mathew Smith, a President's Scholar who double-majors in Chemistry and Criminal Justice and is interested in working in the field of forensic sciences; and Zhujuan (Phoebe) Jiang, Janet

Doan, Kelly Gibson and Ashley Tiu, who are applying for dental or pharmacy schools.

Currently, I have seven people in the group. My post-doc, Dr. Rongming Wang, who has joined my group from Shandong University, China in 2006, is working on NIH-SCORE proposed research. We have had three papers published this year so far. Van Buzzo (graduate student), who joined the group from Cal State Fullerton and received a Departmental Honors Award, is working on thiol coordinated iron dinitrosyl compounds. Sandra Hernandez (undergraduate), sponsored by the NIH-RISE program, is working on making new water soluble phosphine ligands. George Youseff (undergraduate) just joined the group and will be working closely with Rongming and Van. I am also sponsoring three community college students this summer: Peter Shahid (Long Beach City College), Vincent Nervez (Cerritos College) and Chau Nguyen (Cypress College).

### Tom Maricich

This past year, I split the coordination of the department seminar program with Young Shon. I arranged the fall and Young did the spring. If any of our alumni would like to volunteer for future seminars, please contact me at [tmaricich@csulb.edu](mailto:tmaricich@csulb.edu).

There are three undergraduate students and two graduate students in my research group. Also, Andrea Chen and Thach Ho help to mentor my students and work on projects when they are not teaching.

Previous undergraduates Christine Bradford, Nai-Chia Kuan and Jeremy Wood have graduated. Christine is in the biochemistry Ph.D. program at Wisconsin. Jeremy is a research volunteer with Doug McAbee and Nai-Chia is in industry in Los Angeles. Renata [Fan-Chun] Meng completed her master's degree on O-ethylation of amides to give imidates and has returned to Taiwan. Graduate students Igor Izotov and Michael Fimbres are continuing their studies of sulfonimide alkylation reactions of phosphonic acids and thiols, respectively. Undergraduates Francisco Rodriguez, Marilyn Ton and Holly Phung have joined my group, thanks in part to Andrea Chen's recruiting for me. Francisco is pursuing the synthesis of optically active camphorsulfonimides. Marilyn is investigating the alkylation of biologically significant alcohols and phenols. Holly is studying the synthesis and reactions of isopropyl sulfonimides.

This past year we had a family vacation in Maui, I turned 70, bought a Honda S2000 convertible, and came in 23rd in the 60+ 2008 Foil Fencing National Championship.

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## Douglas McAbee

After having served as department chair for the previous six years, the 2008-09 academic year marked my return to the life of a professor, a most welcome change! I received the added benefit of a sabbatical leave during the fall 2008 term, allowing me to work in the lab and assist my students in their research projects.

Aynur Bakirci, an M.S. student, made excellent progress toward understanding the proteomic changes in liver that accompany *in vivo* acute iron overload, this despite a number of recurring instrument problems that tried her patience sorely. Aynur's preliminary evidence shows that acute iron toxicity reduces the expression of a fairly large set of liver proteins, but urea cycle enzymes are among a limited number of liver proteins undergoing increased expression. Aynur is now in the process of repeating and expanding these experiments. She will complete her thesis work this summer and defend in the fall. It's been a pleasure to have her working in the lab. With the help of Tom Douglass, we are now examining the effects of acute iron toxicity on liver ultrastructure.

Jeremy Wood, a senior biochemistry major, joined the lab last year, working on identifying the several human serum proteins that stably bind lactoferrin. Jeremy had previously worked in Dr. Maricich's lab, but working in a biochemistry lab was a novel experience for him. Nonetheless, Jeremy has proven himself a very capable and hard-working researcher, and he made excellent progress on his project. Two-dimensional gel electrophoresis of serum lactoferrin-binding proteins revealed 75+ spots by Coomassie blue staining, and we were able to identify the majority of these spots by MALDI-TOF/TOF mass spectroscopy, with the assistance of Dr. Ashraf Elamin at the college proteomics facility. Some of these identified proteins included immunoglobulin G, prothrombin (coagulation factor II), ceruloplasmin, vitronectin, and transthyretin. Jeremy will continue to work occasionally in the lab over the next year as he prepares to apply to a Ph.D. program.

This spring, I taught biochemistry lab (CHEM 443) for the first time since 2001. Being back in that setting was enjoyable, and having a very good group of students in my lab section really helped me make the transition much easier. At least no one threw away their hemoglobin (as far as I know), which for me has become the gold standard for student lab awareness! I would also be remiss in not publicly acknowledging the superb assistance provided by Daisy

Martinon as course GA—she proved herself indispensable. Thanks also go to Pat Pierce, who taught the other 443 section and provided me advice and assistance after having been out of the course rotation for so long so that I did not utterly embarrass myself.

I'm looking forward to this next year of teaching and research. In addition to continuing to work on projects current in the lab, I will also be collaborating with Dr. Editte Gharakhanian (Biological Sciences) in understanding the molecular derangement of a recently identified vesicular transport mutant in yeast (*env7*) that does not properly deliver newly-synthesized proteins from the trans-Golgi network to the vacuole—the yeast's version of a lysosome. Learning the yeast system will be fun, and I look forward to an enjoyable and hopefully profitable collaboration with Dr. Gharakhanian.

## Stephen Mezyk

Another year has flown past, and again it was a productive and fun time for all in the Mezyk RadKEM laboratory at CSULB. Our focus this year was primarily on our research, particularly completing old projects, establishing new collaborative programs, getting new research support and having everyone present our work at conferences around the country. Over this period, we managed to get 11 peer-reviewed manuscripts and seven extended conference abstracts published or accepted, and made 23 conference presentations.

Amidst all of our successes, there were several especially noteworthy achievements. The first was my students' presentations at conferences, where six of my undergraduates and one master's student gave talks at national American Chemical Society meetings during this period. They all did an outstanding job, as evidenced by the interest they received from my colleagues in Ph.D. programs across the country.

Many of my students were able to fund their own research this year through both internal and external scholarships. This included a Beckman Scholars scholarship given to Tim Feliciano in May and CSULB/Chemistry and Biochemistry scholarships for Tommy Neubauer, Kim Rickman, Delora Gaskins and Garrett McKay. In addition, three of my students also received summer internship positions at Johns Hopkins, Harvard and Bucknell. It was a very busy lab this past summer!

My personal efforts this year were also centered in my research, especially expanding my current collaborations to additional research projects on dissolved organic matter characterization and behavior (University of



Photo by David J. Nelson

Standing: Jonathan Kleinman, Garrett McKay, Katy Swancutt, Timothy Feliciano, Kimberly Rickman, Manu Singh, Thomas J. Neubauer, Devin Doud and Dr. Stephen Mezyk. Seated: Kimberly Johnston, Michelle K. Dail, Delora Gaskins and Edsel Abud.

Colorado), studying the  $\alpha$ -radiolysis degradation of multiple nuclear waste extraction ligands (Orleans, France and Brookhaven National Laboratory), on the radical-induced redox stability of anti-cancer delivery systems (University of Washington) and especially on a new collaboration with the Orange County Water District studying the role of contaminant chemicals such as 1,4-dioxane and caffeine as surrogates for determining efficiencies of chemical removal in treating wastewaters.

This kept me extremely busy writing contracts and joint proposals, but was very successful in keeping the research group funded, and continuing to give my students the opportunity to interact with world-class scientists at additional state-of-the-art experimental facilities. During this period, I was also able to get some major review papers published, especially highlighting our work on MTBE removal from water and on radiation chemistry's role in nuclear waste remediation.

During this past year, I also taught general chemistry (CHEM 111B) where I met the upcoming student stars of the future, and the physical chemistry graduate course, where our master's students discovered how complicated the real world is when it comes to kinetics and dynamics. I also taught a new course on air and water pollution (for Environmental Science and Policy), where I tried to translate some of my research interests into a course for students with little chemistry background.

Finally, this past May, four of my senior students graduated. Jonathan Kleinman finished his master's thesis and is now back to his full-time job and actually able to spend time with his family. Michelle Dail graduated with her B.S. degree in biology and worked at several different hospitals before beginning an NIH internship. Her eventual goal is to enter an M.D./Ph.D. program. Katy Swancutt also graduated with her B.S. biology degree and began her D.V.M./Ph.D. dual graduate program at Colorado State

University in August. Lastly, Devin Doud finished his biochemistry B.S. degree and began his Ph.D. in environmental engineering at Cornell in fall. Devin was also chosen as the Outstanding Graduate from the CNSM, culminating his outstanding undergraduate efforts at CSULB. The group won't be the same without them, but we wish all of them the best of luck in their new endeavors.

In summary, it was an amazingly successful year, and I look forward to another outstanding one to come!

### Ken Nakayama

Our work on the cholinesterase inhibitors has been conducted in collaboration with Professor Roger Acey's research group over the past five or so years and has been very fruitful. Every student in the group has contributed to the progress made in this project.

Junghye Lee, an undergraduate I recruited from CHEM 420, has worked very hard



From left, Astor Suriano, Dr. Ken Nakayama, Ricardo Gallardo and Long Nguyen.

this spring on some chiral organophosphorus synthesis. Junghye graduated this May with a B.S. in biochemistry and will return to Korea for a year. In the future, she hopes to apply to a Ph.D. program in the U.S. Graduate student Eunice Cheung finished her synthetic methods project and defended her M.S. thesis in June.

Meanwhile, graduate student Ricardo Gallardo, who worked on aminophosphonate synthesis, also defended his thesis in June. His work won first place in the physical and mathematical science category at the 2009 CSU systemwide research competition held in May. Ricardo entered the Ph.D. program at Yale University this fall. I continued working this summer with two M.S. candidates and four undergraduate research assistants.

I have been involved during the four semesters in teaching the advanced organic laboratory course (CHEM 420). Every semester, I try to incorporate reactions from the literature into the course curriculum to give students an opportunity to experience "real-world" challenges in the lab.

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## Collaboration Bears Fruit for Research and Teaching

**A** current research project in the Department of Chemistry and Biochemistry illustrates the potential of collaborations in which different faculty bring their diverse skills together to work on a scientific problem. The project involves Professors Roger Acey, a biochemist; Ken Nakayama, an organic chemist; Eric Sorin, a computational chemist; and Katherine Kantardjieff of CSU Fullerton, an X-ray crystallographer.

Nakayama found evidence in the literature that several organophosphorus compounds, such as the dialkyl phenylphosphates, were effective inhibitors of esterases. So, he approached Acey to test the compounds for such inhibition. Ken Law and Cameron Smith, two undergraduates in Nakayama's lab, synthesized a small structural library of dialkyl phenylphosphates. Acey's lab was working already on cholinesterases, so two students in his lab, David

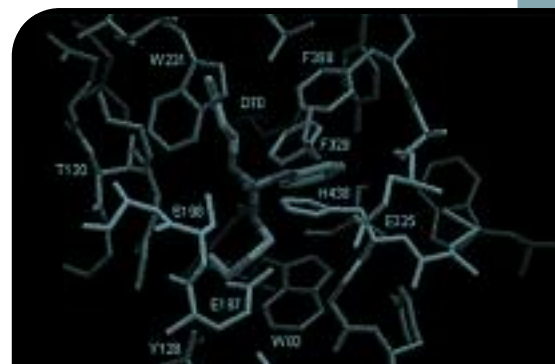
Benton and Sheila Soroushian, conducted the appropriate enzyme kinetic measurements. The compounds were found to be potent competitive inhibitors of butyrylcholinesterase but not acetylcholinesterase.

Acey and Nakayama then enlisted the help of Kantardjieff, a physical chemist at Cal State Fullerton, to perform computer docking studies to model the binding of the inhibitors to the known three-dimensional structures of the two enzymes. These modeling studies found that the predicted affinities of the inhibitors for the two enzymes were consistent with the specificity observed in the kinetic measurements. The results were published in 2007 (*Biochem. Biophys. Res. Comm.* 355, 371-378).

Subsequently, two graduate students in Nakayama's lab, Eunice Cheung and Ricardo Gallardo-Macias, added a chlorine atom to the basic structure and synthesized a family of dialkyl chlorophenylphosphates. Kinetic studies by Chad MacArthur, a grad student in Acey's lab, showed that these compounds were highly potent irreversible inhibitors of butyrylcholinesterase, presumably by acting as phosphorylating agents. Sorin will contribute further modeling studies to this project.

The project has resulted in contributions to three courses in the Department of Chemistry and Biochemistry. In CHEM 420: Advanced Organic Chemistry Laboratory, students perform an experiment in which each pair of students synthesizes a different dialkyl chlorophenylphosphate. These compounds are given to students taking CHEM 443: Biochemistry Laboratory, who test the inhibitory properties of the compounds in kinetic assays of acetyl- and butyrylcholinesterase. Students taking CHEM 377B, the second semester of Physical Chemistry for Biochemistry Majors, perform modeling studies to examine the binding of the same compounds to cholinesterase enzymes.

The new compounds and their analogs may have applications as drugs to combat Alzheimer's disease. The brain defects in Alzheimer's disease are accompanied by a drop in brain levels of acetylcholine, which has been correlated with elevation of brain butyrylcholinesterase. Inhibition of butyrylcholinesterase may therefore lessen the symptoms of the disease. Acey's lab is planning to attempt to knock out butyrylcholinesterase activity in rats by administering selected dialkyl chlorophenylphosphates as a first step in exploring this possibility.



An image of di-n-butyl phenylphosphate docked in the active site of human butyrylcholinesterase.



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### Vas Narayanaswami

Looking back over the past year since my arrival at CSULB from the Bay Area, I am amazed at how I hit the ground running. I will directly attribute the success to the terrific team of students in my laboratory, without whom I simply could not have accomplished the smooth transition. Arti Patel, a first-year graduate student, is the cornerstone of the team. The team is ably supported by Panupon Khumsupan (responds only to PK), Chris Manansala and Max Amaya, seniors who are the pillars. Our newest member is Carlos Gallo, also a senior.



From left: Max Amaya, Arti Patel, Dr. Vasanthi Narayanaswami and Panupon Khumsupan.

While we managed to drive each other crazy, we have come out as a merry team, each with our own project but our eyes focused on the ball—to have a singularly exciting and successful research training and experience in the areas of cardiovascular and cerebrovascular disease. Heart disease and stroke are the No. 1 and No. 3 killers in the U.S., with related health care costs running into millions of dollars. One of the aspects we investigate is the role of the anti-atherogenic protein apolipoprotein E (apoE), which plays a role in lowering plasma cholesterol and triglycerides levels and is a key mediator of cholesterol homeostasis in the brain. Our work is funded by the American Heart Association and the Tobacco-Related Disease Research Program.

Arti Patel is investigating the structure of the cholesterol- and lipoprotein-binding domain of human apoE employing site-specific fluorescence labeling. She has over-expressed the recombinant wild type protein and different variants bearing single cysteine residues at specified sites in a bacterial expression system, isolated and purified the protein to homogeneity. She has labeled the proteins with a spatially sensitive fluorescent probe, from the emission characteristics of which she has arrived at significant conclusions regarding its molecular organization

under physiologically relevant conditions.

She presented her results at the 2009 CSUPERB meeting that was held in Los Angeles. It is very exciting that Arti was one of the finalists for the Don Eden graduate student award at this meeting. She received the CSUPERB travel award to attend the 2009 annual meeting of Arteriosclerosis, Thrombosis and Vascular Biology Council of the American Heart Association (AHA) in Washington, D.C., this April and May. She was the primary author in a poster presentation and a co-author on a collaborative project with the Lawrence Berkeley National Laboratory in understanding the structure of a peptide that plays a role as a potent anti-atherogenic compound. Arti also received the 2009 McAbee-Overstreet Award for excellence in scholarship and commitment to research in biochemistry and the Louis Perlgut Award. Way to go, Arti!

PK is reconstituting (on the bench) the high-density lipoprotein (HDL) found in human plasma. Popularly known as the "good cholesterol," HDL is a large protein/lipid complex involved in transporting cholesterol from the peripheral tissues such as the heart to the liver for eventual secretion. Typically HDL is composed of phospholipids, cholesterol, cholesterylester and apolipoproteins (such as apoE). PK plans to load the HDL with a plant flavonoid that has shown tremendous promise as an antioxidant and as an anti-amyloid agent. He plans to deliver the HDL bearing the active form of the flavonoid in a stealth mode like a "Trojan horse" across the blood brain barrier to sites of inflammation and amyloid formation in the brain. He was one of the awardees of the 2009 CSULB Women in Philanthropy scholarship, which will support his research project.

Chris Manansala also is reassembling the cholesterol-containing HDL in an effort to gain knowledge about the structure of the apoE in this lipid-bound state. This information is crucial to obtain insight about its role in amyloid formation in the brain, the latter a hallmark feature of Alzheimer's disease. A Scholarly and Creative Activity Committee Mini Grant Award funds this project. Max Amaya and Carlos Gallo are involved in over-expressing and isolating recombinant rat apoE in a bacterial expression system. Carlos Gallo was selected for the Children's Hospital Oakland Research Institute Student Summer Research Program scholarship to carry out his research training in my lab at CSULB. The objective is to oxidatively modify apoE in vitro and determine the structural and functional modifications in the protein. While it

is generally acknowledged that smoking is a definitive and direct risk factor in the development of heart disease, the role of secondhand smoke exposure in predisposing individuals to cardiovascular disease and stroke is blatantly disregarded and poorly understood. We are interested in investigating its effect on plasma apoE oxidative modification and function. We use rats exposed to environmental tobacco smoke as a surrogate for studying secondhand smoke exposure in humans. The animal studies are carried out in collaboration with Dr. Kent Pinkerton of the University of California, Davis. Our in vitro studies on oxidation modification of recombinant rat apoE will complement the in vivo studies investigating the effect of smoke exposure. Our long-term objective is to define the effect of cumulative passive smoke exposure in predisposing children and non-smokers to a pro-atherogenic profile, an established risk factor for developing cardio/cerebrovascular disease and stroke.

So what have I been doing in my spare time? Writing grants to the National Institutes of Health (NIH), reviewing grants for the AHA, Alzheimer's Association and NIH, participating in the AHA fundraiser and teaching CHEM 441A. The fall 2008/spring 2009 CHEM 441A and the fall 2008 CHEM 443 students were a fantastic group. I hope they enjoyed my classes as much as I enjoyed bringing the fundamentals of biochemistry to them.

### Michael Schramm

*For what goodwill lies deeper than the bond  
Of guest and host?*

— Aeschylus

Molecular recognition is the study of how and why molecules interact. At its essence lies the attraction of molecules at energy levels "weaker than covalent." Hydrogen bonding, metal coordination and the hydrophobic effect cover some of these possible forces. In nature, we find countless crucial interactions predicated on noncovalent interactions such as enzyme-substrate recognition, DNA-protein binding and ion-receptor transport. From a synthetic point of view, these principles have strongly influenced areas of research from drug design to materials science to molecular self-assembly. Our research uses molecular recognition as a design principle to develop new synthetic molecules that are compatible with and capable of regulating biological function.

Current efforts in the Schramm Research Group utilize the principles of molecular recognition to solve chemical problems. We are actively preparing a 1,000-member small molecule library of alpha-helical peptidomimetics. This collection of compounds is designed to target a spectrum of protein-protein interactions based on the alpha-helix. In generating these molecules, we hope to have a collection of compounds suitable for modulating several biological pathways. Our first screens will target the p53-HDM2 and BAX-Bcl protein-protein recognition events that are a cornerstone of study for the development of new chemotherapeutics. Over the past year, this work has received funding from a SCAC award, Women in Philanthropy, NIH MARC and, most recently, a two-year award from Research Corporation. Sadie Martin, Jenny Pham and Meredith Flores have made great strides in preparing building blocks and developing new solid-support chemistry, resulting in our first poster at the fall 2008 CNSM poster session.

A second project utilizes molecular recognition as a tool to develop synthetic small molecule receptors that we hope will one day shuttle molecules of our choosing across biological membranes. We have prepared a collection of fluorescently labeled small molecules that are complementary for a synthetic receptor known as a cavitand. Cavitands sequester these guests when embedded in phosphocholine micelles. We are now turning our attention to vesicle systems that are composed of a lipid bilayer. Utilizing fluorescent microscopy, we are tracking the migration of host and guest. Through synthesis we aim to tune these molecules to control their localization and function. This work has been supported by two Provost Summer Stipends and a SCAC award. Hai Hoang has made great progress and presented our results at the April 2009 ACS Southern California Division Undergraduate Research Conference in Chemistry and Biochemistry. Several other great posters from CSULB were on display at this event.

A challenging and strictly synthetic project developing new chemistries for siloxyalkynes is being pursued by Ha Nguen. Steve Smith from the Mezyk lab has been active in our group preparing halogenated carboxylic acids for testing in their lab.

Last summer I authored a 72-page chapter on the preparation of 1,3-carbodiene by elimination reactions for the *Houben-Weyl* series, *Science of Synthesis*. This work is in the final stages of proofing and should be published within a matter of months.

I taught a variety of courses over the past year, starting with the new CHEM 322A/B series and now have migrated to the CHEM 320A/B series. Teaching organic chemistry—to any audience that will listen—is a great pleasure and privilege to me. I have witnessed a few wonderful teachers in my tenure as a student, and I try to recreate what they did to inspire me in my own classroom. I use the whiteboard and 3-D models borrowed from Tom Maricich to illustrate the concepts, logic and spatial characteristics of carbon containing molecules. In future semesters I am exploring the introduction of computer modeling tools that the students can use on their own. Thus far, the best students I have had as a teacher at CSULB rival those that I have seen as a TA when I was in graduate school.

When not working, I have taken up surfing—a longtime dream to a native of the East Coast. Once in awhile I find myself reading a treatise or two on combinatorial analysis and game theory in an effort to uncover new investing opportunities—results to be published in due course...

### Young Shon

During the 2008-09 year, it was great to see my research group evolving into a team that works together and shares their knowledge to help one another. This clearly helped students to get a better understanding on what our research group is trying to achieve and also led the year to a productive one.

One book chapter, entitled "Nanoparticle-cored Dendrimers and Hyperbranched Polymers," in *Advanced Nanomaterials* is currently in press. Another review/research paper, entitled "Preparation of Nanostructured Film Arrays for Transmission-Localized Surface Plasmon Sensing," is published in *Plasmonics*. This research was done by collaboration with Professor Kwon's group in the Department of Physics and Astronomy. Two other research papers have been submitted, and one other is currently in preparation.

Two graduate students, Linh Tran and Elham Sadeghmoghaddam, joined my research group and are currently working on the synthesis of water-soluble nanoparticle-cored dendrimers (biomarkers) and the preparation of AuPd nanoisland films (catalysis), respectively.

Among undergraduate students, Erick Ovale is working on the synthesis of nanoparticle-cored dendrimers with single molecular weight. This project is now supported by American Chemical Society Petroleum Research Funds (May 2009-Aug. 2012).

Erick received both a Provost Summer Undergraduate Scholarship in 2008 and CSU LSAMP Scholarship for the 2008-09 academic years. He also presented a poster on some of his work at the CNSM Student Research Symposium.

Tuong Dinh showed his devotion to the research titled "Preparation of Photosensitive C60-Gold Nanoparticle Hybrid Films" by spending the bulk of his time in the lab. He made an oral presentation at the Southern California Undergraduate Research Symposium held at USC and presented a poster at the CNSM Student Research Symposium. Michael Aquino and Tiffany Yee studied the preparation of metal nanoisland films that can be used in optical sensing or catalysis, respectively. Michael's work is included in the recently submitted manuscript. Tiffany graduated in May and was accepted into pharmacy school. Parfait Voundi and Shaeleen Chuc studied the synthesis and characterization of ionic monolayer-protected nanoparticles. Their work was also recently submitted to a scientific journal.

Several new students who joined our research group in spring 2009 include Minh Ho, Phuong Nguyen and Paul Vaccarello, who have been exceptional in learning and getting their feet wet in scientific research. I am looking forward to an exciting time with these new and continuing research students in the new academic year.



Back row: chemical engineering major Erik Thompson, Dr. Eric J. Sorin, chemistry graduate students Yi An and Lucheng Shao, and biochemistry major Mona Bakhom. Front row: biology major Felisha Eugenio, math major Jessica Servin, biochemistry/chemistry major Allison DePaul and math major Kristin Haldeman. (Not shown: recent biochemistry graduate Sarav Patel).

### Dr. Eric Sorin

It's been a busy and exciting year in the Sorin lab! First and foremost, we received the Research Corporation grant that I applied for during my first year at CSULB, which is now funding our efforts to properly model several lipid moieties on the all-atom scale for simu-

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# 2008-09 Research Publications for Department Faculty

## Roger Acey

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- Patent: R.A. Acey, B. Harpham, and M. Mustillo, Metal Binding Proteins and Associated Methods, *Australian Patent Number 2002316183*, Issued 7/18/08.

## Xianhui Bu

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- J. Zhang, T. Wu, S. Chen, P. Feng, and X. Bu, Versatile Structure-Directing Roles of Deep Eutectic Solvents and Their Implication in Generation of Porosity and Open Metal Sites for Gas Storage, *Angew. Chem. Int. Ed.*, 48, 3486-3490 (2009).
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## Jeffrey Cohlberg

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## Lijuan Li

- R. Wang, J. Zhang, and L. Li, Synthesis, Characterization and Crystal Structure of a Dinuclear Iron Nitrosyl Complex with 2-mercaptop-1-[2-(4-pyridyl)-ethyl]-benzimidazolyl, *Journal of Molecular Structure*, 923, 110-113 (2009).
- X. Song, Z. Wang, Y. Liu, C. Wang, and L. Li, A High Sensitive Gas Sensor for Ethanol Based on Mesoporous ZnO-SnO<sub>2</sub> Nanofibres, *Nanotechnology*, 20, 075501, <http://dx.doi.org/10.1088/0957-4484/20/7/075501> (2009).
- R. Wang, M.A. Camacho-Fernandez, W. Xu, J. Zhang, and L. Li, Neutral and Reduced Roussin's Red Salt Ester [Fe<sub>2</sub>(μ-RS)<sub>2</sub>(NO)<sub>4</sub>] (R=n-Pr, t-Bu, 6-methyl-2-pyridyl and 4,6-dimethyl-2-pyrimidyl): Synthesis, X-ray Crystal Structures, Spectroscopic, Electrochemical and Density Functional Theoretical Investigations, *Dalton Trans.*, 777-786 (2009).
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lating lipid bilayers and membrane protein systems. While this project is taking off, several of my students and I are preparing our first three manuscripts for submission in summer and fall 2009, which will focus on the conformational dynamics of small RNAs, models and methodologies to accurately simulate helical peptides and proteins, and new efforts to properly model the collagen triple-helix in an effort to study disease-related mutations.

On the teaching front, I've further refined CHEM 377A by integrating a computational biochemistry project that is an analog of activities our biochemistry majors pursue in the CHEM 420 and 443 laboratories, thereby providing our majors with a superior undergraduate experience that directly involves them in a drug development and testing feedback loop (graduate student Yi An deserves much of the credit for this!). I also had the pleasure of offering my new course, CHEM 480/580: Biomolecular Modeling and Simulation, for the first time this past fall. While this was a trying experience for most of the students who enrolled, it was an exciting experiment in providing graduate level work in a highly interdisciplinary field. I'm already at work refining the course for the next offering in spring 2010. Lastly, I gave Zed Mason a hand teaching the BIOL/CHEM 466H honors class, a fascinating and eye-opening experience in which I found myself learning a great deal as a young faculty member and teacher.

Finally, I've been lucky enough to participate in several service activities, in which I'm very excited to be involved. As chair of the Web Page Committee, several colleagues and I are in the process of revamping the department Web site, and I look forward to helping produce a new, worldwide portal into our department that will be easy to navigate, eye-catching and fully representative of our diverse research programs and strong focus on instruction in the chemical sciences. As I write this, I also look forward to helping Roger Acey provide academic advising to our incoming freshmen and transfer students during this summer's SOAR program.

On a personal note, after losing my wife's truly amazing and beloved American boxer, Harmony, on New Year's Day, we recently brought home a new addition to our family, a beautiful and irritatingly intelligent German shepherd pup, who has been most aptly named Pandora.



Standing: Sean Lee, Dr. Paul Weers, Mary Catherine M. Valdez, Johana Rodriguez and Yin Phung. Seated: Daisy Martin and Xinping Wu.

## Paul Weers

Apolipoproteins are the protein component of lipoproteins, the vehicles responsible for the transport of lipids (aka fat) in our blood. Many details about how apolipoproteins bind to lipids are not known, and the Weers research group aims to gain insight in the structural aspects of lipid binding. Apolipoproteins also bind to lipopolysaccharides, which are toxic and lethal membrane components of gram-negative bacteria. Understanding how apolipoproteins neutralize lipopolysaccharides is one of the main goals of our research program and may lead to new therapeutic approaches to treat gram-negative sepsis.

We use the insect apolipoprotein apolipoprotein III as a model system because of the structural resemblance with human apolipoproteins, availability of high-resolution structure and biophysical properties. Last year, our research was funded by a grant from NIH-SCORE.

Highlights of our lab's work include a combined effort of Lesley Vasquez (supported by the RISE program), Gizman Abdullahi and Leon Wan to understand the role of lysine residues for phospholipid binding interaction, which resulted in an article in *Biochimica Biophysica Acta*, section Biomembranes.

Gizman made another valuable contribution to a collaborative project that was published in the *Journal of Lipid Research*. Merve Oztug and Angela Wu left the lab this summer, graduating after spending three years in our research group. Daisy Martinon and Sean Lee were proud recipients of the 2009 Provost's Graduate/Undergraduate Student Summer Stipend Program for Research, Scholarly and Creative Activity.

Last year, Pehzhan Mansourian was appointed as the new lab technician and started his medical school career this fall. We welcomed five new members in the lab: Yin Phung, Catherine Valdez, Kathy Bui, Joseph Yoo and Chris Adams. MARC student Johana Rodriguez left the lab temporarily to join the summer research program at Harvard.

# Awards & Scholarships

Chemistry and Biochemistry Students 2009

## Endowed Awards

### Robert B. Henderson Award

Professor Henderson, a distinguished scientist and teacher of organic and general chemistry, was a founding member of the Department of Chemistry and Biochemistry and taught from 1955-82. He served as chair of Physical Sciences and associate dean of the college, and was a thesis advisor for several M.S. students. This award is given to a student best exemplifying Henderson's scholarship and commitment to the profession of chemistry. Three outstanding students received awards of \$2,500 each for 2009: **Jason Alvarez**, **Christopher Bruner** and **Devin Doud**.



Jason Alvarez



Christopher Bruner



Devin Doud



Thomas Neubauer

research scientist at Beckman Instruments. Monahan was also the founder and president of California Medicinal Chemistry Corporation. In 1985-87, following his retirement, he served as an adjunct faculty member in our department. According to his will, the income from his bequest is to be used to support student research in our department. This year's recipient is **Thomas Neubauer**, an M.S. chemistry student working with Professor Mezyk.

### Spyros Pathos IV Award

The Spyros Pathos IV Award is presented annually to a student excelling in the second semester of general chemistry, CHEM 111B. This award was made possible by the friends of Spyros Pathos IV, who was an undergraduate chemistry major in our department at the time of his death in 1993. This year's recipient is **Kimberly Johnston**.

### David L. Scoggins Award

This award memorializes David L. Scoggins, a 1968 B.S. chemistry graduate of CSULB and a graduate student and teaching assistant in the Department of Chemistry at the time of his death in 1969. The award recognizes outstanding scholarship and promise by a graduating chemistry or biochemistry student who intends to pursue a career in one of the health-related professions. The Scoggins scholar this year is **Sarav Patel**.



Delora Gaskins



Kimberly Johnston

### John H. Stern Award in Physical Chemistry

The Stern Award, consisting of a cash prize, is given in memory of Professor John H. Sterns, internationally known for his work in solution thermodynamics and author of many publications in that field. The award was established by colleagues, former students and friends of Stern, who was a member of our faculty from 1957-87 and a distinguished teacher of physical and general chemistry. **Sarav Patel** was named the recipient of the Stern Award for 2009.

### Kenneth L. Marsi Scholarship

The Kenneth L. Marsi Scholarship was established by faculty, staff, family, friends and former students of Professor Marsi on the occasion of his retirement in 1996. Marsi was a distinguished scientist, teacher of organic chemistry, and served superbly as department chair for 21 years. Marsi passed away in 2005. The \$1,500 scholarship is used to defray registration fees of outstanding junior and senior chemistry or biochemistry majors. This year's scholar is **Delora Gaskins**, who is a double major in chemistry and mathematics working with Professor Mezyk.

### McAbee-Overstreet Fellowship

The McAbee-Overstreet Fellowship recognizes a graduate student for excellence in scholarship and commitment to research. It was established by a donation from Cathie Overstreet, who received her M.S. degree in biochemistry at CSULB in 2004 under the supervision of Professor Doug McAbee and went on to a Ph.D. in molecular biology at UC Irvine. This year's recipient is **Arti Patel**, a biochemistry graduate student working with Professor Narayanaswami.



Arti Patel



Sarav Patel

Photos by David J. Nelson

### Michael Monahan Fellowship

The Monahan Award was established through a generous bequest from Michael Monahan, an alumnus of our department who received his B.S. in chemistry in 1963 and his Ph.D. in physical organic chemistry in 1968 at UC San Diego. While an undergraduate, he was a research student with Professor Robert Henderson. He was a distinguished scientist and member of the faculty at the Salk Institute and subsequently a senior

## Subject Area Awards

Freshman Chemistry Award  
Garrett McKay  
Spyros Pathos IV Award  
Kimberly Johnston  
Inorganic Chemistry Award  
Christopher Bruner  
Organic Chemistry Award  
Kimberly Rickman  
Merck Award in Organic Chemistry  
Christopher Bruner  
Biochemistry Award  
John Nguyen and Ross Obenauer  
John H. Stern Award in Physical Chemistry  
Sarav Patel  
Analytical Chemistry Award  
Jason Alvarez



Garrett McKay



John Nguyen



Ross Obenauer



Michelle Park



Kimberly Rickman



Mathew Smith

## Special Departmental Awards

Robert B. Henderson Memorial Scholarship  
Jason Alvarez, Christopher Bruner,  
Devin Doud  
American Institute of Chemists Baccalaureate Award  
Chemistry–Mathew Smith  
Biochemistry–Andrew Newman  
American Institute of Chemists Graduate Award  
Chemistry–Ricardo Gallardo-Macias  
Biochemistry–Gwen Jordaan  
David L. Scoggins Memorial Award  
Sarav Patel  
Toni Horalek Award  
Alexandria Brooks  
Hypercube Award  
Lucheng Shao  
M. Monahan Memorial Summer Research Fellowship  
Thomas Neubauer  
Kenneth L. Marsi Award  
Delora Gaskins  
McAbee-Overstreet Award  
Arti Patel  
Louis Pergut Scholarship  
Arti Patel  
Outstanding Teaching Associate Award  
Thomas Neubauer  
Allergan Undergraduate Summer Research Fellowship  
Michelle Park and David Rudd  
NHK Laboratories Incorporated Award  
Garrett McKay  
Stacie Loftus Award  
Michael Brown



Ricardo Gallardo-Macias



Gwen Jordaan



David Rudd



Alexandria Brooks



Lucheng Shao



Michael Brown

## Departmental Honors

Undergraduates  
Christopher Bruner, Devin Doud, Sarav Patel  
Graduates  
William Hammond and Jonathan Kleinman



William Hammond

## College Awards

Boeing Scholars  
Jason Barca, Brian Johnson, Kim Nguyen,  
David Rudd  
Graduate Dean's List of University Scholars & Artists  
William Hammond  
Robert B. Rhodes Award  
Jason Alvarez



Jason Barca



Brian Johnson



Kim Nguyen

Photos by David I. Nelson



# Alumni News



Photo by Victoria Sanchez

**Note:** We are reviving the Alumni News section after several years' absence. Please send us news about yourself for the next newsletter.

## 1962

**Robert Hutchins** (M.S., chemistry, 1962) retired as a professor of chemistry at Drexel University last year after 40 years.

## 1988

**David Maynard** (M.S., chemistry, 1988) is chair of the Department of Chemistry at CSU San Bernardino.

## 1991

**Rong Guan** (M.S., biochemistry, 1991) and Min-Ping Liu (M.S., biochemistry, 1991) have a very busy medical practice in Boston serving the Chinese community. Rong writes, "Believe or not, we are thinking of retirement, now, at least semi-retirement. My ideal retirement location is, of course, Southern California. Owning a Lakers season ticket and enjoying every Lakers home game is one of the essential elements of retirement. Our older son, Patrick, is now about to finish his freshman year at UCSD majoring in pre-med and planting a seed in Southern California for the future. His interest in the medical field stemmed from his two months summer internship in Dr. Cohlberg's lab. Go Lakers!!"

## 1998

**Dyna Sao** (B.S., biochemistry, 1998; B.A., chemistry, 1998; M.S., biochemistry, 2003) reports that after graduation, "I worked temporarily at Allergan for a couple of months and then obtained a permanent position. Currently, I am working in animal model development in the area of 'dry' Age-Related Macular Degeneration (ARMD or AMD). I screen potentially beneficial drugs for treatment of this degeneration." Dyna and Sylors Chem (see below) are married.

## 1999

**Sylors Chem** (B.S., biochemistry, 1999; B.A., chemistry, 1999; M.S., biochemistry, 2004) writes, "After graduating from CSULB, I worked at UCI for 1½ years designing clones and gene knockouts in *Saccharomyces cerevisiae*. I then worked in industry for another year and a half. At Valeant Pharmaceuticals, I was responsible for designing HIV reverse transcriptase clones and tested different reverse transcriptase inhibitors. At Allergan, I did a lot of work in cell biology, drug screening with different immunoassays and DNA cloning. Currently I'm working on Mycobacterium Tuberculosis (MTB) research at the Veterans Affairs Medical Center in Long Beach. I am also pursuing a career path in forensic science. Currently, I am part time at

the Orange County Crime Lab doing a DNA project with one of the forensic scientists."

**Randy Goff** (B.S., chemistry, 1999) is currently a post-doc working in Jon Thorson's group at the University of Wisconsin, Madison in the School of Pharmacy. "I guess it's been about 2½ years now since I left BYU and joined up here. What we mainly do is glyco-randomization, where we develop processes to attach sugars to small molecules without the typical protection/deprotection and activation steps. Most of my work has been related to fine tuning the process and developing some bioactive small molecule libraries. I just had a paper come out in *Org. Lett.*"

## 2004

**Trina (Howard) King** (B.S., biochemistry, 2004) worked for CRG Marine Laboratories after graduation. She returned to school and earned a single subject credential in chemistry in 2008 and currently teaches at Carmenita Middle School in the ABC Unified School District. "I enjoy sharing my love of science with the youth of today and hope to inspire them to pursue scientific careers."

## Alumni News

**Ken-Shing Law** (B.S., chemistry, 2004) moved to New Haven, Conn., where he attended the Ph.D. program in chemistry at Yale University. Two years into his studies, he discovered that he was more passionate about teaching than research. He left Yale with a master's degree in chemistry and joined a learning center, where he is currently the director of math and sciences. He found that his education and experience at CSULB have enabled him to not only teach a wide range of academic subjects, but to also mentor and guide his students. He is still very much a science geek at heart, though. Ken is also interested in photography and has started a small business that focuses on portrait and wedding photography. He currently resides in New Haven with his beautiful wife, Sara.

### 2005

**Melissa Flores** (B.S., biochemistry, 2005) started the graduate program at the University of California, Santa Barbara after graduation and joined the group of Jeffrey Bode. "Our group moved to the University of Pennsylvania in 2007, and I have just finished my fourth year of graduate school.



Photo by David J. Nelson

Research is going well; publication is pending, and hopefully, I will be finished next year. I am currently involved in developing methodology to aid in the synthesis of peptide derived alpha-ketoacids for use in the decarboxylative amide bond forming condensation."

### 2007

**Christopher Bowman** (B.S., biochemistry, 2007) has completed his second year at New York University School of Medicine's M.D./Ph.D.

program. He will enter the Ph.D. phase this summer when he joins Dr. Brian Dynlacht's lab in investigating the role of Sin3 complexes in transcription regulation.

### 2008

**Joseph Badillo** (B.S., chemistry, 2008) is a graduate student in chemistry at UC Davis, working on asymmetric catalysis and biotechnology.

**Christine Bradford** (B.S., biochemistry, 2008) started graduate school in the Ph.D. program in biochemistry at the University of Wisconsin, Madison in September. "I joined Dr. Ron Raines' lab, along with three other students. We are now a total of 18 graduate students and post-docs combined. I am loving my lab. I love being able to do both synthesis and biochemistry. I will be studying molecular receptors and cellular internalization."

**Thomas Combahee** (B.S., biochemistry, 2008) will be attending pharmacy school at Midwestern University in Glendale, Ariz. "The plan is to have my Pharm.D. degree by spring 2012."

## M.S. Theses

### Chemistry & Biochemistry

#### Yiu Yiu Cheung

M.S., Chemistry

"Enantioselective Synthesis of the Phosphate Extension Reaction and Synthesis of Di-N-Butyl Aryl and Diaryl-N-Buthyl Phosphates as Selective Inhibitors of Butyrylcholinesterase"  
Research Advisor: Professor Ken Nakayama

#### Ricardo Gallardo-Macias

M.S., Chemistry

"Sn (II) Compounds as Novel Catalysts for the Kabachnik-Fields Reaction: Studies in the Synthesis of Aminophosphonates Under Solvent-free Conditions and Synthesis of Phosphonates and Phosphates as Reversible and Irreversible Inhibitors of Butyrylcholinesterase"  
Research Advisor: Professor Ken Nakayama

#### Chad MacArthur

M.S., Biochemistry

"Diaryl Chlorophenyl Phosphates: Selective Inhibitors of Butyrylcholinesterase"  
Research Advisor: Professor Roger Acey

#### Yoko Nakano

M.S., Biochemistry

"Characterization of Cu, Zn-Superoxide Dismutase Aggregates: Role of Disulfide Bonds and Pathway for Aggregation"  
Research Advisor: Professor Jeffrey Cohlberg

#### Dan-Tam Nguyen

M.S., Chemistry

"Synthesis and Structural Study of Zinc Sulfite Frameworks"  
Research Advisor: Professor Xianhui Bu

#### Thomas Patko

M.S., Chemistry

"Novel Porphyrin Anion Receptors: Synthesis, Uses in Sensors and Modeling of Binding"  
Research Advisor: Professor Marco Lopez

#### Srividya Raman

M.S., Biochemistry

"Purification and Characterization of RNA Polymerase II from Artemia Salina"  
Research Advisor: Professor Roger Acey

#### Ihsan Furkan Senal

M.S., Biochemistry

"Oligomeric Intermediates in the Aggregation of Superoxide Dismutase"  
Research Advisor: Professor Jeffrey Cohlberg

# Future Plans of Graduates

**Angela Bittrolff:** Graduate school at California State University, Los Angeles, M.S. in criminalistics.

**Christopher Bruner:** Graduate school at Stanford University.

**Chris Cervantes:** Pharmacy school at University of Southern California in fall 2010.

**Devin Doud:** Doctorate program at Cornell University in environmental microbiology.

**Lara Driggers:** Medical school at University of California, Davis.

**Marianne Guirguis:** M.S. in engineering at California State University, Long Beach.

**William Hammond:** Medical school at Boston University.

**Junghye Lee:** Returning to home country to take a year off.

**Kimberly Marsh:** Masters of Public Health degree at University of California, Berkeley.

**Martha Montes:** Dietetic internship.

**Karen Peng:** Pharmacy technician and volunteer work at the Veterans Administration.

**Srividya Raman:** Employed by contract pharmaceutical lab.

**Matthew Sasaki:** Pharmacy school in the fall at University of the Pacific.

**Mathew Smith:** Internship with the Forensic Services Unit at Garden Grove Police Department.

**Katy Swancutt:** DVM/Ph.D. combination program at Colorado State University.

**Xinping Wu:** Chemistry Ph.D. program at University of Southern California.

Photo by David J. Nelson



From left: Dr. Michael Schramm (advisor), Sarav Patel (student member), Marco Martinez (treasurer), Alexandria Brooks (president), Dr. Brian McClain (advisor) and Myles Brookman (student member).

## Student Affiliates of the American Chemical Society

by Brian L. McClain

Professors Michael Schramm and Brian L. McClain continued to advise the CSULB chapter of the Students Affiliates of the American Chemical Society (SAACS) in the spring of 2009, until the ACS informed the chapter that SAACS was being terminated at the national level. In its place, the ACS has renamed the organization as the Student Members of the American Chemical Society or SMACS. The advisors and the students wish to thank the ACS for again providing us ample opportunities to use our new acronym in clever marketing opportunities.

SMACS closed out the fall 2008 semester with a tour of two Temecula wineries. Students on the tour watched the process of vinification first hand and spoke directly to the winemakers. They were quite impressed with the amount of chemistry that occurs in winemaking, from the fermentation process through the bottling of the wine, while Schramm was impressed by the taste!

SMACS rolled into the spring 2009 semester with a new twist on the Welcome Back meeting by hosting a bowling party in the University Student Union. The party was an overwhelming success with the students and attracted some new members to the group. The memories of the kickoff party continued for several weeks as former and new members of SMACS continued to remind McClain how many times he was beaten that evening. Unfortunately none of those students were in McClain's class that semester, but he hasn't forgotten who they are.

The SMACS officers for the spring semester were Alexandria Brooks, president; Heather Ascher, vice president; Marco Martinez, treasurer; and Shauna Otto, secretary. These four individuals have given countless hours of their time to help grow the club and will be attending a student leadership conference over the summer to hone their leadership skills and continue to grow and strengthen SMACS.

The officers are also continuing the tradition of working in research groups over the summer. Brooks worked with McClain on protein expression using a yeast system; Ascher worked with Professor Paul Buonora on synthetic organic reactions; Martinez engineered suborbital space vehicles through the California Launch Vehicle Education Initiative; and Otto worked with Professor Judy Brusslan from biology, studying plant molecular genetics.

SMACS had an outstanding garb sale during the spring semester, which is the group's revenue generator. From these funds SMACS funded the bowling party and various meetings throughout the semester. SMACS is planning for future field trips in the fall to a local biotech company and a site visit to the oil platforms just offshore of Long Beach, as well as funding student participation and poster presentations at local conferences, depending on resources. As always, alumni support is welcome. Please contact either McClain or Schramm to find out more about SMACS and how to get involved.





## Allergan Supports Department Programs

Our department's distinguished lecturer, weekly seminar series and summer research fellowships have benefited from substantial support from Allergan, Inc. Allergan is a pharmaceutical company with 8,000 employees worldwide, including several CSULB graduates at the company headquarters in Irvine. They make a wide variety of products in the areas of eye care, neurosciences, obesity intervention, medical aesthetics, medical dermatology and urologics, though their best selling product is botulinum toxin (Botox).

Since 1997, Allergan has sponsored our Annual Distinguished Visiting Lecturer series. This yearly event brings a distinguished chemist or biochemist to our department to give two talks, one for a general audience in addition to a research seminar. Lecturers who have visited under Allergan sponsorship include Leslie Orgel, Ahmad Zewail, C. Grant Willson, Dudley Herschbach, Catherine Fenselau, Marc Kirschner, Barry Trost, Peter Ford, Andrew Ewing, Jennifer Doudna and Carlos Bustamante. The series is always an intellectual highlight of our academic year.

Recent donations by Allergan have included funds covering the cost of our weekly Wednesday afternoon seminar series to pay travel and hospitality expenses for our speakers. Finally, in both 2008 and 2009, Allergan sponsored two \$3,500 summer undergraduate research fellowships. Each year, two undergraduates who might have had to spend the summer working at off-campus jobs were able to work on research projects under the supervision of faculty in our department.

We are truly grateful for the generosity of Allergan and to Dr. Steve Ruckmick, Allergan's representative on our advisory council. Their support has really made a difference to our programs.

## Your Donations are Critical to Department Operations

Your donations to our department make a BIG difference. Simply put, your support determines how rich an educational experience we can provide to our students: time to do research instead of working off campus; use of state-of-the-art equipment in their classes and research labs; travel to professional meetings to present their research results; and access to seminars and lectures by leading scientists discussing their own research.

About 97 percent of our budget is fixed in the form of salaries for faculty, teaching assistants, graduate assistants and staff. There is income from course, breakage and locker checkout fees, which pay for glassware and consumable supplies for our lab courses and student assistants working in the issue room, but only a small portion of our budget, around 3 percent (approximately \$100,000), pays for department operating expenses and what the state terms "non-instructional" expenses. These expenses include faculty and student travel, equipment purchase and maintenance (both for classroom labs and research labs), our seminar and Distinguished Lecturer series, our advisory council activities, and student awards, scholarships and research fellowships.

Where does that 3 percent come from? Only around one-third of our operating expenses are covered by the state; the remainder comes from private sources, including distributions from the department's small endowment, a return from the overhead on research grants, gifts from corporate donors and, most importantly, donations from alumni and friends.

What is the outlook for the near future? Our expenses continue to rise with inflation and increased sales taxes, while our state funding continues to decline with each budget cut. Due to the substantial decline in market value of our endowment principal, we did not receive a distribution this year. The future of lottery fund allocations is uncertain, and corporations, feeling the pinch of the recession, are spending less money on charitable contributions.

All of this means your donations to our department are more important than ever. Each gift makes a difference. We hope that, even in these difficult times, you will continue to give, and give as generously as you can.

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During the 2008-09 fiscal year, the department received gifts totaling **\$241,373**. The faculty, staff and students of our department are very grateful for your generosity.

Cash gifts are used for scholarships, awards, the seminar program, and purchase of supplies and equipment for which there is not adequate state funding. Also, the costs of publishing the Chemistry and Biochemistry newsletter are met with private giving. You may give an income tax-deductible gift directly to the department by sending a check to:

*CSULB Foundation/Chemistry Fund  
Department of Chemistry and Biochemistry  
California State University, Long Beach  
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The Office of University Relations and Development is informed of all gifts, and you will receive a personal letter of acknowledgment from the department. You might investigate the possibility of your company matching employee gifts, which multiplies the value of your gift to the department.

If you are contacted through the university giving program and a gift is requested, please specify the Department of Chemistry and Biochemistry as the recipient of your gift, if that is your intention.

Thank you!

## Corporate Gifts to the Department

Total value of cash and in-kind gifts to the department during the fiscal year ending June 30, 2009 was **\$219,267**.

Companies and foundations contributing cash and in-kind gifts were:

Allergan Foundation\* (Summer Research Fellowships)  
Allergan, Inc.\* (Distinguished Lecturer)  
American Heart Association (Research)  
Anonymous (Research)  
Community Foundation of Tompkins County (Perlgut Fellowship)  
Camille & Henry Dreyfus Foundation (Research)  
NHK Laboratories, Inc.\* (Scholarship)  
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Matching gifts totaling **\$725** were received from the following companies (employees whose gifts were matched are given in parentheses):

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The Boeing Company\* (Dr. Arie A. Passchier, Dr. Norman R. Byrd)  
Toyota Motor Sales, U.S.A., Inc. (Mrs. Grace Ponferrada)

\* Companies have members on the Chemistry and Biochemistry Advisory Council.

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*Photo by David J. Nelson*

*Members of the 2008-09 graduating class with several members of the Chemistry and Biochemistry Department faculty.*

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