

# CHEMISTRY & BIOCHEMISTRY



**Arti Patel**  
(M.S., 2012)

Arti co-authored four research papers and is now in a Ph.D. program at Tufts University.

*"Participating in research at CSULB was a very rewarding and informative experience, which influenced me to continue my academic career in science."*

**Miguel Camacho**  
(M.S., 2010)

Miguel co-authored a publication and several presentations. He is now in a Ph.D. program at UC Irvine.

*"Research in Dr. Li's lab provided me with the skills, intellectual tools and inspiration to pursue a professional career in science."*

## Research Experience Makes the Difference

By Dr. Krzysztof Slowinski

The CSULB Department of Chemistry and Biochemistry faculty are increasingly committed to promoting student success through undergraduate research experiences. It has long been recognized, particularly in the science, technology, engineering and mathematics (STEM) disciplines, that individual student research performed under the direction of faculty is the best method to stimulate curiosity and promote critical thinking skills. This, in turn, produces a skilled workforce as well as researchers who contribute new knowledge and innovative ideas that drive the nation's economic growth. This research effort is rewarded not only by higher pay (employee compensation in innovation-intensive sectors increased 50 percent between 1990 and 2007, nearly 2½ times the national average) but also in increased admission to competitive graduate and professional schools. A study by SRI International, "Evaluation of NSF Support for Undergraduate Research Opportunities: Synthesis Report, 2006," indicated that 53 percent of all surveyed STEM graduates participated in undergraduate research, with rates varying from 34 percent in mathematics to 72 percent in chemistry.

Moreover, in 2008, the American Chemical Society's Committee on Professional Training issued new guidelines for the approval of undergraduate chemistry programs, placing significantly greater emphasis on research experience. Undergraduate research can now be used for almost half of the required upper-division laboratory hours.

In our college, external grant funding for research has almost doubled over the last four years, to \$5,948,864 for this last academic year. The university has also shown extraordinary support in designating science as its top priority for capital building projects on campus, supporting the construction of the \$28 million, 93,159-square-foot Molecular Life Sciences Center, which was completed and equipped in 2004, and the \$120 million, 164,369-square-foot Hall of Science, which was occupied in fall 2011.

Our department offers two directed research classes, CHEM 496 at the undergraduate level and CHEM 697 at the graduate level. The number of students participating in undergraduate research with faculty mentors has been increasing steadily, from 35 students enrolled in CHEM 496 for fall 2005 to 86 students for spring 2012. More than 90 peer-reviewed journal research articles have been co-authored by 120 students since 2006. Both undergraduate and graduate students are co-authors in high-profile "hot articles" and "cover pages" in major journals. There have been many success stories of our graduates linked to their research experience. You can read about just a few of them in this newsletter!



**Kimberly Rickman**  
(B.S., 2011)

Kimberly co-authored two research papers and six presentations at national ACS meetings. She is currently in an M.D./Ph.D. program at Cornell University.

*"The opportunity to conduct undergraduate research in Dr. Mezyk's lab was the most important asset available to me at CSULB in pursuing my ultimate interests in treating infectious diseases. My participation gave me great insight into what it takes to be a successful researcher and enabled me to acquire the skills necessary to conduct my graduate studies as a fully funded M.D./Ph.D. student at the Weill Cornell/Rockefeller/Sloan Kettering Tri-Institutional M.D./Ph.D. Program."*



Dr. Laura Kingsford

## Message by the Dean

One of the best things that happened to us this past year is the move into our new Hall of Science. We started in March 2011 with the college administrative offices; the department offices for Biological Sciences, Chemistry and Biochemistry, and Science Education; the Jensen Student Access to Science and Math (SAS) Center; and several faculty members moving in. After that, there

was a steady stream of people moving "things" into the building through the end of the summer. This included NMRs and other major pieces of equipment, chemicals, rocks and minerals, teaching/research equipment and materials, preserved plant and animal specimens, shark tanks, live fish and invertebrates, etc. Faculty and staff spent an enormous amount of time moving and then cleaning out spaces in PH1, PH2 and F05.

In case you didn't get to the Dedication and Open House event last October, the Hall of Science is a four-floor building with 22 research labs, 31 teaching labs, two 180-seat and two 80-seat lectures halls, five department offices, all the college administrative offices, the Jensen SAS and Academic Advising Centers, three greenhouses and an observatory platform for six telescopes on the roof, the college shops, the marine lab, a science learning center and a number of storage areas. It is so nice to be in modern, clean facilities that are designed for our specific needs and provide a wonderful learning atmosphere for our students. It has also been great to see faculty and staff on a regularly basis—something that didn't occur when we were distributed throughout three buildings. We even see our neighbors from the Molecular Life Sciences Center and the Microbiology Building more often, as the department offices for them are in the Hall of Science.

Our new Academic Advising Center was established during the past year with resources from a Student Excellence Fund fee instigated in summer 2011. Our professional advisors, Angela Tuan, Timothy Kalliomaa and Lyndsey McKinley, coordinate with the SAS Center and our faculty advisors to assist students in their academic and careers paths. If needed, the advisors refer students to various resources on campus that can help with counseling, tutoring and career exploration. California and our nation are in great need of graduates in science, technology, engineering and mathematics, as well as teachers who are highly qualified to teach middle school and high school science and mathematics. Thus, we are working hard to help our students be successful and stay on track to graduation.

Our top priority is student success, and you will see many events and recognitions supporting this on our College of Natural Sciences and Mathematics (CNSM) homepage (<http://www.cnsm.csulb.edu>) as well as in the June 2012 *CNSM Highlights* ([http://www.cnsm.csulb.edu/news/highlights/2012\\_06\\_12.shtml](http://www.cnsm.csulb.edu/news/highlights/2012_06_12.shtml)). Student success is also a priority shared by our friends and alumni in the community. We thank you—faculty, staff, students, alumni and friends—who have contributed in some way. Your support helps make it possible to provide the quality programs for our students so they leave CSULB with highly valued degrees.

—Dean Laura Kingsford

## Remarks by the Chair

Dear Alumni and Friends:

I am very pleased to share with you our 2012 Department of Chemistry and Biochemistry newsletter. It provides just a small glimpse into the many great things that are happening in our department.

This past year, our faculty generated an unprecedented level of external grant support for research, continued to publish in top-level journals and supervised a record number of undergraduate researchers. The dollar amount of external research support and the number of undergraduate students participating in research alongside faculty have more than doubled during the last six years. Faculty continued their strong involvement in developing new curricula, applying novel pedagogical approaches and strengthening our advising efforts.

As part of the university-wide Highly Valued Degree Initiative, several faculty conducted assessment and advising projects in general and organic chemistry, and participated in the College of Natural Sciences and Mathematics (CNSM) Faculty Learning Community, which is designed to provide tools and strategies that can be used in the classroom to improve student learning in science and math. I consider it a privilege to work with faculty and staff who are committed, hard-working and striving for excellence.

In fall 2012, we will be welcoming our newest faculty member, Dr. Jason Schwans. Dr. Schwans is a bioorganic chemist (Ph.D., University of Chicago with Dr. Joseph Piccirilli) and will be joining the department following a postdoctoral appointment with Dr. Daniel Herschlag at Stanford University.

Thanks to \$540,000 of Group II funds earmarked for the new Hall of Science building equipment, we were able to secure several instruments for our teaching and research laboratories. These instruments include GC-MS and ICP-AES for the instrumental analysis laboratory, a laser-flash photolysis system for the physical chemistry laboratory, equipment upgrades for our new laser facility, and minor equipment and furniture for instructional laboratories.

In spring 2012, we made significant upgrades to our NMR facility. With help from CNSM, CSULB Academic Affairs and the last of the Group II funds, we cobbled together \$214,000 to purchase a new Bruker 300 MHz NMR spectrometer and \$55,000 to purchase a refurbished Bruker/Spectrospin 400 MHz magnet, which will be integrated with our existing NMR console. These two spectrometers will be used for organic chemistry laboratories and faculty research.

As always, I would like to acknowledge the essential help we are receiving from our alumni and friends. Your past support has made a big difference in the quality of programs that we are able to offer to our students: research opportunities, seminars with leading scientists, and participation in professional meetings and conferences. Please consider the difference a chemistry and biochemistry degree has made in your success and give back as generously as you can. I am very grateful for your partnership and support. Please keep in touch.



Dr. Krzysztof Slowinski

—Dr. Krzysztof Slowinski



# Alumni Giving Makes a Difference! YOUR DONATIONS AT WORK

## 20 Student Research Travel Awards

Twenty undergraduate and graduate students received awards of up to \$500 each in support of their participation in national and international meetings.

Undergraduate student Katie M. Feher presented her research performed under the direction of Chemistry Professor Michael P. Schramm "Selective Small Molecule Membrane Transport Via Synthetic Molecular Receptors," at the 243rd American Chemical Society National Meeting and Exposition, held in San Diego, Calif., on March 25-29, 2012.

## 14 Departmental Honors and Special Awards

For outstanding service, teaching associate, thesis, baccalaureate and post-baccalaureate candidates.

## 9 Scholarship Awards

Ranging from \$1,000 to \$5,000 each.

## 4 Summer Research Awards

Supported students in 10 weeks of faculty-mentored summer research.

## 25 Seminars by Distinguished Visiting Scientists

From such prestigious institutions as Caltech, UCLA, USC, UCI, UCR, UC San Diego, UC Santa Barbara, UMass Amherst, Medical College of Wisconsin and Methodist Hospital Research Institute.



Professor James Heath of Caltech presents one of two Allergan Foundation Distinguished Lectures.

## YOU CAN MAKE THE DIFFERENCE IN 2012-13!

Because of unprecedented cutbacks in state appropriations for public higher education (35 percent in just the past 18 months and more expected after the November election), the department now depends exclusively on private contributions to support these key educational enrichment activities for students.

- Summer Research Program
- Student Research Travel Fund
- Department Awards and Scholarships
- Seminar Series

Please use the enclosed envelope or give online at [www.csulb.edu/givenow](http://www.csulb.edu/givenow) to make a difference in the life of a student by supporting one of the department priorities above.

Chemistry & Biochemistry is published annually for past and present students and friends of the Department of Chemistry and Biochemistry. The opinions expressed on these pages do not necessarily reflect the official policies of the CSULB administration or those of The California State University Board of Trustees.

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## CSU Budget Depends on Proposition 30

The fate of Proposition 30 on the November ballot will determine the amount of funding that the California State University (CSU) system will receive in the 2012–13 fiscal year. Passage of the proposition would increase state income taxes by 1 to 3 percent for the next seven years for individuals earning more than \$250,000 or couples earning more than \$500,000. It would also increase the state sales tax by 0.25 percent.

The budget passed by the California Legislature on June 15 includes an allocation of \$2.06 billion for the CSU, an amount equal to what we received in 2011–12 but \$750 million below the level for 2010–11 and \$1.3 billion (39 percent) less than the funding in 2007–08.

But this amount will be further reduced by \$250 million if voters fail to approve Proposition 30. This would result in the lowest level of state support allocated to the university since 1996, when the CSU was serving 90,000 fewer students.

### Research Success Stories

#### Yufei Li (M.S. 2011)

Yufei co-authored two publications in the *Journal of the American Chemical Society* and *Chemistry—A European Journal*. These papers have received more than 60 citations to date. Yufei is currently in a Ph.D. program at Queen's University.

*"I spent two years in Dr. Bu's lab as a graduate student studying the crystallography of metal organic frameworks and their potential applications in gas molecule storage, which helps me a lot at Queens University to continue my research about this area and its relationships to luminescent materials."*

## 2012 Distinguished Lecturer: James R. Heath California Institute of Technology

By Dr. Kasha Slowinska

James R. Heath, the Elizabeth W. Gilloon Professor of Chemistry at the California Institute of Technology (Caltech), visited our department on March 14 as this year's Allergan Distinguished Visiting Lecturer. Dr. Heath, an expert in molecular electronics, was named one of the Top Seven Innovators by *Forbes* magazine in 2009. His research focuses on solid-state quantum physics, materials science and basic surface science, as well as fundamental biology and translational medicine with a focus on oncology.



Photo by Victoria Sanchez

Dr. James R. Heath

During the morning presentation to a general audience, Dr. Heath focused on "Oncology from a Physical Scientist's Perspective." He described how quantitative proteomics measurements at the single cell level can be used to sensitively monitor changes in the protein composition of cells. This may allow physicians to follow the response of cancer patients to various targeted therapies, including those in which the patient's own immune system is engineered to fight the disease. Dr. Heath's lab has also applied these tools to study basic questions in cancer biology and has recently detected a major "phase transition" that tumor cells undergo as the oxygen concentration is lowered. More than 250 students, faculty and community members attended the lecture.

During the afternoon lecture, "Surface Science at the Nanoscale," Dr. Heath discussed a variety of nanosystems developed in his laboratory for efficient control of energy conversion

using physical properties that uniquely emerge at the nanoscale. A major challenge associated with such nanotechnologies is that the high surface-to-volume ratio of nanostructures means that surface chemistry can play a dominant role. In particular, Dr. Heath discussed the use of graphene templating, which makes it possible to capture and study weakly bound surface adsorbates and the influence those adsorbates have on the electronic properties of the underlying nanostructures.

Dr. Heath received a B.S. degree in 1984 from Baylor University and his Ph.D. in chemistry in 1998 from Rice University, where he was the principal student involved in the Nobel Prize-winning discovery of C60 and the fullerenes. He was a Miller Fellow at UC Berkeley from 1988–91 and served on the technical staff at IBM Watson Labs from 1991–93. In 1994, he joined the faculty at UCLA. He founded the California NanoSystems Institute in 2000 and served as its director until moving to Caltech.

He has received numerous awards, including a Public Service Commendation from Governor Grey Davis, the Sackler Prize, Spiers Medal, Feynman Prize, Jules Springer Prize and the Arthur K. Doolittle Award. He has founded or co-founded several companies, including NanoSys, MTI, MoB and Homestead Clinical Corporation, and he serves on the board of a number of organizations, including the Board of Scientific Advisors of the National Cancer Institute.

Dr. Heath truly enjoyed his time at CSULB, where he met with faculty and students. He said, "I was impressed with all the work that is going on, here." We are grateful to the Allergan Foundation for their continued support of the Distinguished Lecturer program, making it possible for our students and faculty to meet and interact with truly outstanding scientists who are using chemistry to tackle problems at the frontiers of knowledge.

# Young Shon Explores the World of Nanomaterials

By Dr. Jeffrey Cohlberg

**D**r. Young Shon's research is exploring new ways of synthesizing nanomaterials and using them for a variety of technological applications. Nanoparticles of diameters between 1 and 100 nanometers often exhibit properties significantly different from those observed either in bulk materials or in atomic and molecular structures. Nanomaterial research is currently an area of intense scientific interest due to a wide variety of potential applications in optics, electronics and biomedical areas.

Dr. Shon received his B.S. and M.S. degrees at Sogang University, a private Catholic university in Korea. After working briefly for the Korea Institute of Science & Technology, he entered the graduate program at the University of Houston, completing a thesis on material chemistry and organic thin films in 1999 under the direction of Dr. T. Randall Lee.

It was during postdoctoral work under the direction of Dr. Royce Murray at the University of North Carolina that Dr. Shon became involved in research developing methods of synthesizing ligand-capped nanoparticles. He continued this work while serving as a professor at Western Kentucky University from 2001-06. During this period, his group developed new approaches to nanoparticle synthesis.

Since coming to CSULB, Dr. Shon has focused on developing applications of nanoparticles prepared using the synthetic methods that his group developed in Kentucky. According to Dr. Shon, "I started by doing a lot of reading about current applications of nanoparticles. For example, I didn't know anything about plasmonics until I started reading about it."

Dr. Shon's current research encompasses three areas. One project involves investigating the use of ligand-capped metal nanoparticles as catalysts for regio-, chemo- and stereoselective organic reactions. In general, nanoparticles are very efficient catalysts due to their large surface area. Dr. Shon's group has synthesized palladium nanoparticles capped with a low density of alkanethiolate ligands and has shown that they exhibit almost perfect product selectivity in catalyzing the isomerization of allyl alcohols to the corresponding carbonyl compounds. His group is extending this work to develop efficient and selective catalysts for many other reactions, including the isomerization/ hydrogenation of unsaturated alcohols, alkenes, alkynes and carbonyl compounds. This work is supported by a three-year grant from the American Chemical Society's Petroleum Research Fund.

A second area explores the development of biocompatible gold nanoparticle-cored dendrimers linked with fluorophores and antibodies as

potential biomarkers and nanocarriers for cancer diagnosis and therapy. The problem with using ligand-capped gold nanoparticles for biological applications is their low solubility and high toxicity. Dendrimers, which are highly branched molecules, have a large surface area and a high density of functional groups. Coating gold nanoparticles with dendritic frameworks should make them more resistant to aggregation and less toxic. Developing biocompatible, fluorescently labeled gold nanoparticles having conjugated antibodies against cancer-specific surface markers may make it possible to both visualize cancerous cells and destroy them in a cell-specific fashion through non-invasive thermal therapy. This work is supported by a four-year grant from the National Institutes of Health to Dr. Shon.

A third project concerns developing plasmonic nanostructures for use as photocatalysts. These metal nanoparticles are highly efficient at absorbing and scattering light, and their optical properties can be tuned by controlling their size, shape and surface coating. By controlling the



Dr. Young Shon

Photo by Victoria Sanchez

composition and structure of plasmonic nanostructures formed by depositing noble metal nanoparticles on semiconductor zinc oxide particles, the Shon group hopes to develop optimized photocatalysts that can be used in an economically and environmentally friendly manner. Applications for these materials include the degradation of dye molecules during wastewater treatment and the preparation of aromatic carbonyl compounds. Dr. Shon collaborates with Dr. Yohannes Abate's group (Department of Physics and Astronomy) for the characterization of plasmonic nanostructures with near-field optical scanning electron microscopy and they have, together, published three peer-reviewed articles in the last year.



# Steve Mezyk Receives Two University Honors

By Linda Fontes

## Research Success Stories

### Edsel Abud (B.S., 2011)

Edsel co-authored four presentations at national ACS meetings and is now in an M.D./Ph.D. program at UC Irvine.

*"My research experience provided me with a great academic/career mentor, stimulating science, and opened amazing opportunities for my career. My research at CSULB with Dr. Mezyk was the catalyst for my two summer research internships at Johns Hopkins School of Medicine, my first-author Proceedings of the National Academy of Sciences paper and acceptance to the M.D./Ph.D. program at UC Irvine School of Medicine."*

### Katy Swancutt (B.S., 2009)

Katy co-authored four publications and six presentations at national ACS meetings and is now in the D.V.M./Ph.D. program at Colorado State University.

*"The primary criteria for being accepted into my fully funded, dual D.V.M./Ph.D. program revolved around extensive experience in scientific research, which I achieved at CSULB while studying kinetics of free radical reactions for Dr. Stephen Mezyk. Ironically, my initial interest in research was to have a nice-looking addition to my vet school application, but after less than a year in the process, I decided that I wanted to pursue research as a career in its own right. As it turns out, medicine and research are certainly NOT mutually exclusive."*

Dr. Stephen Mezyk is the recipient of two prestigious university awards this year. First, he received the Academic Affairs Award for Outstanding Faculty Mentor for Student Engagement in Research, Scholarly and Creative Activity. Second, he was named the Most Valuable Professor by Kimberly Johnston, a graduating senior receiving a B.S. in biology who was recognized as this year's Outstanding Graduate of the College of Natural Sciences and Mathematics.

Dr. Mezyk's success as a faculty mentor is evident in his students' achievements. He encourages his graduate and undergraduate students to present their research at national conferences such as the American Chemical Society (ACS) conferences. Johnston has presented her research at three different ACS conferences and is now working to publish each of her four projects in peer-reviewed journals. Dr. Mezyk's graduate student, Thomas Cullen, recently presented his research at the MARC IX conference in Kona, Hawaii, following his Department of Energy workshop presentation in Chicago last November. His presentation inspired several scientists attending the workshop to offer him an opportunity to pursue a doctorate and career at the Idaho National Laboratory. Kimberly Rickman, the 2011 Outstanding Graduate of the College of Natural Sciences and Mathematics, credits Dr. Mezyk with helping her secure full funding to attend the Tri-Institutional M.D./Ph.D. program at Cornell University.

Along with Johnston, Cullen and Rickman, Dr. Mezyk, a physical chemist with interests in energy and the environment, has worked with an extensive group of research students. In the past 18 months, his six graduate students, 18 undergraduates and 12 student laboratory volunteers have all been highly successful in the number of awards and scholarships they have won, the number of articles they have co-authored, and the national and international conferences at which they have presented.

Since joining the university in 2001, Dr. Mezyk has developed a successful system to oversee his research students' academic progress. All students get an individual research project and become actively involved in all aspects of the work, even when it involves traveling to state-of-the-art facilities throughout the country. Dr. Mezyk is fully involved in his students' projects, ensuring that each one provides a valuable learning experience.

Over the past 18 months, he has worked with his students to help them obtain over \$34,000 in research-based scholarships, and on 16 of his peer-reviewed publications, there have been 12 CSULB student authors. "I find it incredibly rewarding to see all of my students become confident, independent, critical thinkers, enjoying our mutual enthusiasm for science," Dr. Mezyk said.



Photo by Victoria Sanchez

Dr. Stephen Mezyk

## Research Success Stories

### Michelle Dail (B.S., 2009)

Michelle co-authored two publications and four presentations at national ACS meetings and is now in an M.D./Ph.D. program at the University of Pittsburgh.

*"My research in Dr. Mezyk's lab at CSULB was my first stepping stone to my passion for research, allowing me to complete a 20-month Intramural Research Training Award Fellowship at the NIH from 2009-11."*

### Cassandra Cox (B.S., 2008)

Cassandra co-authored a publication and four presentations at national ACS meetings and is now in a Ph.D. program at MIT/Harvard University.

*"I decided to pursue graduate school at MIT because I had the opportunity to conduct scientific research at CSULB with Dr. Mezyk and take ownership of a project, as well as take a leadership role in a chemistry lab in the department. This is an experience most undergraduates just don't get."*

# Thomas Gufrey Named Among America's Top Undergraduate Professors

By Rick Gloady

**T**homas Gufrey, a longtime lecturer in the Department of Chemistry and Biochemistry, has been named one of America's top undergraduate professors by The Princeton Review in its newest guidebook, *The Best 300 Professors*, which was released April 3.

Published in partnership with RateMyProfessors.com, the highest-trafficked college professor ratings site in the U.S., *The Best 300 Professors* profiles outstanding faculty at 122 colleges. According to The Princeton Review, all of the professors won high praise from their most important audiences—the undergraduate students they teach and inspire, class after class, year after year, in fields that range from ancient studies to neuroscience to sports management.

An educator for more than 40 years, Gufrey has taught at CSULB for 35 years (since 1977), and much of that time has been spent teaching one course, Chem 100. According to his "professor profile" in the guidebook, "...he looks for students whose love of chemistry is buried so deep inside them, they don't know they have it." He says his job is to "un-bury" that love of chemistry.

"There are many people more deserving than I, but it is still a very nice honor to receive," Gufrey said of his selection. "It is an honor to work with young kids. I try to show them how neat chemistry is in today's world, and I try to treat them with dignity and decency. The truth is, I get to do a job that I love to do, and being an old geezer like I am, it is great being around young people."

His professor profile states, "In his legendary demonstrations, he uses humor, songs and poems, and treats students with respect. And, he says, 'Frankly, I make it very easy to do well if students show up and really try. It's half chemistry, logic and critical thinking, but half of it is appreciating how important chemistry is.'"

"He is a great instructor, very entertaining," said department chair Kris Slowinski. "Tom has been here for many, many years. He's very interactive, a good showman, and he is very popular among the students. He is truly enthusiastic about chemistry, and that's very important."

His profile also includes comments from students who describe him as a "real goofball" who is "big on explosions" and awards bonus points to students for all sorts of contributions.

Gufrey admits that he is obsessed with chemistry, and that fact comes through in his demonstrations. He also says that humor is very, very important when it comes to helping students learn chemistry, as is getting them involved in the subject. At the same time, he said he tries to teach students a little about life in general and what he thinks is important.

"First, I try to tell them that being a decent human being is the most important thing. It's not what fame you get, or money or power, but treating your fellow human beings decently," Gufrey explained. "Second, I think everyone in class should appreciate how lucky we are to be in this country with the opportunities it gives us."



Professor Thomas Gufrey during a controlled demonstration in his lab. Clearly, don't do this at home.

Photo by Victoria Sanchez

## Research Success Stories

### Burcin Irfanoglu (M.S., 2012)

Burcin worked in Dr. Bu's lab, co-authoring two publications. Her paper, "Multi-Component Self-Assembly of a Nested Co<sub>24</sub>/Co<sub>48</sub> Metal Organic Polyhedral Framework," was chosen as a "Hot Paper" for its importance in a rapidly evolving field of current interest. Burcin is currently in a Ph.D. program at Georgetown University.

*"I am very thankful to Dr. Bu and his research group for providing me with great knowledge and incredible experiences at CSULB. Through the experience and knowledge I got, I was able to observe how to be successful in research. I believe all the experience with Dr. Bu at CSULB is going to have a big contribution for my academic life and also for my personal further purposes."*

### William J Hammond (M.S., 2009)

Bill Hammond worked in Dr. Kris Slowinski's lab, co-authored three research papers and is now in an M.D. program at the Boston University School of Medicine.

*"My research experience at CSULB played a pivotal role in my acceptance and preparation for medical school and continues to serve me well by making me a competitive applicant for residency programs."*

### Ricardo Gallardo-Macias (M.S., 2009)

Ricardo wrote a research paper, made several presentations and placed first in the 23rd CSU Systemwide Research Competition in 2009. Ricardo is currently in the Ph.D. program at Yale University and is working with Professor W. L. Jorgensen.

*"Research in the Nakayama lab group at CSULB helped me to develop my scientific skills."*

# Jason Schwans Joins Chemistry Faculty

The Chemistry and Biochemistry Department welcomed Dr. Jason P. Schwans as an assistant professor this fall after he completed his post-doctoral research in enzyme catalysis in the Stanford University lab of Dr. Dan Herschlag.

Dr. Schwans earned his Ph.D. and M.S. in chemistry at the University of Chicago and B.A. with a double major in chemistry and music at Augustana College in Sioux Falls, S.D.

"My research interests lie at the interstices of chemistry and biology and address the central question: How do enzymes work?" he said. "Further, as

enzymes are the most common drug target, understanding their function is crucial to the development of new and better pharmaceuticals. Finally, enzymes play an ever-increasing role in 'green chemistry' as biocatalysts to minimize the environmental impact of the chemical industry.

"I am interested in developing and applying new chemical tools to study enzyme function. In particular, I am interested in bringing together the power of organic chemistry and biochemical techniques to use unnatural amino acids and nucleotides to investigate enzyme mechanism," he said. "As a graduate student, I studied RNA structure and function using nucleic acid chemistry to synthesize nucleotide analogs, and as a postdoc, I used synthetic chemistry and protein expression techniques to generate proteins bearing unnatural amino acids."

At CSULB, "We will integrate nucleic acid and protein chemistry to delve into the 'next generation' of enzymology to investigate enzyme mechanism at an unprecedented depth," he explained. "Not only will we be developing new chemical tools, but we will also incorporate these approaches with traditional biochemical approaches such as site-directed mutagenesis. While the molecules synthesized are ultimately for biochemical experiments, I am also interested in developing new approaches for the synthesis of nucleic acid or amino acid analogs, and this will offer an excellent training opportunity in synthetic chemistry.

"Together, our research at CSULB will further our understanding of the energetic and structural basis of enzyme catalysis and will provide rigorous training in synthetic chemistry, biochemistry, x-ray crystallography and spectroscopy."

But life for Dr. Schwans isn't all about the lab. His interest in both chemistry and music led to his double major. "While studying both subjects at the same time often led to a time crunch, juggling labs and rehearsals, I found it to be a rewarding experience," he said. "I think the variety of topics makes studies more exciting and interesting. I play saxophone, so in college I spent a great amount of time involved in wind ensemble, jazz band, sax quartet, individual recitals and playing in a city band that paid for performances, providing a great summer job for a high school and college student."

Although he stopped performing to focus on academics, "I have, however, continued to listen, attend concerts and read about music history. At CSULB, I hope to take advantage of being near the renowned Bole Cole Conservatory of Music to attend performances. As a hobby, I continue to scour record stores to add to my vinyl and CD collection," that numbers several thousand.

The South Dakota native also enjoys spending time outdoors and hiking in area parks. "After living in South Dakota and Chicago, I certainly appreciate the California weather. I no longer keep an ice scraper and snow shovel in my car during the winter."

He saw multiple reasons for joining CSULB. "I was greatly impressed by the equal

emphasis on teaching and research, the dedication of the faculty to excel as teachers and researchers, and the enthusiasm and diligence of the students to excel in the classroom and in their research projects. Teaching and research are not exclusive, but the equal focus on both provides an excellent training opportunity no matter what path is followed after graduation," he said.

"The interactions with the faculty and students immediately indicated that CSULB is an energetic and stimulating place to teach and carry out exciting research. It is these interactions that made me delighted to have the opportunity to join the CSULB community, and I look forward to many enriching interactions with the faculty and students.

"In our new lab at CSULB, I think our research directions in mechanistic enzymology will provide a fantastic opportunity to connect the classroom and lab. Our research will be directly related to many of the topics covered in organic chemistry and biochemistry courses."



Dr. Jason Schwans



# Department Upgrades NMR Instruments

The Department of Chemistry and Biochemistry recently acquired a new 300 MHz nuclear magnetic resonance spectrometer for use in the teaching laboratories and has upgraded its 400 MHz instrument.

Nuclear magnetic resonance, or NMR as most chemists and biochemists know it, is so much an integral part of modern chemistry that a working NMR spectrometer is the only piece of instrumentation specifically required by the American Chemical Society's Committee on Professional Education for ACS certified degree programs. No longer just a structure identification tool for organic chemists, NMR has broad application in organic, inorganic, physical and biochemical laboratories.

The department has continually worked to provide graduates with NMR training appropriate to the current technology. Some readers may remember the 60 MHz NMR that was housed in the instrument rooms between the Henderson Organic Labs in PH2. It was useful for obtaining low-resolution proton spectra in teaching labs. In 1993, the department acquired a Bruker AS400 MHz instrument to provide the kind of resolution and multi-nuclear capabilities graduates would see in Ph.D. programs and CSULB research programs demanded. Ten years later, this instrument was upgraded with a Tecmag Apollo console to provide more advanced gradient capabilities for still better resolution. About that time, the original 60 MHz instrument was replaced with a 90 MHz instrument that had better resolution and the ability to obtain carbon spectra in the teaching laboratory. In 2006, the department acquired a reconditioned Varian Gemini 300 MHz NMR to serve the laboratory classes in MLSC.

Thus, as the plan for the move to the new Hall of Science went forward, the program was served by a suite of aging instruments. Then, within a few weeks after the 400 MHz was moved to a new NMR room in the new building during spring 2012, the 300 MHz instrument failed. A combination of department and college resources helped to purchase a new Bruker 300 MHz NMR. The 300 MHz instrument will be capable of performing one- and two-dimensional NMR experiments and will be equipped with an auto-sampler, allowing us to run samples from the teaching labs for each student and improving their NMR experience.

Finally, the department had to replace the magnet on the Apollo 400 MHz system. With the new magnet on the 400 MHz NMR and with the new 300 MHz instrument in place to serve the teaching labs, the 400 MHz instrument can be used exclusively to serve the many research programs for which NMR is the major tool.



M.S. Chemistry candidate Makan Kaviani loads a sample into the department's new Bruker 300 MHz NMR for analysis.

## Research Success Stories

### Thomas Neubauer (B.S., 2008)

Thomas co-authored a publication and three presentations at national ACS meetings and is now in a Ph.D. program at UC Riverside.

*"The research experience I got in Dr. Mezyk's lab at CSULB has afforded me confidence in science through a firsthand approach while conducting top-notch experiments. From the time spent in Dr. Mezyk's lab, I was able to utilize this fortitude and put forth my knowledge to attain my ultimate goal of pursuing a Ph.D., all the while carrying with me the lab motto, 'Find new ways to understand the things you are learning.'"*

### Roger York (B.S., 2003)

Roger worked in the laboratory of Dr. Kris Slowinski, completed his Ph.D. at UC Berkeley under Professor Gabor Somorjai, worked as a postdoctoral associate at Harvard University with George Whitesides and is now a research associate with Professor Robert Langer at MIT.

*"Undergraduate research at CSULB provided me with the tangible benefits of three published papers when I left and the intangible benefits of increased self-confidence and a greater understanding of the scientific process. I have directly used some of the material I learned during research at CSULB in my studies at Harvard and MIT."*

### Yeon Joo Kim (High School Student)

Yeon co-authored a research paper, which was published in 2011. She is currently a first-year undergraduate student at UCLA, where she is involved in research on hematopoietic stem cells at the UCLA Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research.

*"The research on molecular switches that I did with Dr. Schramm was the experience that opened my eyes to research and made me realize that this is a path that I wish to pursue."*

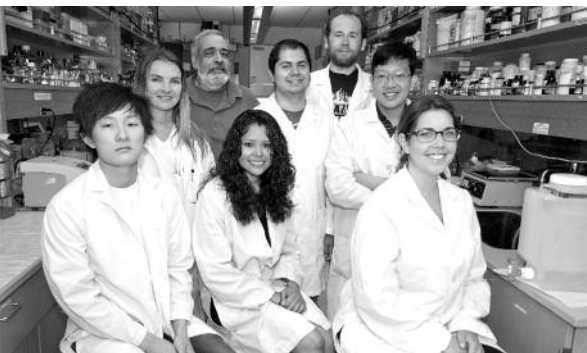


Photo by David J. Nelson

# Reports from Faculty

## Dr. Roger Acey

It has been a very exciting year for my research group. There are three ongoing projects in the lab. One is to determine the role of butyrylcholinesterase (BuChE) in neuron development. The second is to develop unique BuChE inhibitors as a potential therapeutic for the treatment of Alzheimer's disease. This project is in conjunction with Dr. Kensaku Nakayama. We have begun animal studies to determine the *in vivo* pharmacological effects of the compounds. The third project involves the development of water purification technology using a unique metal binding protein known as metallothionein (MT). I



Back row from left: Lauren Hartman, Dr. Roger Acey, George Lara, Matthew Kunicki and Phuc Nguyen. Seated from left: Joshua Feng, Joselyn Del Cid and Shauna Otto.

Photo by David J. Nelson

am pleased that Dr. Stephen Mezyk has decided to collaborate with us on the project.

Four undergraduate students joined the lab this year. Josh Feng and George Lara are working on the BuChE inhibitor project, Matthew Kunicki is looking at BuChE expression in stem cell differentiation and Phuc "Sam" Nguyen is working with MT. We also welcomed two Whitney High School students to the lab, Tiffany Chen and Kaajal Visnagra. Both are working with Sam on the MT project.

Joselyn Del Cid is the "old timer" in the lab. She is involved in several aspects of the BuChE

*From left: Dr. Eric Sorin, Dr. Christopher Brazier, Dr. Lijuan Li, Dr. Young Shon, Dr. Jeffrey Cohlberg, Dr. Krzysztof Slowinski, Dr. Robert Loeschen, Dr. Kasha Slowinska, Dr. Paul Buonora, Dr. Marco Lopez, Dr. Vasanthi Narayanaswami, Dr. Brian McClain, Dr. Paul Weers and Dr. Tom Maricich.*

project. I am please to report that she will enter a Ph.D. program at UCSF in the fall. We will all miss her enthusiasm and commitment to her research. Brent Wilkinson and Steve Poynter, a volunteer in the lab, were accepted into Ph.D. programs at USC and Harvard, respectively. Archie Turner, a participant in the Bridges to the Baccalaureate Program, has been working on the BuChE inhibitor project. He will be transferring to CSULB this fall.

Lauren Hartman is a current graduate student in the lab. Her thesis is to determine if the BuChE inhibitors prevent  $\beta$ -amyloid formation in cultured neuroblastoma cells. We are excited about the clinical potential of her research. Paul Madera completed his first year of medical school and will be writing his thesis this summer.

Jim Yano, Gwen Jordaan and Simon Moon all completed their theses this year. Jim studied the expression of a unique nuclear protein in differentiating macrophages, Gwen isolated the gene for MT from artemia and Simon identified glycosylated isoforms of histone H1 in developing artemia. They have been responsible for much of the training of incoming students. They were an absolute pleasure to work with the last few years. We will all miss them.

Finally, I've decided to enter the Faculty Early Retirement Program (FERP) program, beginning in the fall. I will be teaching half time each semester and will continue my research program.

## Dr. Paul Buonora

The year was marked by a number of transitions in the Buonora group. While past research work has focused primarily on bi- and tricyclic lactams in synthesis, we have begun expanding into studies aligned to understanding the nature of reaction stereocontrol and other synthesis work.

In transitions, some players move on. Crystal Jenkins completed her M.S. thesis in dynamic kinetic resolution in the bicyclic lactam synthesis. Mariko Yokokura, Philip Campos and Kevin Mahle finished up their work in the same area. Crystal continues as faculty at Santa Ana College. Mariko begins study at the UCSF School of Pharmacy in the fall. Kevin presented his work at the fall 2011 American Chemical Society (ACS) national meeting and is applying to Ph.D. programs in chemistry this fall. Phil's work was presented with his lab mate, Joe Ferraro, at the spring ACS national meeting.

Lizeth Perez and Hannah Pham have been studying the formation and use of aldehyde enamines in alkylation reactions under microwave reaction conditions. Their work was also presented at the spring ACS national meeting. Lizeth, a RISE program Fellow, will apply to Ph.D. chemistry programs in the fall, and Hannah is applying to pharmacy programs.

Akira Ueno and Sean Donovan worked on our nascent phthalide synthesis project. This class of compounds is of interest as central nervous system active agents. The project is taking off as the lactam projects phase out.

Our dioxepinenone reagent project challenge has been accepted by M.S. candidate Yong Shin. Yong was assisted in summer 2011 by Bridges to the Baccalaureate students Tuyen Nugen and Lea Santiago. Every study teaches us more about this system, which we expect will yield to the constant pressure in the near future.



## Reports from Faculty

The dioxepinenone related project is our one-to-one reagent development work. Straun Phillips completed his M.S. thesis on this in early 2012 before joining Materia, Inc. Reginald Ramirez continued the work through this spring as an NIH-RISE program Fellow. Reginald will also be applying to graduate programs in the fall.

We heard from a few former group members. Michiko Okawara is progressing in the pharmacy program at Loma Linda University. I saw a strong talk by Joe Badillo at the spring ACS national meeting. He is making good progress at UC Davis. Also at the ACS national meeting, Liz DeSelm had dinner with group members and shared her perspectives on pharmaceutical industry employment based on her experience since completing an M.S. degree at CSULB.

Witnessing former students supporting current students is heartening. In addition to the former group members mentioned, I thank Dr. Ken Ishida of the Orange County Water District for his continued financial support of our research. This support is instrumental in keeping new projects going in tough fiscal times.

As for me, I continued work in student development through the CSULB NIH-RISE and NSF S-STEM programs and became an advisor for the SAACS group. I continue to teach the majors organic course and coordinate the seminar program. As to the latter, I invite alumni interested in presenting their science in the seminar program to contact me.

### Dr. Jeffrey Cohlberg

I have completed my very enjoyable first year in FERP teaching half time, including a fun-filled return to CHEM 443, the biochemistry lab class, which I had not taught while serving as department chair. It's great to get to know some of our majors in a small group setting instead of in a large lecture hall.

I have continued to work on my molecular modeling manual, "Studying Protein and Nucleic Acid Structure with Jmol." The manual is an online learning resource for the Berg, Tymoczko and Stryer *Biochemistry* text and will be an online resource for the new edition of Nelson and Cox, *Lehninger Principles of Biochemistry*, due out this fall, which I'm helping to review. I'm also continuing to edit the department newsletter and help organize our annual career day. I'm also looking forward to being one of three instructors this fall in our new course, Biochemistry Core for Graduate Students (CHEM 541), along with coordinating the department's weekly seminar program. So what I thought was going to be a mostly idle summer has turned out to be a very busy one!

### Dr. Stephen Mezyk

Another 12 months have flown past and, as always, it has been a busy period. Again, the focus of the CSULB Mezyk RadKEM group was on finishing up our current projects in our mix of environmental water remediation, nuclear chemistry and chemical carcinogenesis research. Our efforts have produced 11 published or in-press papers and 20 conference presentations. It was a busy travel year for me, too, with work and conferences taking me to Sweden, Chile and across the U.S.

There were fewer changes to my research group this year, with only a few students graduating. Kimberly Johnston completed her B.S. biology degree and matriculated into a P.A./M.S. position in Boston, Mass. In her final year, Kimberly focused on four separate projects that we are now writing up for journal publication. Her exceptional efforts at CSULB culminated in her being chosen as the 2012 Outstanding Graduate of the College of Natural Sciences and Mathematics. Jeremy Scheeler also completed his undergraduate biology degree, with his Beckman Scholars research project focused on the role of nitric oxide in nitrosamine carcinogenesis. He is working towards his MCAT exam this summer, with the goal of attending medical school in fall 2013. Shauna Otto joined the group this past year; she is graduating with her B.S. degree in biochemistry but planning on coming back to CSULB for her M.S. degree. It has been a lot of fun mentoring these students to all of their great achievements, and we wish them even greater success in their futures.

More students also joined our laboratory. Daniel Tran is working on the radical-based remediation of small, halogenated chemicals in contaminated wastewaters; Lauren Olson is working on a joint project with Dr. Michael Schramm, synthesizing iodo-containing acetic acid compounds for further radical kinetic studies; DeeAnn Asamoto is investigating the direct reaction of disinfectant peroxide with antibiotics in water; and Maya Hey is studying the removal of animal feed chemicals from farm wastewaters. All of these students have already shown their excellent abilities in research.

DeeAnn and Maya recently received Women and Philanthropy scholarships for their research this summer, and Lauren received the ACS Polymer Chemistry Award for her organic chemistry prowess. In addition, I personally received the 2012 CSULB Alumni Association's Most Valuable Professor and Academic Affairs' Outstanding Faculty Mentor awards.

Additional highlights this year included my students' conference presentations. Four students presented at the American Chemical Society meeting in San Diego (March), and we have nine presentations scheduled for the next meeting in Philadelphia (August). In addition, two of my M.S. degree students are making presentations: Thomas Cullen at the July Radiation Research Gordon Conference in New



Photo by Victoria Sanchez

Back row from left: Dr. Stephen Mezyk, Thomas Cullen, Matthew Chagnon and Garrett McKay. Middle row from left: DeeAnn Asamoto, Brittney Sjelin, Mayumi Tamada and Daniel Tran. Front row from left: Hanqing Pan and Lauren Olson.

Hampshire and Garrett McKay at the 16th Meeting of the International Humic Substances Society at Zhejiang University, China, in September.

With the continued strong focus on research, I only taught and coordinated General Chemistry (CHEM 111B) during the fall 2011 semester. My CSULB service efforts were mainly concentrated on the Executive Council in our department.

Overall, it was another amazingly successful year, and they just keep on getting better!

### Dr. Kensaku Nakayama

Our collaborative work with Dr. Roger Acey's group on the cholinesterase inhibitor study has been very fruitful over the past year. Through their expertise in computational chemistry, Drs. Eric Sorin and Katherine Kantardjiev (CSU San Marcos) have continued to assist in unraveling how these enzymes are inhibited.

Every student in my group contributed to the progress made in this collaboration. Robert Esquivel and Nick Spurlock, undergraduates majoring in biology who I recruited from CHEM 323B, and Zandra Gomez, a biochemistry major, have helped us to further understand the chemistry behind the synthesis of our bivalent inhibitors. Biochemistry major Elise Van Fossen, who spearheaded our synthetic efforts, will be entering our M.S. degree program this fall. My M.S. degree students continue to drive the projects forward. Trina Tran completed her first year in our chemistry M.S. degree program. Kim Tu, who will be entering her third year in the M.S.

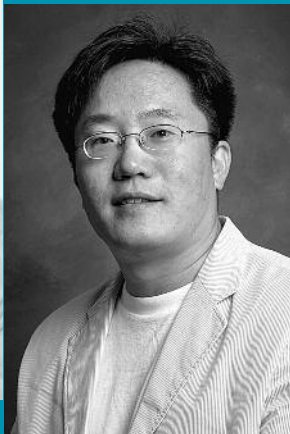
*Continued on pg. 13, Reports from Faculty*



Dr. Shahab Derakhshan



Dr. Vas Narayanaswami



Dr. Young Shon



Dr. Kasha Slowinska



Dr. Michael Schramm

## Department Faculty Get Major Grants

By Dr. Jeffrey Cohlberg

**F**ive of our faculty members have received major funding to support student research during the past year.

**Dr. Michael Schramm** received a three-year, \$433,500 NIH SCORE grant from the National Cancer Institute to work on "Selective Small Molecule Membrane Transport Using Cavitand Receptors." Cavitands are container-shaped molecules with cavities that can encapsulate smaller molecules. Recently, Katie Feher, an undergraduate student in Dr. Schramm's lab, demonstrated that cavitands can be localized in phosphocholine vesicles, a first step toward developing systems to test their ability for transport.

The grant will allow Dr. Schramm's group to investigate the potential of these cavitands to shuttle small drug-like molecules across unilamellar vesicles, lipid bilayer structures that are models for cell membranes. This project has the potential for leading to new ways of delivering drugs to cells, including many drugs that are highly effective against their targets *in vitro* but are not currently useful for therapy because they cannot penetrate cell membranes.

**Dr. Shahab Derakhshan** received an award jointly with Dr. Yohannes Abate (Department of Physics and Astronomy) for research on "Near-Field Nanoscopy of Metal-Insulator Phase Transitions toward Synthesis of Novel Correlated Transition Metal Oxides and Their Interaction with Plasmon Resonance." The grant was awarded by the Department of Defense Research and Educational Program for Historically Black Colleges and Universities/Minority Institutions.

The three-year, \$590,000 grant will fund a project investigating certain transition metal oxides that exist as metals or insulators at different temperatures because of changes in their crystal structures. Dr. Derakhshan will design and synthesize the oxides and determine their crystal structures and bulk electronic properties. Then Dr. Abate will characterize the phase transitions in these materials with near-field nanoscopy, a recently developed technique in which imaging with far-infrared light can reveal the distribution of mobile electrons in a substance at a resolution of tens of nanometers. The

research may lead to the development of thermally triggered switches, and hysteresis in the phase transitions may be exploited to develop new memory devices.

**Dr. Kasha Slowinska** received a four-year, \$433,500 NIH SCORE grant entitled "Rigid-Rod Peptides as Nanocarriers for Delivery of Cancer Drugs." Her lab recently showed that peptides designed to mimic the protein collagen assemble into triple-helical structures similar to those found naturally in collagen. The grant will support research investigating the potential of these triple helical structures to serve as nanocarriers for drug delivery. For this purpose, the peptides will be covalently conjugated with paclitaxel and other low solubility cancer drugs. This conjugation has the potential to increase the solubility of the drugs and enhance their stability. Incorporation into the peptide sequence of a cell-targeting sequence or a cell-penetrating vector may allow local delivery of the drugs specifically to targeted cells.

**Dr. Young Shon** received a four-year, \$433,500 NIH SCORE grant entitled "Synthesis of Gold Nanoparticle-Cored Dendrimers Linked with Fluorophores and Antibodies: Smart Biomarkers for Cancer Treatments." The grant will enable Dr. Shon's lab to develop gold nanoparticles coated with dendritic frameworks for potential use in cancer diagnosis and therapy. For more information about this project, please see the story about Dr. Shon's research on page 5.

Finally, **Dr. Vas Narayanaswami** was the principal investigator for the successful five-year renewal of our grant from NIH's Minority Access to Research Careers (MARC) Undergraduate Student Training in Academic Research program. The overall aim of the \$1,276,706 project is to continue increasing the number of underrepresented minority (URM) students entering and earning doctorates in biomedical sciences. The program will recruit seven URM students per year who have potential and interest in pursuing research as a career and provide each with an individually designed academic and research training plan. Fifteen faculty members in our department and 10 faculty members from the Department of Biological Sciences will serve as mentors for the MARC students.



Continued from pg. 11

degree program, maintained a 4.0 in her course work and was awarded the John and Elizabeth Leonard Scholarship for the 2012–13 academic year.

I have been involved in teaching the advanced organic laboratory course (CHEM 420) since fall 2007. Every semester, I try to incorporate reactions from the literature into the course curriculum to give students an opportunity to ponder “real-world” examples in the lecture and lab. I’ve continued to also teach the CHEM 322 series, the two-semester organic chemistry lecture sequence for bioscience majors. The course has its own challenges, but I enjoy applying Dr. Don Paulson’s (retired, Cal State L.A.) active learning strategy in its instruction.

### Dr. Vas Narayanaswami

Occasionally, I complain that my students move at glacial speed. Thanks to global warming, glaciers are moving faster nowadays, and looking back, it seems like the students are keeping pace with them! Read on to find out what a bunch of jetsetters we have in our group.

Photo courtesy of Vas Narayanaswami



Hanging out in Old Town, San Diego after a hard day's work at the Biophysical Society meeting, from left to right: Pankay, Roy, Sea, Vas and Tuyen.

We welcomed the new M.S. biochemistry student Shweta Kothari, who joined our group in early spring. We also hosted three NSCI 160 freshmen, who spent the semester tagging students in our lab. One of them, Patricia Nguyen, won the LSAMP summer fellowship award to continue working in our group during summer 2012.

In late spring, we bid farewell to graduate student Gursharan Bains, who successfully defended her M.S. thesis. She co-authored a review article in *Molecules* in 2011 on the use of pyrene to study protein conformation. She is viewing the industry sector for jobs. We also said goodbye to Vi Dao, an undergraduate student

from our lab, as she heads off to Rutgers, the state university of New Jersey, for an M.S. degree in food chemistry.

We had good representation at the 24th Annual CSU Biotechnology Symposium in Santa Clara in January, with biochemistry undergraduate student Tuyen Tran and biochemistry graduate students Roy Hernandez and Sea Kim in attendance.

Tuyen Tran was one of the finalists for the Glen Nagel Undergraduate Student Award competition at this meeting. The trio also presented their work at the 56th annual meeting of the Biophysical Society in San Diego.

In addition, Roy was invited in June to give a talk on lipoprotein metabolism at the Gordon Research Seminar (GRS), held at the Waterville Valley Resort in New Hampshire. The GRS was held in conjunction with a related Gordon Research Conference, in which Roy and I participated as well. He won a CSUPERB student travel award and a GRS conference travel award to attend this meeting.

Tuyen has been a poster child for our research group! He made an oral presentation on his research at the 2011 Annual Biomedical Research Conference for Minority Students (ABRCMS) in St. Louis. He won an ABRCMS travel award to attend this meeting. He and I attended the Arteriosclerosis, Thrombosis and Vascular Biology Meeting in April, where we had a poster presentation. Finally, Tuyen won a CSUPERB–Howell award to examine the structure–function relationships of apoE that has been modified by 4-hydroxynonenal, an aldehyde that mediates oxidative stress.

Tuyen Tran and Roy Hernandez won 2012 NIH-sponsored Children’s Hospital Oakland Research Institute summer research fellowships. Roy planned to spend time this summer in our collaborator’s lab at Oregon State University, Corvallis, performing hydrogen/deuterium exchange coupled to mass spectrometric analysis of apoE.

I guess I need not have worried about students moving at glacial speed after all!

### Dr. Young Shon

Our research has continued on the design, synthesis and application of nanoparticle–hybrid materials with potential applications in nanoparticle catalysis, plasmonic sensing and multifunctional biomarkers.

The past 12 months have been quite productive in terms of research accomplishment. First, our research proposal on nanoparticle-

cored dendrimer biomarkers was funded by the NIH–SCORE program for the period 2011–15. Second, a total of four research papers were published. Elham Sadeghmoghaddam, who successfully defended her M.S. thesis and graduated in May, is the first author of the paper published in *Applied Catalysis A*. This paper is also co-authored by a former undergraduate, Kalil Gaïeb. Another outgoing graduate student, Linh Tran, contributed significantly to a published article in *Colloids and Surfaces A*. This paper was co-authored by a former undergraduate, Paul Vacarello. Linh Tran is finishing up his thesis in time for graduation this summer (2012).

Our collaborative research on “near-field spectroscopy investigation of silica and silica/gold nanoparticles” with Dr. Abate’s group in the Department of Physics and Astronomy has generated successful results that are published in the *Journal of Nanoparticle Research and Optics Express*. This collaboration is continuing for research involving various nanostructured materials.

A continuing graduate student, Diego Gavia, had another productive year and is preparing several manuscripts for his nanoparticle catalysis research. Undergraduate students Jordan Koeppen and Tae Y Kim also spent quality time in the lab and participated in the investigation of catalytic organic reactions using Pd nanoparticles.

Five new undergraduate students joined my research group in the past year. Becky Hsu, Nikki Viola and Annika Sotelo have been working on synthesizing water-soluble gold nanoparticles and nanoparticle-cored dendrimers with different particle core sizes, and studying their stability and other properties in different environments. Van Truong and Vicky McKnight have prepared Au or Pd nanoparticle-assembled structured materials and studied their chemical and photochemical catalytic properties. I am looking forward to an exciting time with these new and continuing research students in the new academic year.

Many students had opportunities to present their research at national meetings. Elham, Diego, Becky and Nikki made presentations at the March ACS national meeting in San Diego, and Diego, Jordan and Tae presented their work at the ACS western regional meeting in Pasadena.

### Dr. Kasha Slowinska

I can honestly say that this was the busiest year in our lab since it was established! The

Continued on pg. 14, Reports from Faculty

## Dr. John E. Leonard Named 2012 CNSM Distinguished Alumnus

**D**r. John E. Leonard (1969, B.S., chemistry; 1972, M.S., biochemistry) was named the 2012 Distinguished Alumnus of the College of Natural Sciences and Mathematics (CNSM). He went on to get a Ph.D. in biochemistry in 1978 at UC Riverside and then had a long and successful career in both academic research and the pharmaceutical industry. During his career, Dr. Leonard has helped develop 26 biologic or small molecule drugs for treating cancer or autoimmune disease. Of these drugs, Rituxan, Zevalin and Tysabri have received commercial use approval.

After receiving his doctorate, Dr. Leonard spent five years as a postdoctoral scientist at UC San Diego and another five years as an assistant research biochemist participating in translational research in the Cancer Center, UC San Diego School of Medicine. In 1988, he joined IDEC Pharmaceuticals, where he was senior director, regulatory affairs and quality assurance; then vice president, pre-clinical product development; and vice president, quality. Following the 2003 merger of IDEC and Biogen, Dr. Leonard served until 2005 as vice president and program executive leading the Tysabri development team.

From 2005 through 2008, Dr. Leonard served as a consultant to various national and international biotechnology companies. In early 2009, he joined Vaccinex, Inc. (Rochester, N.Y.), where he currently holds the position of senior vice president, development.

In January 2011, Dr. Leonard and his wife, Elizabeth, formed the John and Elizabeth Leonard Family Foundation to continue their history of philanthropic giving. While attending CSULB, Dr. Leonard shared the university's academic life with his father, Earl (1974, B.S., mechanical engineering), and brother, Robert (1971, B.A., health science). A CSULB annual fund donor of more than 15 years, Dr. Leonard established the John and Elizabeth Leonard Scholarship in CNSM in 2010. He and his wife are the parents to daughter, Katherine, and son, Matthew.

## Reports from Faculty

*Continued from pg. 13*

group is growing fast, and at this point, we have four graduate and 11 undergraduate students. As the size of the group increases, so does the number of projects we are pursuing.

Last year, we completed a collaboration with Dr. Harmon from Aerospace Corporation to study the microstructure and mechanical properties of collagen modified with gold nanoparticles. This collaboration resulted in a paper published in *Colloids and Surfaces B:*



*Photo courtesy of Chem Dept.*

From left: Heather McKinney, Dr. Kasha Slowinska and Aparna Shinde after the hooding ceremony.

*Biointerfaces*, co-authored by undergraduate students Thomas and Joseph Schuetz (yes, they are identical twins, and after these many years, I still cannot tell them apart!) and graduate students Luciano Castaneda and Nate Richmond.

Another successful collaboration between our group, Profusa, Inc., and groups from the University of Washington, Duke, and Texas A&M University was supported by DARPA to study the effects of hydrogel implantation on small- and macro-molecular diffusion. I am especially impressed with the students from my lab who are involved in this project: Armando Reimer, Daniel Hernandez and Melody Loera. We all know that data reporting to DARPA is a killer and keeping up with the measurement schedule was almost an inhumane effort (thanks, guys!). This project provided an excellent excuse to build and optimize the new FRAP setup in our laboratory. I am currently working on a publication summarizing our findings. While collaborations with Aerospace and Profusa came to an end, we engaged in several new ones in our own department with the Schramm, Sorin and Shon groups (it looks like we only collaborate with "S" groups).

In our lab, Armando Reimer made the biggest discovery of the year, which pertains to collagen peptide assembly into unique hollow microtubules. The initial results were published in the *Journal of Materials Chemistry*

(check out the amazing pictures that Katie Feher took on the confocal Olympus microscope). We received more good news at the beginning of the year in the form of NIH funding for four years to study peptides as nano-carriers for delivery of cancer drugs. There are several students involved in this project, but Aparna Shinde worked especially hard on studying uptake of the carrier to the nucleus and carrier digestion by serum enzymes. We are ready (almost) to submit a summary of our findings to the *Journal of Controlled Release*. We are still struggling a little with the coupling of cancer drugs to carriers, studied by Mona Oumais, but we see the light at the end of the tunnel!

Our work was presented at several conferences. Aparna Shinde presented at the ASC meeting in San Diego, and Daniel Hernandez presented at MAES in San Francisco. I was invited to New York City to a meeting funded by NSF-DFG on "Bio-Inspired Design and Engineering of Novel Functional Materials." The meeting took place in German House (part of the United Nations complex) so security was overbearing, but the view from the meeting room (34th floor) compensated for the inconvenience!

Two of my students, Heather McKinney and Aparna Shinde, are finishing their M.S. theses and will soon leave the group. I wish them all the best in their future endeavors.

### Dr. Eric Sorin

This year, my fifth at CSULB, has been very hectic for me and more so for a number of my students, who have continued to be successful on many fronts. Physics undergraduate Amethyst Radcliffe, who completed an Independent Research Internship at Pasadena's Jet Propulsion Laboratory this spring, presented a poster on our enzyme inhibition project with her lab partner, biochemistry undergraduate Sam Cao, at the CSUPERB Biotechnology Symposium in Santa Clara in January. Amethyst also presented at the SCURCCB meeting at CSU Channel Islands in April. This was followed by M.S. chemistry student Ben Pham and undergraduate Sam Cao presenting at the annual ASBMB meeting in San Diego. All three of these students are now hard at work, alongside their teammate Phuc La, helping me to prepare manuscripts for submission this summer.

Biology major Erik Carpio and chemical engineering major Kim Helm were awarded Women and Philanthropy summer research



scholarships, marking the second year in a row that the Sorin lab had two W&P Scholars. Erik, who will soon be working on a manuscript or two of his own, was also this year's Glenn M. Nagel Undergraduate Research Fellow, and Kim, currently analyzing her own data set, was awarded a 2012 BP America Scholarship. The support that Sorin lab students received this year has thus kept my students and me energized and looking forward to further accomplishments in 2012-13, with several new lab members by our side. M.S. chemistry student Linh Nguyen and biochemistry undergraduates Nguyen Nguyen and Emilio Robles are now in the lab with us full time this summer!

While working alongside this group of very ambitious and talented undergraduate and graduate students, I'm also having fun



Standing from left: Tae Ji, Linh Nguyen, Erik Carpio, Kim Helm, Carolyn Kusaba, Ben Pham, Amethyst Radcliffe and Dr. Eric Sorin. Seated from left: Phuc La, May Zimmerman, Samantha Cao, Nguyen Nguyen and Emilio Robles.

teaching CHEM 361, our chemical communications course, for the first time this summer. For the second year in a row, I had a great time spending the year with a large number of our majors moving through the CHEM 377A/B sequence, which was very rewarding and allowed me to get to know some of our majors quite well (a couple of whom stayed on for my summer CHEM 361 class!). My teaching experiences at CSULB never fail to "shock and awe" me, and I'm looking forward to meeting next year's crop of aspiring chemists and biochemists.

I also remained extremely busy on the service front this year, as I continued to maintain the department's website and serve on the CSULB Academic Senate; developed and planned our first annual New Graduate Student Orientation event; served on our bioorganic faculty search committee; and was added to the editorial board of two journals this year, *OMICS Bioenergetics* and the

upcoming *ISRN Structural Biology*. While both challenging and rewarding in their own ways, it's certainly nice to be able to put these tasks aside for the time being and be back in the lab with my students crunching numbers for the summer!

#### Dr. Paul Weers

The program in the Weers research laboratory investigates the antimicrobial properties and lipid binding interaction of apolipoproteins, a class of proteins critical for lipid transport processes in the human body.

During the last academic year, several personnel changes took place in our lab. The following new students joined: Anna Smith, Eugenia Maravilla, Nnejiuwa Ibe and Jonathan Diaz. After spending a good portion of their time in our lab during their last undergraduate years, Ivan Biglang-Awa, Jake Thistle and Anthony Tabet graduated in the spring semester. Pankaj Dwivedi and Chris Adams are graduating M.S. degree students. Pankaj will continue his education at the University of Cincinnati, where he was admitted to the Ph.D. program in cancer biology.

The Weers lab presented their research progress at four different conferences: CSU Program for Research and Education in Biotechnology in San Jose (Ivan Biglang-Awa and Pankaj Dwivedi), Biophysical Society in San Diego (Pankaj Dwivedi), American Society for Biochemistry and Molecular Biology in San Diego (Ivan Biglang-Awa and Wendy Beck) and the Canadian Chemistry Conference in Calgary (Dr. Paul Weers). Ivan Biglang-Awa made an important contribution to a collaboration project with the Dr. Haas-Stapleton lab (CSULB Department of Biological Sciences). This project studies the antimicrobial properties of an insect antimicrobial and antiviral protein (gloverin), and Ivan investigated the ability of gloverin to interact with negatively charged phospholipid membranes. This work was recently published in the *Journal of Invertebrate Pathology*. The thesis work of former graduate students Merve Oztug and Daisy Martinon, a biophysical characterization of apolipoprotein-lipopolysaccharide complexes, was recently published in *Biochemistry*.

## Research Success Stories

### Chung-Ping Leon Wan (B.S., 2008)

Chung-Ping co-authored six publications and is currently entering his fourth year of the Ph.D. program in pharmaceutical sciences at the University of British Columbia.

*"The training I had in Dr. Weers' lab during my graduate study at CSULB has enabled me to acquire the essential skillset as a competitive scientist in life sciences."*

### Lesley Joanna Vásquez (B.S., 2007)

Lesley co-authored two research papers and is currently in the Pharm.D. program at UC San Francisco.

*"At the UCSF School of Pharmacy, the focus is on evidence-based medicine and applying this knowledge to helping improve patient care. My research experience in Dr. Paul Weers' lab at CSULB helped me develop the analytical tools and skills necessary to become a successful student pharmacist at UCSF."*

### Leonardo Leon (B.S., 2005)

Leonardo co-authored two research papers and is currently a Ph.D. candidate in pharmacology at UC Davis.

*"I initially was unclear about the career path I wanted to pursue when I entered Cal State Long Beach. After my participation in the laboratory of Dr. Paul Weers, I realized that I found scientific research fascinating. I am currently pursuing my doctorate degree in the laboratory of Dr. Kermit Carraway at UC Davis, with an aim of discovering novel and effective cancer treatments."*

### Pankaj Dwivedi (M.S., 2012)

Pankaj co-authored several papers and is joining the Ph.D. program in cancer biology at the College of Medicine, University of Cincinnati, Ohio.

*"The Department of Chemistry and Biochemistry at CSULB is an amazing place to learn and excel in research. Working with Dr. Paul Weers' lab optimized my chances to get in a good Ph.D. school."*

# 2011-12 Research Publications for Department Faculty

## Dr. Roger Acey

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- Young, K.J.H., X. Buand, and C. Kaska. 2011. Synthesis, characterization, and cyclometalation studies of benzo[1,2-H: 5,4-H'] diquinolines with palladium and platinum. *J. Organometallic Chem.* 696, 3992e3997.
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- Zhai, Q., Q. Lin, T. Wu, S.-T. Zheng, X. Bu, and P. Feng. 2012. Induction of trimeric [Mg<sub>3</sub>(OH)(CO<sub>2</sub>)<sub>6</sub>] in a porous framework by a desymmetrized tritopic ligand. *Dalton Trans.* 41, 2866-2868.
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#### Dr. Michael Schramm

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#### Dr. Young Shon

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#### Dr. Kasha Slowinska

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#### Dr. Paul Weers

- Moreno-Habel, D.A., I.M. Biglang-Awa, A. Dulce, D.D. Luu, P. Garcia, P.M.M. Weers, and E.J. Haas-Stapleton. 2012. Inactivation of the budded virus of *Autographa californica M* nucleopolyhedrovirus by gloverin. *J. Invertebr. Pathol.* 110, 92-101.
- Kamei, A., P.S. Hauser, J.A. Beckstead, P.M.M. Weers, and R.O. Ryan. 2012. Expressed protein ligation-mediated template protein extension. *Protein Expr. Purif.* 83, 113-116.
- Oztug, M., D. Martinon, and P.M.M. Weers. 2012. Characterization of the apoLp-III/LPS complex: insight in the mode of binding interaction. *Biochemistry*, in press.

## Vas Narayanaswami's Article Named Paper of the Year

A paper by Dr. Vas Narayanaswami has been named Paper of the Year 2011 by *Biochemical Journal Structure* in recognition of the article being the most highly cited paper published by the journal. Entitled "Antiparallel  $\beta$ -sheet: a signature structure of the oligomeric amyloid  $\beta$ -peptide," the paper was co-authored with colleagues at the Free University of Brussels, Children's Hospital Research Institute in Oakland, UC Irvine and the Catholic University of Louvain (Belgium).

The paper concerns the beta amyloid peptide, which forms the amyloid fibrils found in extracellular plaques in the brains of patients with Alzheimer's disease. The fibrils are organized as parallel beta sheets, in which hydrogen bonds form between successive protein chains oriented in the same direction.

In recent years, research has shown that the amyloid peptide can also form a soluble oligomer (a small number of peptide molecules associated with each other). Most investigators believe that the soluble oligomer, and not the fibrillar form, is the toxic species that causes degeneration of brain cells.

Dr. Narayanaswami and her collaborators investigated the structure of the oligomers with attenuated total reflectance infrared spectroscopy. In this technique, a protein solution is deposited as a film on the surface of a crystal and a beam of infrared light is repeatedly reflected from the crystal faces. When the light beam penetrates the protein film, the protein molecules absorb infrared light, and a spectrum is recorded.

The infrared spectrum of the oligomers showed that they are organized as antiparallel beta sheets, with successive chains running in opposite directions. The similarity of this structure to that of proteins that form pores in bacterial membranes lends support to the proposal that the toxic action of beta amyloid may involve permeabilization of brain cell membranes. A simple reorientation of the sheet structure could convert the antiparallel chains to the parallel chains found in fibrils.

This paper had a large impact on the field of Alzheimer's research by elucidating the structure of the toxic oligomers and providing new clues concerning the biochemical mechanisms by which the beta amyloid peptide causes the death of brain cells.

# Awards & Scholarships

Chemistry and Biochemistry Students 2012

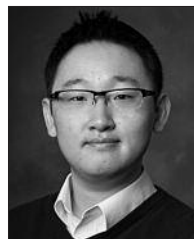
## Annual and Endowed Awards

### Robert B. Henderson Award

Dr. Robert B. 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. This award is given to a student best exemplifying Henderson's scholarship and commitment to the profession of chemistry. This year's award of \$1,000 was presented to **Carolyn Kusaba**, a graduate student in Dr. Brian McClain's lab.



Carolyn Kusaba



Sea Kim

defray the tuition expenses of a graduate student in biochemistry. This year, a \$1,000 scholarship was presented to **Lauren Hartman**, a graduate student working with Dr. Roger Acey.

### Maria Erlinda Co Sarno Scholarship in Chemistry

Dr. Sarno received her B.S. from the University of Santo Tomas, Philippines, and her M.S. in chemistry from the CSULB Department of Chemistry and Biochemistry in 1975. After a highly successful career as a chemist at Baxter Healthcare, she became a U.S. patent attorney in private practice that focuses on serving small businesses and independent inventors. The award recognizes an international graduate student with research interests in compounds leading to therapeutics or prevention of disease. This year, a \$2,500 scholarship was presented to **Sea Kim**, a graduate student working with Dr. Vas Narayanaswami.

### John H. Stern Award in Physical Chemistry

The Stern Award, consisting of a cash prize, is given in memory of Dr. John H. Stern, 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 Dr. Stern, who was a member of the faculty from 1957-87 and a distinguished teacher of physical and general chemistry. **Trevor Reutershan** was named the recipient of the \$1,000 Stern Award for 2012.

### Leslie K. Wynston Scholarship

Dr. Wynston was a biochemistry professor in the department from 1965-98. He served as chair of the Pre-Professions Health Advisory Committee for many years and was active in both the western and national Association of Advisors for the Health Professions. The \$1,000 award recognizes an outstanding junior who is pursuing a B.S. in biochemistry and planning to enter a health-related professional school the following year. This year's winner is **Malinda Tan**.

### Contributions to Student Award Funds Are Welcome

The department welcomes contributions to support these awards. When you make your donation to the department, you may specify that it goes to the Wynston, Stern, Marsi, Henderson, McAbee-Overstreet, Sarno or Monahan fund, or general scholarship fund. Les Wynston particularly welcomes donations that will enable him to increase the amount of the annual Leslie K. Wynston Scholarship and ultimately to endow it. Contributions to the department can be made at [www.csulb.edu/givenow](http://www.csulb.edu/givenow) or returned in the enclosed envelope. Contributions to the Louis M. Perlgut Scholarship fund may be sent to Community Foundation of Tompkins County, 309 N. Aurora St., Ithaca, NY 14850.

### Kenneth L. Marsi Scholarship

The Kenneth L. Marsi Scholarship was established by faculty, staff, family, friends and former students of Dr. Kenneth L. Marsi on the occasion of his retirement in 1996. Dr. Marsi was a distinguished scientist, teacher of organic chemistry, and served superbly as department chair for 21 years. He passed away in 2005. The \$2,500 scholarships are used to defray registration fees of outstanding junior and senior chemistry or biochemistry majors. This year's award went to **Tuyen Tran**, who works with Dr. Vas Narayanaswami.



Tuyen Tran



Trevor Reutershan

### 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 Dr. Doug McAbee and went on to a Ph.D. in molecular biology at U.C. Irvine. This year, an award of \$2,000 was given to **Roy Hernandez**, a biochemistry graduate student working with Dr. Vas Narayanaswami.



Roy Hernandez



Malinda Tan

### Michael Monahan Fellowship

The Monahan Award was established through a generous bequest from Dr. 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 U.C. San Diego. He was a distinguished scientist and member of the faculty at the Salk Institute and subsequently a senior research scientist at Beckman Instruments. Dr. 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 the Department of Chemistry and Biochemistry. According to his will, the income from his bequest is to be used to support student research in the department. This year's award of \$3,000 was given to **Thomas Cullen**, a graduate student working with Dr. Stephen Mezyk.



Thomas Cullen



Cindy Pham

Photos by Victoria Sanchez

aceuticals. NHK operates two facilities in Santa Fe Springs as well as a subsidiary company, NHK Chemical Corporation. Along with the \$1,000 NHK scholarship, the recipient also has the opportunity to complete a course-credit internship at NHK's Santa Fe Springs laboratory. This year's recipient is **Cindy Pham**.

### Louis M. Perlgut Scholarship

Dr. Louis M. Perlgut, professor of biochemistry in the department from 1965-82, taught the biochemistry courses for both science majors and nursing students, and supervised both graduate and undergraduate research. Dr. Perlgut served as the first graduate adviser for the M.S. program in biochemistry and was largely responsible for launching the program. Upon his death in 2003, his family established this scholarship to

### NHK Laboratories, Inc. Biochemistry & Organic Chemistry Award

NHK Laboratories is a family-owned, private label contract manufacturer of vitamins, minerals, herbs, nutritional supplements and over-the-counter pharm-



## Subject Area Awards

American Chemical Society Polymer Chemistry Award  
Joshua Feng

Analytical Chemistry Award  
Jeanice Rodriguez

Biochemistry Award  
Jeanice Rodriguez

Freshman Chemistry Award  
Kayla Bollinger

Hypercube Award  
Amethyst Radcliffe

Inorganic Chemistry Award  
Kelley Vineyard

Merck Award in Organic Chemistry  
Mariko Yokokura

Organic Chemistry Award  
Lauren Olson

Spyros Pathos IV Award  
Stephanie Sodergren

John H. Stern Award in Physical Chemistry  
Trevor Reutershan



Joshua Feng



Jeanice Rodriguez



Kayla Bollinger



Lauren Olson



Stephanie Sodergren



Kelley Vineyard

## Special Departmental Awards

American Institute of Chemists Baccalaureate Award  
Biochemistry: Joselyn Del Cid  
Chemistry: Tae Ji

American Institute of Chemists Graduate Award  
Biochemistry: Gwen Jordaan  
Chemistry: Straun Phillips

Robert B. Henderson Memorial Scholarship  
Carolyn Kusaba

Toni Horalek Award  
Carolyn Kusaba

Kenneth L. Marsi Scholarship  
Tuyen Tran

McAbee-Overstreet Fellowship  
Roy Hernandez

Michael Monahan Memorial Summer Research Fellowship  
Thomas Cullen

NHK Laboratories, Inc., Scholarship  
Cindy Pham

Outstanding Teaching Associate Award  
Andrew Parker

Louis M. Perlgut Scholarship  
Lauren Hartman

Maria Erlinda Co Sarno Scholarship  
Sea Kim

David L. Scoggins Memorial Award  
Mariko Yokokura

Leslie K. Wynston Scholarship  
Malinda Tan



Joselyn Del Cid



Tae Ji



Gwen Jordaan



Lauren Hartman



Andrew Parker



Mariko Yokokura

## Departmental Honors

Undergraduates: Joselyn Del Cid, Jeanice Rodriguez,  
Mariko Yokokura

Graduates: Gwen Jordaan, Andrew Parker, Straun Phillips

## College Awards

CNSM Outstanding Thesis Award in Chemistry and Biochemistry  
Arti Patel

James L. Jensen Undergraduate Research Fellowship  
Malinda Tan

John & Elizabeth Leonard Scholarship  
Undergraduate: Tuyen Tran  
Graduate: Kim N. Tu

Glenn M. Nagel Undergraduate Research Fellowship  
Erik Carpio

Phi Beta Kappa Inductee  
Tuyen Tran

Robert D. Rhodes Award  
Mariko Yokokura



Erik Carpio



Kim N. Tu



Arti Patel

Photos by Victoria Sanchez

# SAACS

## Student Affiliates of the American Chemical Society

By Hannah Pham

The 2011-12 year marked a great leap for the Student Affiliates of The American Chemical Society (SAACS). The club has done outstanding work in recruiting more active members, planning more activities and participating in more educational outreach. The Southern California Section of the American Chemical Society even awarded the club an Honorable Mention, University Student Chapter, for the 2011-12 year! This year's club was headed by Presidents Michelle Stadick (fall 2011) and Carolyn Kusaba (spring

Other educational outreach projects for younger students led SAACS students to several schools around the area. SAACS students participated in Expanding Your Horizons for Middle School Girls, a program that encourages young girls to enter the fields of science and chemistry, at Mount St. Mary's College. Career Day at Monroe Elementary in Lakewood and the Mexican American Engineering Society's Annual Science Extravaganza at CSULB gave club members an opportunity to speak to students about why they chose to study chemistry and why chemistry is

As for volunteer events, SAACS continued with their bi-semester Saturday beach cleanups at Belmont Shore, among hundreds of other local area participants, in the fall semester. Once the spring semester came around, Hannah Pham decided to head monthly beach cleanups every third Saturday to give more SAACS members an opportunity to participate in this fun, volunteer service. Student members also volunteered with other College of Natural Sciences and Mathematics clubs' on-campus events, which included the fall mixer, Allergan Foundation Distinguished Lecture, Nobel Laureate Lecture and the Mayfield Balloting.

Last and probably the most popular volunteer service of all, students and faculty would meet every Friday for delicious donuts and bagels with hot coffee and tea during the Coffee and Donut Hour. The Coffee and Donut Hour met with great success this year, with an increase in student/faculty volunteering to bring food and set up and an increase in student/faculty attendance. A big "shout-out" goes to the stock room and department office employees for their ongoing support by never missing a Coffee and Donut Hour and to the faculty who generously took the time to pick up goodies for those Friday mornings!

SAACS participated in two activities in honor of National Chemistry Week. The first activity, led by Marina Zeledon, took us to Minnie Gant Elementary School. In accordance with this year's "Healthy Chemistry" theme, five SAACS members talked to five classes of students on how to stay healthy by eating right, exercising and washing their hands. Vitamin C tests were performed on 100 percent orange juice, orange juice from concentrate, SunnyD, Capri Sun, etc., to see which drink contained the most Vitamin C. These drinks were dropped into a water/starch indicator solution that was dissolved with iodine. Students definitely did not want to drink SunnyD any longer once they saw that the solution turned green instead of blue like everything else!

The second event, also headed by Marina Zeledon, involved a periodic table and amino acid "healthy" cupcake bake sale. The cupcakes were made from organic ingredients as a healthier alternative to regular cupcakes. This fundraiser was so popular that it was repeated in the spring for Earth Day with a livelier variety of flavors! This event is definitely something the club will conduct every semester as it is a great form of fundraising, and it's also fun watching people

*continued on page 21*



Photo by David J. Nelson

SAACS members, front row, from left: Brandon Graham and Osman Shaheen. Back row, from left: Tuyen Tran, Cindy Pham, Carolyn Kusaba, Samantha Cao and Hannah Pham.

2012), Vice President Akira Ueno, Secretaries Carolyn Kusaba (fall 2011) and Hannah Pham (spring 2012), Treasurer Nicole Hansen, and Student Representatives Samantha Cao (fall 2011) and Brandon Graham (spring 2012).

In April 2011, Carolyn Kusaba and Charmaine Jimenez successfully won over the ACS International Year of Chemistry Student Chapter grant program with their proposal, "Hydrogen Fuel Cell Energy Demonstration." We are very grateful to Dr. Steve Jones of Jones Environmental, who donated the fuel cells that were used in this project. Several SAACS members constructed the demonstration and travelled to a number of elementary and middle schools to explain the importance of alternative energy. Kusaba also gave an oral presentation about the project at the ACS national meeting in San Diego. Six other SAACS members presented their research in posters at the meeting.

important. They conducted three demonstrations as extra "wow" factors for the young students, using a fuel cell; making dry ice bubbles; and running a series of tests on household items to test their acidity and basicity by using the water from boiled red cabbage.

SAACS also reached out to science students on the CSULB campus. SAACS conducted their first annual resume/CV workshop with a lecture on do's and don'ts from Dr. Douglas McAbee. This was followed by one-on-one time with Drs. Paul Buonora, Marco Lopez, Douglas McAbee, Michael Schramm or Kris Slowinski for personal attention to the students' resumes/CVs. Thank you, professors, for making this event successful!

This year, SAACS organized three field trips: to Orange County Sanitation District in Fountain Valley, Grifols Biologicals, Inc. in Los Angeles, and to the Orange County Crime Lab in Santa Ana in association with the Biology Student Association.



The Department of Chemistry and Biochemistry held its second annual Career Day event on Saturday, Oct. 5, 2011. The event, attended by over 40 students, featured six speakers, including three alumni who discussed career options in chemistry.

Vickie Clawson, previously a longtime member of the department's advisory council, discussed her work in the trace evidence and drug chemistry sections of the Los Angeles County Sheriff Department's criminalistics lab.

Dr. John Leonard (B.S., chemistry, 1969; M.S., chemistry, 1972), senior vice president for development at Vaccinex, Inc., discussed his long career in both academia and in biotechnology, including his many years at IDEC and Biogen.

Dr. Catharine Larson, a professor of organic chemistry at UC Riverside, described life as an academic research professor.

Katherine Kurjan (B.S., chemistry, 1986), senior manager of process chemistry at Allergan, described career opportunities in the pharmaceutical sector.

Chris Williams (M.S., biochemistry, 2000), a chemistry teacher at Cabrillo High School in Long Beach, gave a vividly personal account of the rewards and frustrations of teaching in a school that serves students of lower socioeconomic backgrounds.

Finally, Denise Lutz, a business development representative at Kelly Scientific, and her associate, Airika Corley, made a presentation on job interviewing skills entitled "Selling Yourself."

The event was organized by Professors Jeff Cohlberg and Paul Buonora, and Ernie Valfre (B.S., chemistry, 1978), who represents Baxter BioScience as a member of the department's advisory council. The Department of Chemistry and Biochemistry is grateful to the speakers, President Michelle Stadick and the other students from SAACS who helped out on the day of the event. The third annual Career Day will be held this coming October.

## SAACS

### Student Affiliates of the American Chemical Society

*continued from page 20*

fight over what element they get to eat! As a final homage to the National Chemistry Year, the SAACS display case on the third floor of the Molecular and Life Sciences Center was revamped to the theme of "Green Chemistry" with images made out of recycled products and flyers on how to be more "green."

A big thank you goes out to Drs. Slowinski and Slowinska for offering their home to host our annual Halloween social! It was a great chance for students to come and relax and hang out with some of their fellow professors.

Finally, our online newsletter, *The Beaker*, has grown immensely due to the leadership of creator and editor-in-chief Cindy Pham, Jacqueline Dominguez, Matt Garay, Lauren Olson, Kimmy Phan, Monica Royer, Karen Yu and newly added Brandon Graham. *The Beaker* acts as a gateway for chemistry and biochemistry students to the insides of the Chemistry and Biochemistry Department, and it acts as a voice for the SAACS club.

SAACS is sad to be losing one of its advisors, Dr. Brian McClain, but wishes him the best of luck with his new adventure. With Dr. Michael Schramm continuing as one of the advisors, the club would like to welcome Dr. Paul Buonora as the new co-advisor. The club looks forward to a new set of board members, as well, for the coming year. Meet the newly elected members: President Hannah Pham, Vice President Tuyen Tran, Secretary Osman Shaheen, Treasurer Samantha Cao, Public Relations Officers Brandon Graham and Cindy Pham, and Historian Ester Choe.

### Gursharan K. Bains

"Developing Pyrene Fluorescence as a Tool to Study Conformation of Apolipoprotein E"  
Advisor: Dr. Vasanthi Narayanaswami

### Charlotte Hirsch

"The Removal of Synthetic Musks and Other Personal Care Product Chemicals from Reclaimed Wastewater Using Radical Reactions"  
Advisor: Dr. Stephen Mezyk

### Burcin Irfanoglu

"Synthesis and Characterization of Porous Metal Organic Framework Materials"  
Advisor: Dr. Xianhui Bu

### Crystal F. Jenkins

"Chiral Substituted Bicyclic Lactam Templates through Cyclocondensation Reactions of  $\gamma$ -Oxoacids and Amino Alcohols: The Effect of Substituents on Diastereomeric Ratio Due to Dynamic Kinetic Resolution"  
Advisor: Dr. Paul Buonora

### Kian Kolahi

"Proximal Base Effects on the Kinetics of a Hemeprotein System"  
Advisor: Dr. Marco Lopez

### Yufei Li

"Synthetic Development of Crystalline Porous Materials for Gas Sorption Based Applications"  
Advisor: Dr. Xianhui Bu

### Daisy Martinon

"Single Tryptophan Mutants of Galleria Mellonella Apolipoprotein III: Binding Interaction to Lipopolysaccharides"  
Advisor: Dr. Paul Weers

### Arti B. Patel

"Conformational Studies of the Lipoprotein Binding Domain of Apolipoprotein E"  
Advisor: Dr. Vasanthi Narayanaswami

### Straun B. Phillips

"Electronic Considerations in Ligand Assisted Transition Metal Catalyzed Oxidations of Alkenes to Enones"  
Advisor: Dr. Paul Buonora

# Alumni News

*Do you enjoy reading these reports? We would love to hear from you! Please e-mail our editor, Dr. Jeffrey Cohlberg, at [Jeffrey.Cohlberg@csulb.edu](mailto:Jeffrey.Cohlberg@csulb.edu) with news about yourself that we can include in next year's newsletter!*

**1990**

**Stacie Bailey Loftus** (B.S., biochemistry) reports, "Following graduate school at the University of California, Irvine, my husband, Tom, and I moved to the East Coast to take postdoctoral positions. We have been living in northern Virginia for over 12 years, and we have one daughter. I am currently an associate investigator at the National Human Genome Research Institute at the National Institutes of Health. Here, my research has centered on the identification and analysis of genetic variations that contribute to diseases of the neural crest lineage."

**1991**

**Kauser Akhoo** (M.S., biochemistry program, 1988-91) writes, "I passed the USPTO patent bar exam in 2010, and with my Ph.D. in organic chemistry, it allows me to blend science and the law. The added plus--I don't have to be in the lab and I can write about science that has succeeded. I transitioned after my post-docs at UCLA to a small law firm in Pasadena, Calif., had some family time with my kids and then restarted my career in 2008 at a small pharmaceutical company. I recently reentered the law firm arena at Morrison & Foerster and hope to learn the ins and outs of patent law."

**1996**

**Jason Atalla** (B.S., biochemistry; M.S., biochemistry, 2002) writes, "I have been an account sales consultant with Beckman Coulter for the past 10 years. Currently, I am selling their flow cytometry product; my job is to help customers with their flow cytometry needs and provide solutions. This position allows me to interact with a variety of customers, including university research labs and biotechnology/ biopharmaceutical companies as well as hospitals and clinical reference labs. I really enjoy this work, as it allows me not only to learn about the latest in cutting edge research, like stem cell research, but also to see how research translates to viable treatments in medical and clinical settings."

**1997**

**Lenore Landis** (B.S., biochemistry) writes, "After having had the opportunity to work in the research laboratory of Dr. Cohlberg, I earned my M.S. in biological chemistry from UCLA. My love for teaching developed in graduate school, and I started teaching at the high school level after earning a teaching credential from CSUN. I was also an adjunct instructor at Los Angeles Pierce College before I started working at Cypress College as a full-time chemistry instructor. At Cypress College, I have taught organic chemistry and biochemistry for students entering allied health professions, and I am currently teaching general chemistry (111A and 111B) for science majors. Sharing my passion for chemistry with my students has been a truly rewarding experience. I met my husband, Baird, while rock climbing in Bishop, Calif., and we have a wonderful 2-year-old son named Fisher."

**2000**

**Tom Kelly** (M.S., biochemistry) reports, "Since graduating, I have been involved in building up several startup biotech companies and am currently a scientist for Watson Pharmaceuticals in Corona, Calif. I worked for Bausch & Lomb's Surgical Division, where I was in charge of the chemistry laboratory. While there, I helped a friend set up his dental materials company, laying the foundation for a successful business. After leaving B&L, I started a corneal implant company to help correct people's vision. While there, a company from Minnesota asked for help developing a corneal storage medium, and I became a consultant. I was the only scientist at the eye company and, since it was small, wore several different hats (R&D, QA, clinical trials, etc.--you name it, I did it). I spent a brief time developing a platform assay to detect a heart protein that is only emitted during a heart attack. Unfortunately, the company ran out of money, so I found myself working at Watson. I do a lot of different things, from writing scientific reports to running tests, troubleshooting, validation, etc. I have been married for 20 years and have two boys, ages 8 and 14, who are both actively involved in sports, especially baseball (I help coach, too). Weekends are spent travelling to this ballpark or that tournament (we played in Florida during Christmas and will be in Omaha, Neb., at the end of June)."

**2005**

**Zeynep Oztug Durer** (M.S., biochemistry) received her Ph.D. in biochemistry at UCLA under the direction of Dr. Emil Reisler and is currently a postdoctoral fellow in Dr. Margot Quinlan's lab. She writes, "I really enjoy my research and being in a new lab. Our son, John, is almost 4 years old, so it is fun to watch him grow as well."

**2009**

**Ihsan Furkan Senal** (M.S., biochemistry) and his wife, Merve Oztug (M.S., biochemistry), spent two more years in California, where Furkan worked as an associate scientist at Amgen and Merve worked as a research associate at UCLA. In 2011, they moved back to Turkey and are now living in Istanbul. Merve works at the Scientific and Technological Research Council of Turkey, the Turkish equivalent of NIH and NSF, and Furkan is a vice program manager at Eczacıbaşı-Baxter Hospital Supply, a leading drug company. According to Zeynep Oztug Durer (M.S., biochemistry, 2005), "They are both happy to be back, while they miss their life here in Southern California."

**2009**

**Ricardo Macias-Gallardo** (M.S., chemistry) has finished his second year in the Ph.D. program in chemistry at Yale University and is doing very well. He is working with Professor W. L. Jorgensen. Ricardo has so far published one paper while at Yale (Bollini, M., R.A. Domaaol, V.V. Thakur, R. Gallardo-Macias, K.A. Spasov, K.S. Anderson, and W.L. Jorgensen. "Computationally-Guided Optimization of a Docking Hit to Yield Catechol Diethers as Potent Anti-HIV Agents." *J. Med. Chem.*, 2011, 54, 8582-8591).



## Alumni on the Move

# Alumna Arti Patel Receives 2012 Johnson Award for Outstanding Thesis

Arti Patel, who recently received her M.S. degree in biochemistry under the direction of Dr. Vas Narayanaswami, is the 2012 recipient of the Johnson Award for the Outstanding Thesis in the Biological Sciences. The title of her thesis is "Conformational Studies of the Lipoprotein Binding Domain of Apolipoprotein E."

ApoE is a component of the circulating lipoproteins that allow transport of triglycerides and cholesterol in the blood. The N-terminal portion of apoE forms a four-helix bundle; the C-terminal domain is highly helical, but its detailed structure is unknown. Patel's research showed that two copies of the C-terminal domain associate via helix-helix interactions in a parallel orientation to form a dimer.

Patel also reported work on a 29-amino acid peptide, ATI-5261, with a sequence based on the apoE C-terminal domain. This peptide, like apoE, was able to stimulate cholesterol efflux from macrophages and reduce atherosclerosis in mice. Patel showed that this apoE mimetic peptide can also exist as dimers.

Patel's results suggest a model in which the C-terminal domains of apoE dimers form a belt around the periphery of the lipid core in nascent lipoprotein particles. This work is helping biochemists understand the molecular basis of how apolipoproteins interact with lipids, a crucial aspect of lipoprotein function and cholesterol control.

The work reported in Patel's thesis formed the basis of four publications. The study on the C-terminal domain of apoE was published in a 2010 first-author paper in *Biochemistry*, and the work on the peptide mimetic was reported in two papers, one in *Biochemistry* and one in the *Journal of Lipid Research*. A fourth paper, published in *Molecules*, reviewed the use of pyrene as a probe of protein conformation.

After receiving her M.S. degree in summer 2011, Patel entered the Ph.D. program in the Sackler School of Biomedical Sciences at Tufts University.



## Honor Roll of Donors (July 1, 2011 – June 29, 2012)

All of us in the Department of Chemistry and Biochemistry extend our heartfelt thanks and appreciation to the following alumni, friends, corporations and foundations that made gifts to the department from July 1, 2011 through June 29, 2012.

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*Photo by David J. Nelson*

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