

CALIFORNIA STATE UNIVERSITY LONG BEACH

# CHEMISTRY & BIOCHEMISTRY

FALL 2015

FOCUS  
ON  
STUDENT  
SUCCESS

# FOCUS ON STUDENT SUCCESS

Glenn Nagel, former dean of the College of Natural Sciences and Mathematics, often remarked that our success as a university community is directly measured by the success of our students. Like all things that are worthwhile, student success is a collaborative enterprise and it doesn't happen by accident...it takes planning, preparation, hard work, persistence and resources. This issue of the department newsletter focuses on student success and highlights several recent college and department investments and initiatives that are helping our students achieve their potential and reach their academic goals.

— Dr. Doug McAbee and  
Dr. Jeffrey Cohlberg

## REMARKS BY THE CHAIR



Dr. Chris Brazier

### Greetings to all alumni and friends of the Department of Chemistry and Biochemistry.

I would like to start by thanking all the wonderful faculty, staff and students who have helped me first survive and subsequently thrive in my first year as department chair. When Dean Laura Kingsford asked me to take over as interim chair last summer, this was a sudden and unexpected new assignment that I had definitely not expected. I still wonder at times whether I am up to the task, but I was encouraged that the faculty recommended me to the dean for an official three-year term as chair.

I would like to thank all of the staff for keeping the department running efficiently, most especially Irma Sanchez, our administrative coordinator, for making my start as chair an easy one. This fall Xiaoyong Wong, our administrative assistant for several years, left for a position with new challenges and opportunities in the College of Health and Human Services. Her replacement, Mirna Henriquez, has quickly adapted to her new position and is a valuable addition to the department.

The theme of this year's newsletter is student success. Our department and college have been working to enhance our students' success through a number of student support programs in addition to the awards and scholarships that we give to reward student excellence.

A tremendous addition to our student support infrastructure is the new BUILD (Building Infrastructure Leading to Diversity) grant from the NIH (National Institutes of Health). At \$22.7 million over five years, this is the largest grant in the history of the university. While the grant is spread across multiple colleges, it will have a major impact on our programs. Two of our faculty, Paul Buonora as co-principal investigator and Paul Weers as a leader of the student training component, have major roles in this new program.

I would also like to thank Dr. Buonora for his successful effort to bring the NIH-funded RISE (Research Initiative for Scientific Enhancement) program back to our campus. We now have support for both undergraduate and master's students looking to attend Ph.D. programs. I would also like to thank Eric Marinez and Vas Narayanaswami for their stewardship of our other student support programs. These programs are vital to the success of our students and depend upon the commitment from the faculty who write the grants and supervise the programs.

Among our many student award winners, I would like to give a special mention to Skyler Chuang, a master's student in the Vas and Shon labs, on winning first place in the CSU systemwide research competition. Our students have always been successful obtaining scholarships from Women & Philanthropy but this year they did especially well, winning five of the eight undergraduate research scholarships. Congratulations to winners Annabelle Cantu, Kylie Couch, Brittany Daws, Dakota Rochelle and Sam Nguyen.

The university's Student Excellence Fee program has continued to be a valuable resource for keeping our instructional laboratories up to date with the latest equipment. The organic chemistry laboratories received \$190,000 in funding for new instruments. We will be purchasing two new gas chromatographs and two new infrared spectrometers. In addition, we will have a stand-alone mass spectrometer for the first time. We also received more than \$62,000 for new equipment for a complete redesign of the biochemistry laboratory class.

Our faculty continued to have remarkable success attracting funding to support their research. The most notable achievement this year was Steve Mezyk, who received two awards of \$800,000 each from the Department of Energy. His proposals were the only ones funded in the 2015 Consolidated Innovative Nuclear Research Funding Opportunity.

I would like to welcome Fangyuan Tian as a new faculty member in the analytical division beginning this fall. Dr. Tian is originally from China, where she graduated from Jilin University with a B.E. in polymer science and technology. She went on to earn her Ph.D. in analytical chemistry at the University of Delaware in the lab of Dr. Andrew Teplyakov. She then pursued postdoctoral research in the area of carbon dioxide adsorption on zeolitic imidazolate frameworks in Dr. Lauren Benz's group at the University of San Diego, where she also served as an instructor of general chemistry. Dr. Tian has broad research interests in the interdisciplinary area of surface and materials chemistry, with a focus on environmental and energy related questions.

Dr. Tian's research will be a good fit with our active materials science program. Our strength in this area was recognized by a grant of \$500,000 from the W.M. Keck Foundation, joint with the Physics Department, to establish materials science degree options. Young Shon, Shahab Derakhshan and Xianhui Bu are the chemists involved. To further enhance this area, we will be searching for a new faculty member with expertise in materials science to start next August.

Finally, I would like to give special thanks to our alumni and friends whose continued support provides a critical enhancement to the quality of our programs.

— Dr. Chris Brazier

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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## CONTENTS

Remarks by the Chair .....	1
General Chemistry Reform Produces Greater	
Student Success .....	3
Good Advice.....	4
BUILD Research Training Program Gets Underway .....	6
Research Initiative for Scientific Enhancement .....	7
The Beach Remains Hot .....	7
Distinguished Lecturer: Dr. David A. Tirrell .....	8
Nobel Laureate Lecturer: Dr. Randy Schekman .....	9
Schramm Lab Studies Cavitands .....	10
Meet Dr. Fangyuan Tian .....	11
Faculty Reports .....	12
CSULB Degrees Pay Off .....	13
DECLARE Campaign Surpasses Fundraising Goal .....	14
B.S. Biochemistry Now ASBMB Accredited .....	17
2014-15 Faculty Publications .....	18
M.S. Theses .....	19
SAACS Has a Successful Year.....	20
Your Donations at Work .....	21
Skyler Chuang Wins CSU Research Competition .....	21
Awards & Scholarships .....	22
Honor Roll .....	23



# GENERAL CHEMISTRY REFORM PRODUCES GREATER STUDENT SUCCESS

*By Dr. Stephen P. Mezyk and Dr. Shahab Derakhshan*

A recent major course revision of General Chemistry has resulted in greater student success in these classes. CHEM 111A and 111B have traditionally been known as difficult bottle-neck courses with low student completion rates. Since spring 2012 we have undertaken a major course revision to improve students completion and pass rates. Funding for this project came from a grant from the Melinda and Bill Gates Foundation, followed by support from the Promising Course Redesign program of the CSU Chancellor's Office. These grants provided release time for eight of our faculty members as well as funds for extra Supplementary Instruction sections.

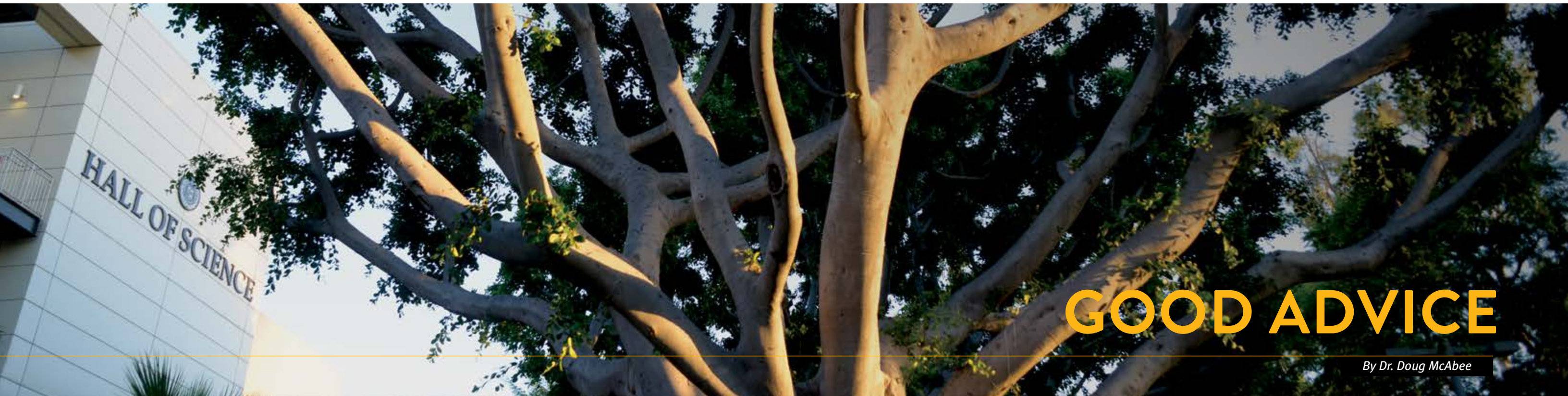
The initial step in both classes was to bring uniformity to all the lecture sections, which was successfully achieved by assignment of long-term course coordinators for each class. To allow a completely objective assessment of student performance in this course, we created standard learning outcomes and assessed students' performance using the corresponding American Chemical Society exam as their final exam.

Midterm exams for each section were also standardized across sections. This allowed detailed itemized analyses to be performed on each question, which allowed subsequent focus on areas where students performed poorly. Additional effort included problem sets for each chapter, specific recitation questions to be answered at the beginning of laboratory periods, greater inclusion of on-line adaptive-learning homework systems, creation of review exams, incorporation of exam review periods in laboratory, and especially stronger collaborations with Supplemental Instructor coordinators and leaders allowing them to better assist us in helping students learn the required material.

These reforms resulted in a tremendous improvement in students' success in CHEM 111A, with our redesign model for CHEM 111A selected by the Chancellor's Office as a unique model for all 23 CSU campuses to follow in spring 2013. Similar improvements were observed for CHEM 111B. Our improvement was accomplished without any sacrifice in standards; our students continue to perform at an above-average level in their final ACS exams in both courses.

Other projects to improve student success in general chemistry are ongoing. Several weeks before each semester starts, we prepare an online study activity that enables the participants to review the material from their previous classes (CHEM 90/High School for CHEM 111A, and CHEM 111A for CHEM 111B). Following the assessment exam, we identify students at risk, and perform individual advising to provide them with options such as Supplementary Instruction or tutoring.

This early alert system has been proven an effective way of advising students towards success, before they lose their hope and motivation. Also, in CHEM 111B we are testing a flipped-classroom, active learning approach for a small section. Our hypothesis is that the increased problem-solving focus will continue to improve student understanding and performance on their assessments.



# GOOD ADVICE

By Dr. Doug McAbee

Over the last five years, student advisement has changed dramatically for our undergraduate students in the department as well as across the college and university. In early 2010, the CSU committed itself long term to enhance advisement at all levels of student academic life with the goal of increasing retention and graduation rates, particularly for historically underrepresented students.

This system-wide policy took shape on the CSULB campus in the Highly Valued Degree Initiative (HVDI), launched in 2010 by then-CSULB President F. King Alexander. A significant part of this initiative was to expand student advisement services at the university and college levels.

## SHIFT TO DEPARTMENT-LEVEL ADVISING

Prior to 2011, students in the College of Natural Sciences and Mathematics (CNSM) received limited advisement and academic support through the Jensen Student Access to Science (SAS) Center, established many years ago by then-Dean Jim Jensen. This changed in July 2011 with the establishment of the CNSM Academic Advising Center. The center has five full-time staff members and is supported completely by the university through HVDI funding. The net effect is that advisement has

shifted from the university to the college and primarily to the department.

The general philosophy and approach for advising has also changed from what had been largely a “student-initiated” pattern to a proactive “department-initiated” pattern. Simply put, the department and college no longer wait for students to seek out advisement — most typically when academic problems overwhelm the student — but rather are constructively intervening to head off problems before they start or get too big. Students now receive support services and resources to help them identify and achieve their educational goals at all stages of their academic career.

## UNIVERSITY POLICIES PROMOTING STUDENT PROGRESS

A number of recent key policy changes have impacted advisement and student success positively.

Historically, students could repeat a course after withdrawal or failure essentially an unlimited number of times, and students could withdraw from a course for almost any reason up through the 11th week of instruction. As a result, some students were enrolling in the same course many times and repeatedly

withdrawing or failing the course, which greatly prolonged their time toward graduation.

In 2010, the university set limits for grade forgiveness (16 units) and course withdrawals (18 units) and repeats (28 units). At present, students cannot withdraw from a course because of poor performance after the first two weeks of the semester. Importantly, students who fail a class twice must now receive university permission to retake the course a third time. A third failure almost always requires the student to change majors. These policies encourage students to do their best in their coursework and take ownership of their academic progress. They also serve as a point of intervention for students who are chronically struggling in the major.

## PRE-MAJORS, PROGRAM MILESTONES, AND EAB

In 2013, all undergraduate majors in the college declared impaction, including the B.A./B.S. chemistry and B.S. biochemistry programs. Now all incoming freshman enter as “pre-majors” and are required to achieve minimal academic milestones to move on to full major status. For students in our department, minimal milestones include general chemistry, calculus, and organic chemistry 1. Students in year 1 and 2 are also expected to complete

general physics. When a student has met these milestones along with foundational general education requirements, they are automatically shifted to full major status.

College and department advisors monitor pre-major student progress carefully, particularly in general chemistry and calculus where performance is a strong predictor of future success in chemistry/biochemistry majors.

Our analysis of 850+ CSULB chemistry/biochemistry undergraduates between 2000-2010 showed that 82 percent of students who achieved a cumulative GPA of  $\geq 2.0$  from all attempts in general chemistry 1/2 and calculus 1 graduated with a degree in chemistry/biochemistry. However, only about 16 percent of students with cumulative GPAs of less than 2.0 in those courses graduated with a chemistry/biochemistry degree. This pattern was observed whether a student took these classes at CSULB or at a community college.

In 2014, CSULB adopted the services of the Education Advisory Board (EAB.com), a cloud-based consulting service used by 600+ colleges and universities in the U.S. that provides analytics and models for student progress and discipline-specific advisement. The B.S. biochemistry and B.S. chemistry

programs were part of the initial wave of majors on campus launched for EAB, and all student advisement at CSULB now routes through the EAB platform.

EAB allows programs to establish and monitor semester/grade milestones for key courses within a major. Advisers are alerted to those students who miss one or more milestones so that the department can intervene quickly to help students get back on track. The EAB platform also has tools that advisors can use to identify students that match specific performance profiles, which facilitates greater ease and focus in student advising.

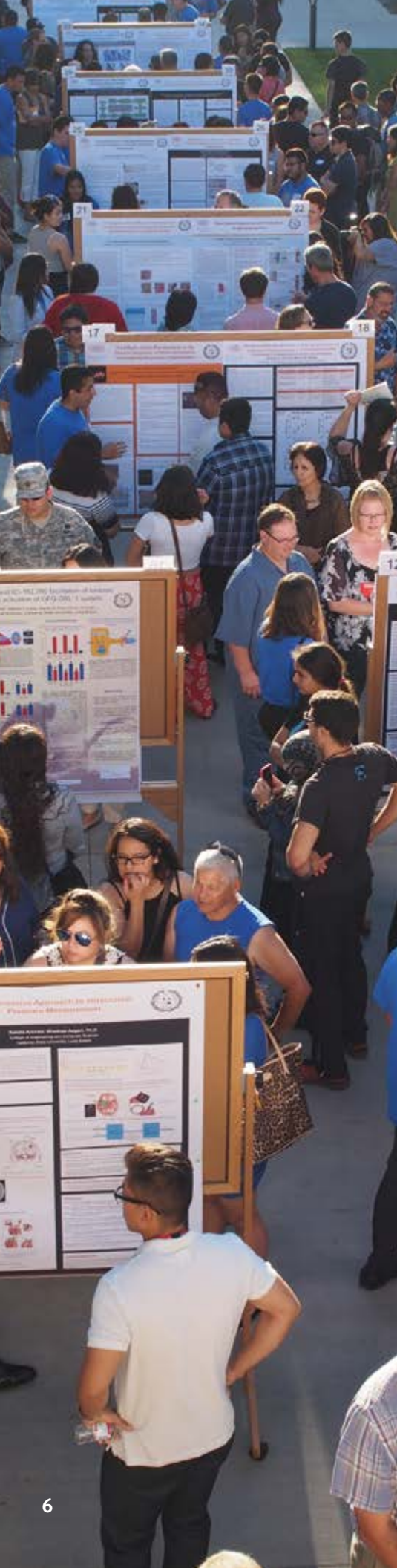
## COLLEGE COMMITMENT TOWARD ADVISING

In fall 2014, Dr. Krzysztof (Kris) Slowinski, professor of analytical chemistry and chair of the department since 2011, was appointed associate dean for academic programs, evaluation and advising, a new associate dean position in the college. Part of Dr. Slowinski’s task is to coordinate department-level advisement activities for the college, the CNSM Academic Advising Center and the Jensen Student Access to Science Center.

In his first full year in the position, Dr. Slowinski has helped coordinate college-wide mandatory advising — group and individual — for all freshman and transfer students during their first two semesters on campus. Department advisers work hand-in-hand with college advisers throughout this advising process for new students. In addition, Dr. Slowinski has helped department advisers formulate and implement strategies in which each student’s progress is reviewed and evaluated at least once annually. Students who are having difficulty are flagged by EAB markers and are evaluated and contacted for assistance each semester.

The end result of this investment in our students is to promote their success in chemistry and biochemistry, to have them graduate in a timely fashion, and to provide them with advice and input about achieving their postbaccalaureate goals.

Starting academic year 2015-2016, two faculty will serve as undergraduate advisers for the department: Dr. Kasha Slowinska and Dr. Douglas McAbee. Dr. Slowinska will serve as the adviser for all B.A./B.S. chemistry students and Dr. McAbee will serve as adviser for the B.S. biochemistry program.



## BUILD RESEARCH TRAINING PROGRAM GETS UNDERWAY

**A** year ago, the National Institutes of Health (NIH) selected CSULB as one of 10 universities for its Building Infrastructure Leading to Diversity (BUILD) initiative, resulting in CSULB's largest grant award ever — \$22.7 million over five years.

"This award has the potential to become a national model and secure Cal State Long Beach's place as a biomedical and behavioral research training ground," said CSULB President Jane Close Conoley. "We are very excited and proud to have been chosen for this potentially transformative award. The opportunities it will bring about for our faculty and students are truly unprecedented for this university."

Nearly 85 BUILD Scholars are receiving mentoring and research training at CSULB and two research partner institutions — UC Irvine and USC — to help them succeed in doctoral programs in the biomedical and behavioral sciences.

BUILD also funds research grants for selected faculty who engage students in their work on

health and biomedically-related topics. Four CSULB colleges are taking part — Liberal Arts, Health and Human Services, Natural Sciences and Mathematics, and Engineering.

"This is an extraordinary opportunity for our students and our faculty," said Laura Kingsford, dean of the College of Natural Sciences and Mathematics. "As the largest award in the university's history, it provides funding for stipends or hourly pay for students engaged in the training programs and research and allows us to renovate shared research spaces on campus and buy research instruments. In addition, our faculty will be able to create new partnerships at Research I Universities, enhancing their research competitiveness."

Moreover, students' families are engaged through outreach and campus activities so that they better understand the importance of BUILD in their child's education.

To learn more, visit [www.csulb.edu/build](http://www.csulb.edu/build).

## RESEARCH INITIATIVE FOR SCIENTIFIC ENHANCEMENT (RISE)

*By Shayne Schroeder, Dr. Paul Buonora and Dr. Jeffrey Cohlberg*

**C**SULB recently received a \$4.45 million, five-year grant from NIH for renewed support of its RISE program. NIH provides these grants to institutions that have a commitment and history of developing students from populations underrepresented in biomedical sciences. By supporting these institutions, RISE aims to help reduce the existing gap in the completion of Ph.D. degrees between underrepresented and non-underrepresented students.

Our program, which began in 2004, is one of 49 RISE programs in the U.S. In the new cycle Dr. Paul Buonora takes the program director reins from longtime director Dr. Marco Lopez. Since its inception the RISE program has supported undergraduates and in the new funding cycle we are adding support for graduate students who will be pursuing a Ph.D. after earning their M.S. in the biological sciences and chemistry or biochemistry. We have funding initially for 25 undergraduate students and eight graduate students, but the latter number will rise to 16 by 2019.

Along with getting to work with faculty mentors in a nurturing environment, students in both programs will receive financial support, research supplies and the opportunity to travel and present their research at the national level.

While at a recent conference in Washington D.C., Dr. Buonora noted that one of the things other program directors talked about when

referring to RISE is that it's about the development of students, not the selection. "When we're looking at the students, we're looking at the motivation, we're not just looking at GPA and things like that. We're looking at 'Is this really what they want to do?' They come in and feel like somebody believes in me and is willing to invest in me."

The financial support provided by the grant is key because it enables students to focus on school and fully participate in research. And when these students apply to graduate programs those doing the selecting can see that these students are already trained to be researchers, which improves their application prospects for a graduate program. Over the last two years, 75 percent of RISE students have moved on to Ph.D. programs, many times more than the general student population.

According to Dr. Buonora, the number of slots given through the NIH grant provides a great opportunity to attract strong students to the master's degree and really advance what's going on in the program. "It will increase the focus on the master's program as a stepping-stone for those students who aren't going directly to a Ph.D.," he said. "So it can really be transformative not only for these departments but for the campus as well down the road."



## THE BEACH REMAINS HOT

Fall 2015 CSULB enrollment is the largest in since 2008, with a headcount of about 37,500. "With exceptionally high enrollments, we are making every effort to ensure we can accommodate all students with the classes needed for timely degree progress. At CSULB, graduation begins the first day a student steps on campus," said Provost David Dowell. "Our dedicated faculty and staff are continuously innovating efficient pathways for timely graduation, reducing financial burden, securing internship and employment opportunities, and making The Beach experience a life experience."

CSULB's excellence is reflected in the 2016 *U.S. News and World Report* ranking that places the campus fifth among public regional universities in the western U.S. and tied for 32nd among all western region public and private institutions.

Moreover, CSULB students come from diverse backgrounds, with 37 percent Latinos/Latinas, 23 percent Asian/Pacific Islanders, 20 percent Caucasians, 4 percent African Americans and less than 1 percent Native Americans. The campus offers unequalled access to economically challenged students and is consistently ranked among the nation's best college values.



Photo by Bob Paz

# CALTECH'S TIRRELL PRESENTS THE 2015 ALLERGAN DISTINGUISHED LECTURE

By Dr. Young-Seok Shon

**D**r. David A. Tirrell, the Ross McCollum-William H. Corcoran Professor of Chemistry and Chemical Engineering at the California Institute of Technology, visited our department on March 25 as the Allergan Foundation Distinguished Visiting Lecturer. Tirrell is renowned for his research in the incorporation of non-canonical amino acids into proteins and the use of these proteins in biochemical studies and in the development of biomaterials.

Tirrell gave two lectures during his visit. The lecture for a general audience was titled "Proteins that Nature Never Made." He described his ongoing attempt to bridge the gap between synthetic polymers, generally heterogeneous and randomly folded, and naturally occurring proteins, which are uniform, well folded and evolvable. The synthetic chemist can now create new amino acids other than the 20 that occur naturally and incorporate them into proteins.

In order to do this, Tirrell's lab outfitted cells with a modified molecular machinery that enables them to use these non-canonical amino acids. This required the development of mutant versions of aminoacyl-tRNA synthetases, the enzymes that link amino acids to transfer RNA. The mutant enzymes are capable of incorporating a particular non-canonical amino acid instead of the canonical amino acid recognized by the original synthetase.

He spoke about the development of this technology and its application in the synthesis of new materials and described work on proteins containing the photoreactive amino acid p-azidophenylalanine. After the protein was deposited on an octylsilane film, exposure to ultraviolet light led to the formation of covalent cross-links between the protein and the film.

Tirrell also presented a technical lecture, "Non-Canonical Amino Acids as Probes of Protein Synthesis in Complex Biological Systems." This talk focused on the use of non-canonical amino acids to analyze protein synthesis in a time-resolved and cell-selective fashion in complex

biological systems including live animals. For example, non-canonical amino acids that could be fluorescently labeled have been used to visualize new synthesis of proteins in neuronal axons in response to a variety of stimuli. Similar approaches have also been used to measure the levels of protein synthesis in living cells and also to monitor their localization within the cells.

Tirrell received a B.S. in chemistry at MIT in 1974 and a Ph.D. in polymer science and engineering 1978 at the University of Massachusetts, followed by postdoctoral work at Kyoto University. He had faculty positions at Carnegie-Mellon University and the University of Massachusetts before moving to Caltech in 1998. He served as chair of the Division of Chemistry and Chemical Engineering at Caltech from 1999 to 2009. He is currently an associate editor of the newly launched *ACS Central Science*.

His contributions to macromolecular chemistry have been recognized by his election to the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the American Academy of Arts and Sciences. He has been awarded the Arthur C. Cope Scholar, Carl Marvel, Harrison Howe, S.C. Lind and Madison Marshall Awards of the American Chemical Society, as well as the ACS Award in Polymer Chemistry. He holds the Chancellor's Medal of the University of Massachusetts, the G.N. Lewis Medal of the University of California, Berkeley, and an honorary doctorate from the Technical University of Eindhoven.

This event was funded by a grant from the Allergan Foundation. We are grateful to the Allergan Foundation for their continued support of the Distinguished Visiting Lecturer program, which annually gives our students and faculty the opportunity to hear and interact with a distinguished researcher in chemistry and biochemistry.



Photo by Hadar Goren

# FROM YEAST TO HUMANS

DR. RANDY SCHEKMAN SHARES HIS JOURNEY TO THE NOBEL PRIZE WITH OUR BUDDING SCIENTISTS

By Dr. Deepali Bhandari

**N**obel Prize recipient Dr. Randy Schekman visited our campus on April 9 to deliver CNSM's 36th Nobel Laureate Lecture. Schekman is a professor in the Department of Molecular and Cell Biology at UC Berkeley and an investigator of the Howard Hughes Medical Institute (HHMI). He shared the Nobel Prize in Physiology or Medicine in 2013 with Drs. James Rothman and Thomas Südhof for their groundbreaking discoveries of machinery regulating vesicle traffic, a major transport system in our cells.

In his lecture for the general audience titled "How Cells Export Proteins," Schekman summarized the Nobel Prize winning key discoveries made by him and his team of graduate students and postdocs.

Schekman had studied the enzymology of DNA replication as a graduate student with Dr. Arthur Kornberg (Nobel Laureate, 1959) at Stanford University and trained in membrane biochemistry during his postdoctoral fellowship with Dr. S. J. Singer at UC San Diego.

His scientific curiosity about the cell's secretory pathway arose while as a postdoctoral fellow, he attended a lecture by George Palade (Nobel Laureate, 1974), popularly known as the "Father of Modern Cell Biology." He became very fascinated by Palade's descriptive morphological studies on how cells organize their transport system and decided to investigate cellular traffic as an independent investigator at UC Berkeley.

Although a biochemist at heart, he first took a genetic approach by employing *Saccharomyces cerevisiae* (baker's yeast) as a model system — a very bold move at the time since not many people believed that yeast could provide any information useful for studying mammalian protein transport. Schekman proved his critics wrong when in an elegant and brilliantly designed genetic screen, he identified three classes of genes that control different facets of the cell's transport system, most of which were found to be conserved in higher eukaryotes. He next took a biochemical approach, establishing powerful in vitro assays to determine the function of the proteins

encoded by some of these genes (in particular, coat proteins), providing new insights into the tightly regulated machinery that mediates vesicle transport in the cell.

Collectively, his and his fellow laureates' work over the years has helped uncover the fundamental cell biological principles and pathways, and has enhanced our understanding of several pathologies associated with defective cellular transport systems including neurodegenerative diseases, diabetes and immunological disorders.

In his technical lecture titled "Genes and Proteins Required for Secretion of Large Particles and MicroRNAs," he shared some of the recent work from his lab. Schekman and his team now mostly focus on physiological aspects of transport unique to mammalian cells; specifically, mechanisms regulating (1) packaging and secretion of long polymers like collagen, which requires modifications in the coat proteins and (2) secretion of micro RNAs using exosomes (small vesicles that are secreted outside the cell).

In addition to his lectures, Schekman also visited many research laboratories in biology and biochemistry where he interacted with students discussing their research projects. He won hearts of faculty and students with his great sense of humor and humility.

In addition to the Nobel Prize, Schekman has received numerous awards including the Eli Lilly, Lewis S. Rosenstiel, Gardner International and Albert Lasker awards; the E.B Wilson Award of the American Society of Cell Biology and the Otto Warburg Prize of the German Society for Biochemistry and Molecular Biology. He is a member of the National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences, the American Philosophical Society and a Foreign Associate of the Royal Society, London, and the Accademia Nazionale dei Lincei (whose members have included Galileo). He is a strong advocate for high quality reviewing, and open access publishing and is the editor-in-chief of the new open access journal *eLife*.

# SCHRAMM LAB STUDIES CAVITANDS THAT MEDIATE MEMBRANE TRANSPORT

By Dr. Jeffrey Cohlberg

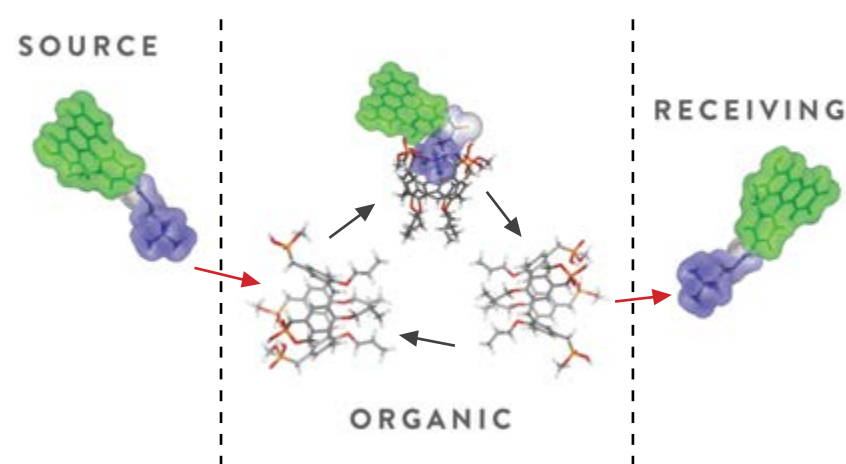
**W**hat can be done to more efficiently get drugs into target cells? The lab of Dr. Michael Schramm is exploring the use of basket-like organic compounds called cavitands to bind drug-like organic compounds and transport them across lipid membranes.

An example of a cavitand is shown in the figure, taken from a 2007 publication from work that Schramm did as a postdoctoral fellow in Julius Rebek's lab at the Scripps Institute.

A benzimidazole-modified resorcinarene cavitand was shown to be embedded in a lipid micelle, where it could act as a receptor (a "host") capable of selectively binding an adamantane molecule (a "guest") with a green fluorophore attached. This meant that these compounds could be used in aqueous environments and not just in nonpolar solvents. This finding provided a starting point for many of Schramm's independent studies at CSULB.

Work done with undergraduates Katie Feher and Hai Hoang showed that mixing a fluorescently labeled resorcinarene cavitand with dilaurylphosphatidyl choline lipid bilayer vesicles led to the cavitand's being incorporated into the vesicles. This was seen clearly in fluorescence images obtained by confocal microscopy, as shown in the figure.

This was followed by a study showing that a cavitand can incorporate into the membrane of living cells and promote the selective transport of fluorescent choline derivatives into the cells. This work was a collaboration



that also involved Dr. Roger Acey's lab in our department and Dr. Richard Hooley's lab at UC Riverside. The time course of uptake and the spatial distribution of the transported choline suggest a mechanism similar to natural receptor-mediated endocytosis, in which the cavitand guest and its bound host are incorporated into vesicles called endosomes.

One problem has been that resorcinarenes bind their ligands very tightly, making it more difficult to release the drugs later. Recent work from the Schramm lab has shown that this problem is less severe with another family of cavitands called calixarenes.

This technology may be eventually applied to increase the efficiency of compounds like the breast cancer drug tamoxifen, which must be used in high doses partly because it is not taken up well by cells. Drugs could be administered along with their cavitand hosts to improve uptake by target cells.

A native of Syracuse, N.Y., Schramm received his Ph.D. at the University of Chicago in 2005, studying combinatorial synthesis of large families of drug-like small molecules. He then became interested in supramolecular chemistry and did two years of postdoctoral work with Julius Rebek's lab, which was doing pioneering work on cavitands and other host-guest systems.

Other projects in Schramm's lab include studying the switching of cavitands between alternate states in response to pH and metal binding, developing new methods of enantiospecific synthesis, and developing peptidomimetic compounds to inhibit protein-protein interactions. The work on cavitands in lipid systems is supported by a grant from NIH-SCORE.

## MEET DR. FANGYUAN TIAN

The department is delighted to introduce its newest faculty member, Dr. Fangyuan Tian, who joined CSULB this fall.

### Briefly describe your background.

I am originally from China, where I graduated from Jilin University with a B.E. in polymer science and technology. In 2008, I came to the states to pursue my Ph.D. in analytical chemistry at the University of Delaware in the lab of Dr. Andrew Teplyakov. My graduate work focused on the modification and functionalization of semiconductor surfaces with wet chemistry, and I then pursued postdoctoral research in the area of carbon dioxide adsorption on zeolitic imidazolate framework-8 in Dr. Lauren Benz's group at the University of San Diego, where I also served as an instructor of General Chemistry Lecture and Lab.

### What are your research and teaching interests?

With a broad science and engineering background, I am excited to start my interdisciplinary research in the area of analytical surface chemistry, renewable energy and materials science. Specifically, I will study the fundamental properties and chemical reactivity of nano-structured surface-anchored metal organic frameworks (MOFs). My teaching interest is mainly in the field of analytical chemistry, including undergraduate Instrumental Methods of Analysis (CHEM 451) and Quantitative Analysis (CHEM 251). I am also interested in teaching some graduate level courses in surface chemistry and nanomaterials.

### How does your research benefit science and society?

One of my research directions is to apply porous materials to capture methane in the liquid state. Methane is a more dangerous greenhouse gas than carbon dioxide — one pound of methane can generate as much heat as 20 one pounds of carbon dioxide. In summer 2014, scientists found numerous methane seeps at the Atlantic seabed right off of the East Coast, far more than they expected. Moreover, a significant amount of methane (3.8 million tons) has been released to the atmosphere over the Arctic. Increasing amounts of methane are extremely detrimental to our environment; on the other hand, methane is the main component in natural gas, which is a cleaner alternative fuel source. People are exploring ways to generate more natural gas. Thus, our research goal is to capture methane from seawater using novel porous materials and transform it into usable energy.

### What interests you about working at Cal State Long Beach?

I am excited to start my career at CSULB for the following reasons:

First, I really enjoy the multicultural environment at CSULB. As an Asian female chemist, one of my educational goals is to promote multicultural education and increase diversity in the chemical sciences. I understand the importance of being an example to young females and underrepresented minorities in STEM fields, and I hope to provide a welcoming and supportive environment in my classes and in my lab for all underrepresented groups.

Second, CSULB provides an excellent platform for my interdisciplinary research, which will involve chemistry, environmental and marine sciences. With increasing collaborations between different fields, the boundary of chemistry is fading, and many interesting puzzles have been solved. CSULB has a strong Natural Sciences and Mathematic College which promotes all types of collaborations among the departments.

Third, the Chemistry and Biochemistry Department at CSULB mirrors my values of a strong, research-based chemical education involving both undergraduate and graduate students. In my opinion, one of the most efficient approaches to promote the development of critical thinking and problem-solving skills is to integrate teaching and research together in a laboratory setting. I appreciate that the Chemistry and Biochemistry Department at CSULB provides a great platform for this.

### Tell us a little about your personal life.

I met my husband in graduate school. We both love outdoor activities such as hiking, biking or just walking on the beautiful Southern California beaches. I also like decorative painting and watching movies (something that keeps me far away from chemistry) in my spare time.



## FACULTY REPORTS

### ROGER ACEY

It has been an incredible year for our lab group. I have been extremely impressed with the efforts of my students, especially with all the new faces.

We still have two major projects in the lab. Josh Feng and Phuc “Sam” Nguyen have been instrumental in coordinating the individual activities of both of our major projects. One involves a novel metal binding protein (MT) we hope to develop into a “heavy metal sponge” for environmental cleanup applications. Gwen Jordaan and Sam have been the driving force for the project. Gwen has cloned a chimeric form of MT that retains the metal binding property of the molecule. We have developed a fermentation procedure for making hundreds of mg of the chimeric protein and Sam has been able to work out the chemistry for putting the MT on a solid support. I’m pleased to report that Hieu Nguyen has developed a procedure for extraction of precious metal from organic solvents. We think this is adaptable to recovering precious metal from e-waste. We have a patent pending describing the technology.

The other project involves butyrylcholinesterase. We are interested in the enzyme’s role in normal neuron development and the effects of endocrine disruptors on the process. Josh Feng has clearly shown that the stem cells exposed to levels of phthalate esters and BPA found in plastic water bottles or cans show changes in their protein expression profiles. I think we have stumbled on a mechanism that might account for the dramatic rise in autism. I’ve taken all the plastic out of my house. Josh will be joining my group as a graduate student in the fall.

Along with Dr. Nakayama, we are also developing a class of butyrylcholinesterase inhibitors as a possible therapeutic for the treatment of neurodegenerative diseases. We have several patents pending on the compounds and recently established a company to commercialize the technology. We have made significant progress this year on both projects.

Believe it or not, there will be 20 students in the group. Hieu Nguyen, Maureen Dougherty, Laura Plascencia and Sean Luis are new members of the group. Hilary Velazquez, Albert Chon and David Lu joined the group this summer, along with two new Bridges students, Jasmine Choi and Christine Zheng, who joined the group as volunteers. Show Takenaka is a new graduate student. His project involves studying the effect of bisphosphates on butyrylcholinesterase activity. Kaycee Villarreal, Archie Turner and Thomas Hsieh are undergraduates working on the butyrylcholinesterase project.

George Lara is completing his first year of graduate school. His project is to localize butyrylcholinesterase in differentiating stem cells. His preliminary results suggest the enzyme is not only bound to the plasma membrane but is also found in the nucleus. We are very excited about these findings. I’m also trying to expose students to the business aspects of basic science. Finally, I’m very happy to report that Lauren Hartman has completed her thesis.

### DEEPALI BHANDARI

This has been a very exciting year for my students and me. I started my position as a biochemist in the department in fall 2014

after finishing my postdoctoral fellowship at UCSD. I was very excited (and a bit nervous) about teaching for the first time. It turned out to be an amazing experience getting to interact with my students in class and during office hours and more importantly, making an impact on their learning and education.

Along with traditional classroom teaching in our upper division biochemistry course CHEM 441A, I also tried some fun ways (at the cost of a few extra credit points) to help students learn carbohydrate metabolism. Students presented skits in groups of 10-12, where they posed as metabolic enzymes/intermediates and enacted the whole pathway in front of the rest of the class. I was very impressed with their creativity for they turned the Electron Transport Chain into a “Shakespearean act” (fall 2014) and “Lord of the Rings” finale (spring 2015)! I also taught the biochemistry laboratory course (CHEM 443) where I introduced a new experiment based on recombinant protein expression and affinity purification, which is now included in our laboratory manual.

On the research side, I had seven students (three graduate and four undergraduate) join my lab in fall 2014 and the number has now grown to 11 (four graduate and seven undergraduate). Needless to say, they keep me busy and I them! It is a great group of motivated students who have helped me tremendously with setting up the lab and getting it going in full swing. We have many projects underway in the lab at the moment — all with a central theme of understanding cell migration and survival under normal and pathophysiological conditions such as cancer and diabetes.

Based on our preliminary results, I applied for and successfully received the CSUPERB New Investigator Grant and we are now busy generating data to apply for an NIH grant early next year. I am also collaborating with my colleague Dr. Steve Mezyk to help develop biological assays to determine the effectiveness of radical-based advanced oxidation processes in inactivating pharmaceutical compounds (antibiotics and estrogenic steroids) in wastewater.

Many of my students also received fellowships/scholarships: Adam Maddox, who joined the lab as an undergraduate student, is now a masters’ student and has received the RISE M.S.-to-Ph.D. fellowship for 2 years. Undergraduate student Yoanna Rodriguez started in the lab as a UROP trainee and is now a RISE upper division fellow. Rosanna Calderon, who joined the lab as an HSI-STEM winter research fellow, is now supported by the LSAMP summer program. She also submitted an abstract and presented a poster titled “Understanding reasons for breast cancer disparities in Hispanic women” at the Latino Health Equity Conference in April 2015.

Clarence Tsai received multiple scholarships including the 2015 Glenn M. Nagel Undergraduate Research Fellowship, the Frank Schatzlein Scholarship, the Douglas W. Robinson Student Success Scholarship and the 2015 Assistance League of Long Beach Scholarship. We also had Andrew Cruz and Amy Tran, RISE upper and lower division fellows, respectively, join our lab this summer. Overall, a very productive and great year for us and we are looking forward to keeping the momentum up in the years to come!



## CSULB DEGREES PAY OFF

The online compensation information firm PayScale recently ranked Cal State Long Beach as third for arts majors and ninth for physical and life sciences majors in return on investment based the cost of education and later earnings.

Laura Kingsford, dean of the College of Natural Sciences and Mathematics, noted, “Our students earn early-career and mid-career salaries similar to students who graduate with bachelor’s degrees from other top schools. Although jobs in the physical and life sciences do not pay as much as the high demand jobs in engineering or technology, they do provide excellent salaries for CSULB graduates. To be ranked in the top 10 is a real tribute to our faculty for the training they give our students, both in the classrooms and in high impact practices such as undergraduate research. Many of our students go on to graduate programs in these fields where they see a large pay increase over those with just bachelor’s degrees.”





# DECLARE CAMPAIGN SURPASSES FUNDRAISING GOAL

CSULB's Declare campaign exceeded its \$225 million goal in August when an anonymous donor pledged a major gift to the College of Natural Sciences and Mathematics to support graduate fellowships and create an endowed dean's chair.

Declare is built around three pillars — unequaled access, transformation and a greater community — that encourages all CSULB students, faculty, staff and community members to support the university's mission to provide highly-valued educational opportunities through superior teaching, research, creative activity and service.

Thus far, the university received gifts from 53,799 new first-time donors (exceeding the goal of 50,000), created 135 endowments, and received more than 257,000 total gifts including more than 603 donations exceeding \$50,000.

“Though we have exceeded our initial campaign goal, our work at The Beach is just beginning,” said President Jane Close Conoley. “Declare is still ongoing and we will continue to foster and expand a culture of giving to ensure that future students have the opportunity for a high-quality CSULB education.”

## PAUL BUONORA

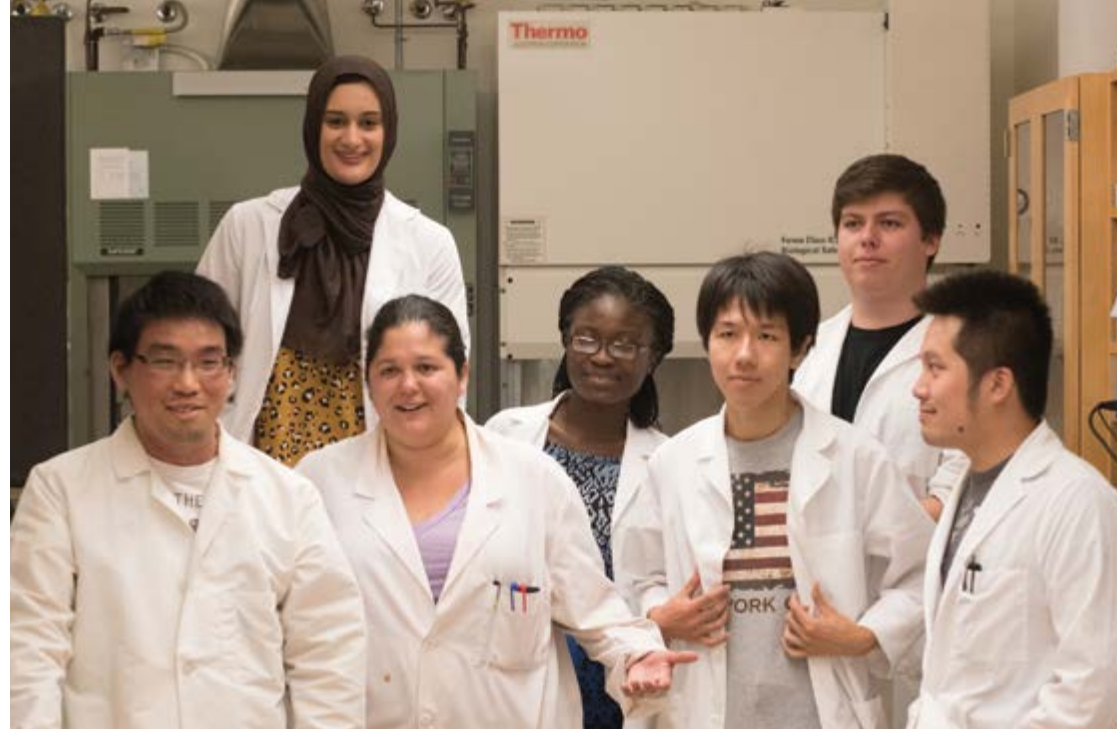
Within the theme of increasing student success, it has been a busy year. The university's Building Infrastructure Leading to Diversity (BUILD) program grant was funded, making CSULB one of 10 BUILD universities and part of the 12-university National Institutes of Health Diversity Consortium. You can read more about BUILD elsewhere in this issue. As the Research Enrichment Core Director in the CSULB program, I work with a team that includes C&B faculty members Drs. Mezyk, Sorin, and McAbee to develop the research infused curriculum and also mentor and train the student participants in the program.

The NIH Research Initiative for Scientific Enhancement (RISE) grant, written with co-PI Dr. Judy Brusslan from the Biological Sciences Department, was funded in the spring. You can also read about RISE elsewhere in this issue. Probably the most exciting new component is the M.S.-to-Ph.D. program, which will support our M.S. students who are going to matriculate to Ph.D. programs and biomedical research careers.

The Physical Sciences and Mathematics Scholarship program grant, which supports and trains B.S. chemistry, geology, math and physics majors who have financial need, is nearing the end of its first round of funding. With the co-principal investigators, Drs. Jen-Mei Chang (math), Chuhee Kwon (physics) and Lora Stevens (geology) we submitted a paper on our activities, “Strategies to Recruit and Retain Students in Physical Sciences and Mathematics on a Diverse College Campus,” to the *Journal of College Science Teaching*, where it is in press. We are currently working on renewing this grant.

Together with co-principal investigator Dr. Dustin Thoman (psychology) we began focus group interviews and background data collection on our National Science Foundation-funded Research on Education and Learning (REAL) grant which is exploring how classroom activities impact students' sense of belonging and identity as scientists, and ultimately impact retention and degree completion in the sciences. We will begin working on the actual interventions study in the coming year.

Within my research group, Hinz Abriam graduated this spring and plans to pursue an M.S. degree in the future. Hinz, Linda Ung and Dustin Nguyen have been doing some interesting work on optimizing cyclocondensation reactions, which we hope to bring to press in the coming year. M.S. candidate Aldrin de Leon continued his work on selective on additions to phthalic anhydrides in support of our larger phthalide synthesis efforts.



## JEFF COHLBERG

I am embarking on my final year in the Faculty Early Retirement Program. In fall 2015 I'm teaching second-semester biochemistry (CHEM 441B) for the last time. My final semester, spring 2016, will feature as my swan song the last offering of my graduate course in Physical Biochemistry. This all seems a bit hard to wrap my brain around, but I plan to make the most of it. There are a few new things I've been meaning to try out in the graduate course — I guess it's now or never!

## TOM MARICICH

Thanks to support from the department faculty, I will be continuing my writing and research. My activity is being moved to the MLSC lab because PH2 will be closed this year for infrastructure renovation (new windows, AC, etc.).

Four undergraduate students, Roy Santos, Lori Digal, Hiep Nguyen and Faraz Hussein, have been working in my research group. Michael Fimbres (M.S., 2014) is now an instructor at Santa Ana College and continues as a volunteer in my group when he's free. Another volunteer joined us for the summer from Columbia University. He is Julian Yano, the 2014 valedictorian from Wilson High School in Long Beach and grandson of Al Yano, an emeritus professor from our Physics Department.

We are continuing our studies of SNAAP (Substitution Nucleophilic of Acids, Alcohols and Phenols) isopropyl sulfonimidate alkylation reactions. I recently received an email from Dr. Robert Rzasa, a graduate of our department (B.S., 1993). He is a member of our Advisory Council and a medicinal chemist at Amgen Pharmaceutical. Dr. Rzasa recently performed an ethylation reaction on

a late-stage pharmaceutical intermediate using the SNAAP Maricich ethylation reagent from Sigma-Aldrich Chemical Co. (Catalog # L512311) and stated, “To my delight, it worked quite well, giving the desired O-alkylated product.” He noted, “Previous attempts to O-methylate resulted in either complex reaction mixtures or N-methylation.”

Besides Dr. Rzasa, I have been in touch with a number of other alumni and would be happy to hear from others. My email address is tom.maricich@csulb.edu. You can reach me on my cell phone at (562) 209-4306.

## STEPHEN MEZYK

The CSULB Mezyk RadKEM group research slowed a little this year, as I continued my sabbatical efforts of writing multiple Department of Energy grants and traveled continuously to work and attend conferences around the world. However, we still had another very productive year, with eight more published/in-press research papers and 19 conference presentations (and 12 more anticipated by the end of this year) by both myself and my research students.

There was more turnover in the research group, with Shauna Otto (M.S., biochemistry), Brittney Sjelin (M.S., biochemistry) and Madison Hanson (B.S., environmental science and policy) finishing during the year, and Ariana Gilmore (M.S., chemistry) and JoAnna Milam (M.S., chemistry) who completed this summer.

My continuing M.S. student is Trevor Reuter-shan, who is studying the absorption of estrogenic steroids onto dissolved organic matter, and who is now joined by Jennifer Castillo and Tin Do this semester. My ongoing

undergraduate research students are Nicole Moulton, who is studying the degradation chemistry of nuclear waste extraction ligands; Brittany Daws, who is continuing our efforts in nitrosamine carcinogenesis; Kylie Couch and Christopher Rice, who are quantifying the role of chlorine atoms in advanced oxidation processes; Amiruddin Lechner, studying bromine atom aqueous chemistry; Jamie Gleason, investigating the production of nitric oxide in oxidized nitrosamines; and newcomers Nicholas Pavlakovich and Stephanie Arciva. Our experimental efforts, using accelerators, rapid-mix spectrophotometers, solar simulators and bacterial cultures, make for a very busy laboratory.

The RadKEM group was especially notable for their conference publications and research-based scholarships this year. Brittany received a Beckman Scholars scholarship, and she and Kylie also received Women and Philanthropy awards. Trevor received the department Outstanding Teaching Assistant Award, and he, Brittany and Kylie also obtained CSULB summer research scholarships. I am very proud of all my students for their accomplishments, which really assists in helping me get this research done!

It is always gratifying to hear of my past research students' current successes, and this was another great year. Casandra Cox finished her postdoc at Harvard and joined BASF; Devin Doud completed his Ph.D. at Cornell and is a postdoctoral fellow at the Joint Genome Institute; Thomas Neubauer completed his Ph.D. at UC Riverside; and Charlie Hirsch finished her Ph.D. at UC Irvine. I'm confident they will continue to impress the world with all their accomplishments.

As always, I am looking forward to another amazingly successful (and hopefully grant-funded) year!

## JASON SCHWANS

We are continuing our studies investigating enzyme function. Understanding how enzymes work is central to our understanding of biology. In addition, as enzymes are the most common targets of pharmaceuticals, a deeper understanding of how enzymes work may aid in the design and application of enzymes and enzyme inhibitors that act as drugs. Projects in the lab include using triosephosphate isomerase to investigate what distinguishes general acid/base catalysis on an enzyme compared to small molecule catalysts, evaluating the importance of active site interactions in ribonuclease A, synthesizing unnatural amino acids and evaluating inhibitors of butyrylcho-



linesterase in collaboration with Drs. Nakayama, Sorin and Acey.

This has been a landmark year for our lab as Elise van Fossen recently defended her thesis and is the first master's student to graduate from the lab. Two other graduate students, Alex Colla and Weilee Chen, are poised to graduate this year, and we are fortunate to have three new master's students in the lab: Nathan Alade, Chris Khoury and Nessa Seangmany. We also have a vibrant group of undergraduate students including Bess Bischocho, Jeanette Gonzalez, Genessis Mercado, Anna Nguyen, Nicholas Nieto, Tracy Osaji, Ana Siu-Xiao and Ashley Torres. It is anticipated with this great group of students and our lab now established that we will make significant progress in all of our projects in the next year.

### YOUNG SHON

Our research continues on the design, synthesis and application of nanoparticle hybrid materials with applications in nanoparticle catalysis, enzyme mimics, energy materials and multifunctional biomarkers. The past year has been quite productive in terms of research accomplishment.

First, the W.M. Keck Foundation funded a collaborative educational proposal on energy materials research for two years. The Keck Energy Materials Research Program (KEMP), for which I am serving as a PI, is currently up and running for summer research and curriculum development. Second, we published three research papers (plus one forthcoming) in this past year. Hanqing Pan (M.S., 2014) and Diego Gavia (M.S., 2013) are the first authors of the papers, published in *ACS Applied Materials & Interfaces*, *ChemCatChem*, and *Journal of Physical Chemistry C*. These papers are also co-authored by Serena Low (M.S. candidate), Nisala Weerasuriya and Yeonjin Do.

Third, our group has continued our NIH-funded multifunctional biomarker research. Suprit Deol (M.S., 2015) is the first author of a paper published in June in *Journal of Materials Chemistry B*. Fourth, I have received several regional and university awards including the Research and Scholarly Committee Award, CSUPERB Joint Venture Award (co-PI), and Multidisciplinary Research Award (co-PI).

Continuing graduate students May Maung and Serena Low had another productive year and presented their research at national meetings, including ACS National Meetings in San Francisco in fall 2014 by May and in

spring 2015 in Denver by Serena; and the Materials Research Society Meeting in spring 2015 by Serena.

Another graduate student, Jackson Zhu, joined the Department of Chemistry at UC Davis for his Ph.D. studies after he completed his thesis and a couple of manuscripts this summer. Two new graduate students, Khin Ye San and Peter Tieu, are currently working on the Pt and Pd nanoparticle catalysis projects, respectively. I have also co-advised a graduate student, Skylar Chuang, with Dr. Narayanaswami. Skylar has won several awards including McAbee-Overstreet Summer Fellowship and the first place oral presentation award from the 29th Annual CSU Student Research Competition presenting our collaborative research.

Undergraduate students Vivian Chen (2015 Inorganic Chemistry Award), Tommy Dinh, Vu Nguyen, Trinh Nguyen, David Ortega (KEMP summer fellow), Roberto Rodriguez (BUILD scholar) and Sylvia Wedderburn have also spent quality time in the lab. I am looking forward to an exciting time with these new and continuing research students in the new academic year.

### PAUL WEERS

The research program in the Weers research laboratory investigates the antimicrobial properties and lipid binding interaction of apolipoproteins, proteins that play a critical role in the transport of lipids in the human body. I was very pleased with the renewal of the SC3 grant from the National Institutes of Health to study the antimicrobial properties of human apoA-I.

Senior lab members James Horn and Jesse Tran received their bachelor's degrees and Eugenia Maravilla graduated with an M.S. biochemistry degree. Our lab was represented at the annual CSUPERB meeting in Santa Clara (James Horn, Lukas Fuentes, Rachel Elena and Kan Cong), the ASBMB meeting in Boston (James Horn and Daniel Sallee) and the American Heart Association (ATVB) meeting in San Francisco. Congratulations to Lukas Fuentes who received the Doris Howell Award and was awarded a prestigious Beckman Scholarship.

Our lab welcomed MARC, BUILD and RISE students Daniel Sallee, Leesa Kakutani and Calvin Voong, and new biochemistry graduate students Heajin Hong, Kriti Shah and Bahareh Haeri.

# B.S. BIOCHEMISTRY PROGRAM RECEIVES ASBMB ACCREDITATION

By Dr. Douglas McAbee

In February, the B.S. biochemistry program received accreditation from the American Society for Biochemistry and Molecular Biology (ASBMB). This is a landmark event in the life of our department because it represents formal recognition by this preeminent biochemistry society of the long-standing excellence of our B.S. biochemistry program.

For many years, the ASBMB has been active in the development and promotion of undergraduate instruction in biochemistry, providing guidelines to institutions and faculty for content and best-practices pedagogy in biochemistry. In 2013, the ASBMB codified these guidelines into benchmark criteria and established a process for program accreditation in biochemistry and molecular biology. To date, ASBMB has accredited undergraduate biochemistry programs at 30 colleges and universities in the U.S. (see map). During the most recent review cycle, CSULB and two other California universities — San Francisco State University

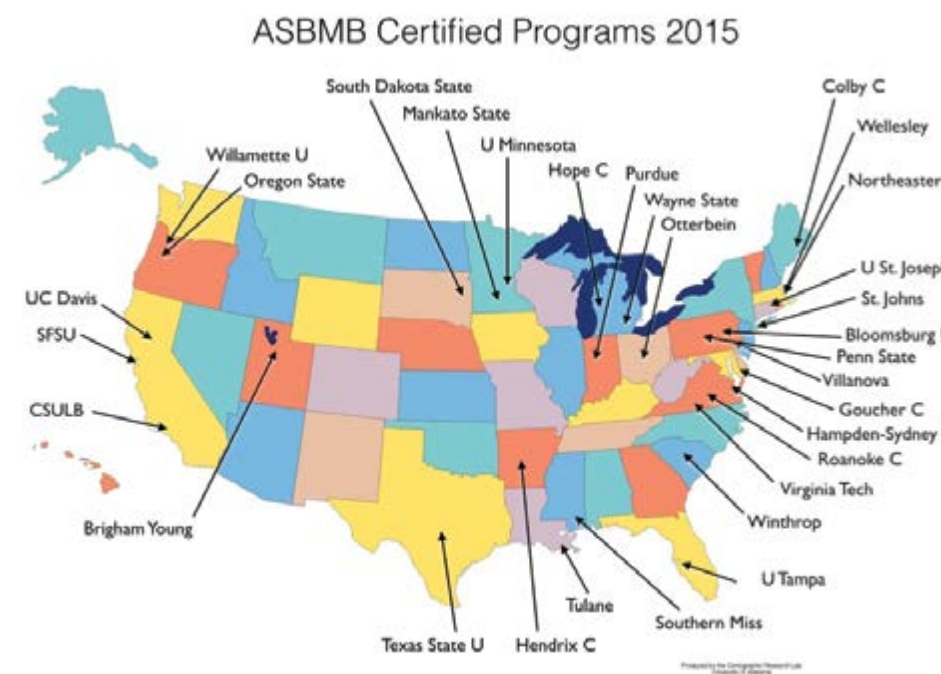
and UC Davis — earned ASBMB accreditation for their biochemistry programs, the first three schools in California to receive this distinction.

Biochemistry has been at offered at Long Beach State for decades. Biochemistry lecture and laboratory courses were offered as early as 1958 by the physical sciences program at (then) Long Beach State College, taught by one of the founding department faculty members, Dr. Don Simonsen. It was not until 1987 that the B.S. biochemistry degree program was first offered, and in 1989, the Department of Chemistry changed its name to the Department of Chemistry and Biochemistry. Along with chair Dr. Ken Marsi, the new B.S. biochemistry program was developed by Drs. Roger Acey, Jeff Cohlberg, Margaret Merryfield and Les Wynston and crafted to be chemically rigorous with lab experience being a crucial component in which students were exposed to modern methods and technologies.

The B.S. chemistry program has been accredited by the American Chemical Society (ACS) for 30+ years, and during that time, the ACS accreditation program requirements for instruction were applied to the B.S. biochemistry program. In many important respects, the ASBMB accreditation requirements mimic those of the ACS. In addition, the B.S. biochemistry program has received very strong commitment on the part of the college and the university, particularly with the construction of the Molecular Life Sciences Center, establishment of the Proteomics Center in IIRMES and continued financial support to equip the biochemistry lab with modern instrumentation. Thus, the B.S. biochemistry program content and focus that have been in place for many years readily fulfilled the accreditation requirements established by ASBMB.

As part of an ASBMB accredited program, B.S. biochemistry students who are in their final year of the program and have completed some or all of the biochemistry course (CHEM 441A/B) are eligible to take a certification exam offered annually by ASBMB. The exam is relatively short (60 minutes in duration) and is composed entirely of short-to medium-length essay questions. Students who score at designated levels on the exam receive formal written certification from ASBMB for "proficiency," "high proficiency" or "distinction" upon graduation from the program.

We anticipate that ASBMB accreditation will greatly benefit the students in the B.S. biochemistry program now and as we go forward.



# 2014-15 RESEARCH PUBLICATIONS FOR DEPARTMENT FACULTY

## XIANHUI BU

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## SHAHAB DERAKHSHAN

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## VAS NARAYANASWAMI

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## M.S. THESES

### Suprit Deol

"Stability, Cytotoxicity, and Cell Permeability of Dendron-Conjugated Gold Nanoparticles with 3, 12, and 17 nm Core"  
• Adviser: Dr. Young-Seok Shon

### Lauren Hartman

"The Role of Butyrylcholinesterase in β-Amyloid Formation in Neuroblastoma Cells"  
Adviser: Dr. Roger Acey

### Hanqing Pan

"Heat-Induced Reshaping and Coarsening of Metal Nanoparticle-Graphene Oxide Hybrids"  
• Adviser: Dr. Young-Seok Shon

### Matthew Shimazu

"Synthetic Design of New Lithium-Organic Framework Materials"  
• Adviser: Dr. Xianhui Bu

### Karol L. Sitwu

"Synthesis and Characterization of Novel Dinitrosyl-Iron Complexes of Bridged Bis-Phosphine Ligands"  
• Adviser: Dr. Lijuan Li

# SAACS HAS A SUCCESSFUL YEAR

By Jessica Kyees

In the fall semester we were informed that the Student Affiliates of the American Chemical Society (SAACS) was selected by ACS to receive an Honorable Mention award for its activities during the 2013-14 academic year. This news was also published in *Chemical & Engineering News* and in an issue of *inChemistry*, the student member magazine. To receive this recognition from ACS is an honor and we hope to continue this success in years to come. Congratulations to the 2013-14 SAACS officers and faculty advisors, Dr. Schramm and Dr. Buonora, for their dedication to SAACS!

The 2014-15 year for our student chapter was led by Co-Presidents Chelsi Heiner-Melancon and Genessis Mercado, Vice President Sheri Satterfield, Treasurer James Collins, Secretary Jessica Kyees, Public Relations Officers Annabelle Cantu and Lori Digal and Historian Danielle Jackson. Through our outreach opportunities, we had the chance to inspire young minds with the wonder of chemistry that is all around us.

In our first outreach event of the year, we participated in Noche Cultural – Extravaganza de las Ciencias at Centro Salud es Cultura in downtown Long Beach, wowing a group of 25 children aged 6 to 17 with our “silly putty” activity. In October we ventured to Jordan High School where we performed food chemistry demonstrations for two classes of 30 junior-level students in pre-medical track programs. We held a Q&A session about chemistry and general college inquiries and had some wonderful participation!



We started the spring semester by participating as judges for the McPherson Middle School Science Fair, examining various project posters and listening to oral presentations. We think we see some budding scientists! Finally, our outreach events concluded with the MAES Science Extravaganza in April. Middle school students witnessed acid/base chemistry with various household products, using boiled cabbage as an indicator. We'd love to see some of those familiar faces in our halls in a few years.

We had some very exciting news in our department that our B.S. biochemistry program was awarded certification by the ASBMB. To give students a better understanding of what this means and how they are affected, SAACS hosted an ASBMB information session led by Dr. McAbee. It was an informative meeting and we would like to thank Dr. McAbee and all who attended. Good luck on those certification exams.

Our fall and spring Periodic Table bake sales continue to be a success. Students and faculty alike enjoyed a variety of delicious cupcakes, each labeled with an element of the periodic table from actinium to zirconium. Make sure you're quick to get your cupcakes during next semester's sale, because if you wait too long you'll find that all the cupcakes *argon!* We

also provided goggles, lab coats, and ACS study guides in our regular garb sales. Somebody call the safety department, because our students are looking sharp!

We continued our weekly tradition of free Coffee and Donut Hour every Friday on the MLSC patio. This gave students and faculty a chance to connect outside of the classroom. Thank you to all of the fantastic volunteers that we had over this past year. We are always looking for more volunteers to help with setting up, cleaning up and bringing in tasty treats.

This year we created our new SAACS room that opened to students in the fall semester. Check it out in HSCI-326. We're looking forward to next year led by Co-Presidents Lori Digal and Annabelle Cantu, Vice President Helen Dinh, Treasurer Hiep Nguyen, Secretary Vivian Chen, Public Relations Officer Jessica Kyees and Historian Jennifer Ramirez. It's sure to be a year packed with events, knowledge and new memories! **Go Beach!**

## ALUMNI GIVING MAKES A DIFFERENCE! YOUR DONATIONS AT WORK

13 Student Travel Research Awards

14 Departmental Honors and Special Awards

8 Scholarship Awards

6 Summer Research Awards

24 Seminars by distinguished visiting scientists 13 in spring + 11 in fall 2014 from such prestigious institutions as Aerospace Corp., Caltech, UCLA and others.



Dr. David Tirrell, the Ross McCollum-William H. Corcoran Professor in the Division of Chemistry and Chemical Engineering at California Institute of Technology made two presentations as the Allergan Foundation Distinguished Lecturer.

You can make the difference in 2015-16!

To learn more, contact Maryanne Horton, Senior Director of Development, College of Natural Sciences and Mathematics, 562.985.1687, maryanne.horton@csulb.edu.

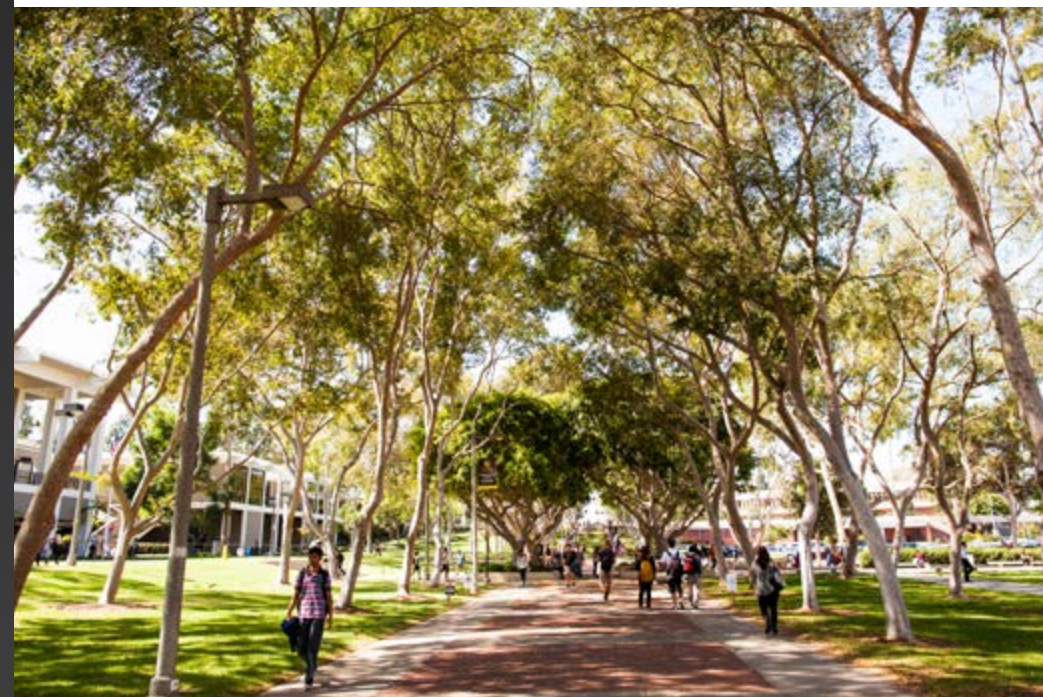


## SKYLAR CHUANG WINS IN CSU RESEARCH COMPETITION

Skylar Chuang, a student in our M.S. program in biochemistry, won first place in the Physical and Mathematical Sciences graduate student category of the 29th annual statewide CSU Research Competition, held in May in San Bernardino.

A student in Dr. Vas Narayanaswami's lab, Skylar's talk was titled, "The Role of Nanogold apoE Reconstituted Vehicles (NERVs) as Potential Drug Delivery Systems." Skylar's research involved the synthesis and characterization of a biomimetic high-density lipoprotein (HDL) gold nanoparticle functionalized with apolipoprotein E as a potential agent for delivery of cancer therapeutics. He hopes to eventually develop a nanoparticle that can cross the blood brain barrier.

A 2011 UCLA graduate with a B.S. in biology, Skylar plans to get a Ph.D. in chemistry with a focus on nanomedicine.



# AWARDS & SCHOLARSHIPS

Chemistry and Biochemistry Students 2015

## ANNUAL AND ENDOWED AWARDS



Akil Ali



Kylie Couch



Trevor Reutershan



Sean McCoy



Skylar Chuang



Brittany Daws



Alexandra Donovan



Analisa Garcia

### 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. The award is given to students best exemplifying Henderson's scholarship and commitment to the profession of chemistry. This year's recipients are **Akil Ali**, **Kylie Couch** and **Trevor Reutershan**.

### Kenneth L. Marsi Scholarship

Dr. Kenneth L. Marsi was a distinguished scientist and teacher of organic chemistry, who served superbly as department chair for 21 years. The \$2,500 scholarships are used to defray registration fees of outstanding junior and senior chemistry or biochemistry majors. **Sean McCoy** received the 2015 award.

### McAbee-Overstreet Fellowship

The McAbee-Overstreet Fellowship was established by a donation from Dr. 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 UC Irvine. It recognizes a graduate student for excellence in scholarship and commitment to research, and this year was presented to **Skylar Chuang**.

### Michael Monahan Research Fellowship

The Michael Monahan Fellowship was established through a generous bequest from Dr. Monahan (B.S., chemistry, 1963), who was a member of the faculty at the Salk Institute, a senior research scientist at Beckman Instruments, and the founder and president of California Medicinal Chemistry Corp. In 1985-87, following his retirement, he served as a lecturer in our department. The fellowship supports student research in our department. **Brittany Daws** and **Alexandra Donovan** are the 2015 recipients.

### NHK Laboratories, Inc. Scholarship

NHK Laboratories is a family-owned, private label contract manufacturer of vitamins, minerals, herbs, nutritional supplements and over-the-counter pharmaceuticals. Along with the \$1,000 NHK scholarship, this year's recipient, **Analisa Garcia**, has the opportunity to complete a course-credit internship at NHK's Santa Fe Springs laboratory.

Continued on pg. 24

## COLLEGE AWARDS

CNSM Outstanding Thesis Award in Chemistry & Biochemistry

**Roy Hernandez**

Graduate Dean's List

**Sahar Roshandel**

James L. Jensen Research Fellowship

**Phuc (Sam) Nguyen**

Robert D. Rhodes Award

**Eric Kircher**

## DEPARTMENTAL HONORS

Graduates:

**JoAnna Milam, Elise Van Fossen, Sophia Nguyen**

Undergraduates:

**Ji Won Lee, Daniel Ta, Katrina Bautista**

## SPECIAL DEPARTMENTAL AWARDS

American Institute of Chemists Baccalaureate Award

Biochemistry: **Ji Won Lee**

Chemistry: **Katrina Bautista**

American Institute of Chemists Graduate Award

Biochemistry: **Elise Van Fossen**

Chemistry: **Matt Shimazu**

Toni Horalek Award

**Elise Van Fossen**

Outstanding Teaching Associate Award

**Trevor Reutershan**

## SUBJECT AREA AWARDS

American Chemical Society Analytical Chemistry Award

**Daniel Ta**

American Chemical Society Organic Chemistry Award

**Eric Kircher**

American Chemical Society Polymer Chemistry Award

**Khang Nguyen**

Analytical Chemistry Award

**Kaylee Smith**

Biochemistry Award

**Eric Kircher**

Freshman Chemistry Award

**Roxanne Jacobs**

Hypercube Award

**Khai Nguyen**

Inorganic Chemistry Award

**Vivian Chen**

Organic Chemistry Award

**Lukas Fuentes**

Spyros Pathos IV Award

**Sandy Masoud**



Roy Hernandez



Sahar Roshandel



Phuc (Sam) Nguyen



Eric Kircher



JoAnna Milam



Elise Van Fossen



Sophia Nguyen



Ji Won Lee



Daniel Ta



Katrina Bautista



Matt Shimazu



Khang Nguyen



Kaylee Smith



Khai Nguyen



Vivian Chen



Lukas Fuentes

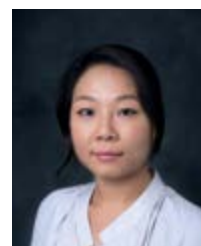


Sandy Masoud

# AWARDS & SCHOLARSHIPS

Chemistry and Biochemistry Students 2015

Continued from pg. 22



Hea Jin Hong

## Maria Erlinda Co Sarno Scholarship

After a highly successful career as a chemist at Baxter Healthcare, Maria Erlinda Co Sarno (M.S., chemistry, 1975) became a U.S. patent attorney serving small businesses and independent inventors. The award, which was presented this year to **Hea Jin Hong**, is meant to recognize and inspire an international graduate student with research interests in compounds leading to therapeutics or prevention of disease.

## David L. Scoggins Award

This award memorializes David L. Scoggins, a graduate student in the Department of Chemistry at the time of his death in 1969. This award recognizes outstanding scholarship and promise by a chemistry or biochemistry student who intends to pursue a career in one of the health-related professions. **Sheri Satterfield** is this year's recipient.



Wilberth Narvaez

## John H. Stern Award in Physical Chemistry

Dr. John H. Stern, a distinguished teacher of physical and general chemistry in our department from 1957-87, was internationally known for his work in solution thermodynamics and author of many publications in that field. **Wilberth Narvaez** received this year's award.



Jaime Tran

## Leslie K. Wynston Scholarship

Dr. Leslie K. Wynston was a biochemistry professor in the department (1965-98), who served as chair of the Pre-Professions Health Advisory Committee and was active in the Association of Advisors for the Health Professions. The \$1,500 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. The 2015 recipient is **Jaime Tran**.

## 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 go 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 by contacting Maryanne Horton, [maryanne.horton@csulb.edu](mailto:maryanne.horton@csulb.edu), 562.985.1687.



## HONOR ROLL OF DONORS (JULY 1, 2014 - JUNE 30, 2015)

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, 2014 through June 30, 2015.

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*In addition to meeting fully its obligations of nondiscrimination under federal and state law, CSULB is committed to creating a community in which a diverse population can live and work in an atmosphere of tolerance, civility, and respect for the rights and sensibilities of each individual, without regard to economic status, ethnic background, veteran status, political views, sexual orientation, or other personal characteristics or beliefs.*