

CHEMISTRY & BIOCHEMISTRY

FALL 2017

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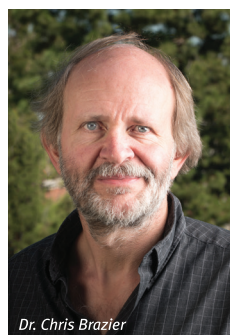


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"FUN AT ANY COST!"

REMARKS BY THE CHAIR



Dr. Chris Brazier

Greetings to all alumni and friends of the Department of Chemistry and Biochemistry. The department faculty and students have continued their excellent record with more awards received and grants funded, along with a continued high level of publication in major journals.

The focus of this year's newsletter is biochemistry at CSULB, starting with the stylish and artistic biochemistry lab t-shirts on the front cover and panel to the left. The last new degree program in the department was the B.S. in Biochemistry which began in 1986 and continues to be the largest degree program in the department. The proposal for a new B.A. program in Biochemistry has been developed and is awaiting approval at the university level and from the Chancellor's Office. I would like to thank Professor Doug McAbee for his help with refinements to the proposal requested by academic affairs. The new program should be in place and accepting students in Fall 2018. The intent is to provide a more flexible program for students interested in pursuing professional programs, teaching careers or positions in industry.

In looking for the correct year to start the B.S. Biochemistry program, I looked through the 1987 department newsletter. The number of tenure/tenure track faculty has remained the same at 22, as has the number of lecturer faculty at 14. The number of degrees awarded has gone from 77 to 117, while the number of students has grown from 200 undergraduates and 50 master's students in 1987 to 450 undergraduates and 60 master's students today. It comes as no surprise that we are doing so much more with no increase in faculty. Undergraduate research has continued to grow, evidenced by the fact that in 1987 there were 35 students enrolled in research -- more than the rest of the college combined (20) -- while this fall 93 undergraduates are enrolled in research, still more than the rest of the college combined (86)!

The new B.S. Chemistry option in Materials Science is now official and in the 2017 catalog. While freshman and transfer students were unaware of the new option, we are seeing many requests from students who took the materials science classes over the past two years to switch to the new option. The classes are in high demand with 30 in lecture this semester. A second section of the materials lab classes needed soon. It is exciting to see the new program become a success so quickly.

I would like to thank once more Young Shon, Xianhui Bu and Shahab Derakhshan, the three chemistry faculty who originated the program, along with the physics department. Our two newest faculty, Fangyuan Tian and Hadi Tavassol, have joined the materials science group.

The department faculty have had continued success in obtaining research funding with six major research grants this year totaling more than \$1.8 million.

- Professor Deepali Bhandari received a three-year, \$425,000 grant from the NIH SCORE-SC2 program to study "Novel Insights into Cancer Cell Survival during Endoplasmic Reticulum Stress".
- Professor Michael Schramm received a three-year, \$225,000 grant from the NSF RUI program to study "Mono and Bis Gold Resorcinarenes: New, Potent Supramolecular Catalysts".

- Professor Xianhui Bu received a three-year, \$384,000 grant from the NSF RUI program for "Development of a Synthetic Platform for Highly Tunable Cationic Porous Materials".
- Professor Jason Schwans received a five-year, \$180,000 share of a grant from NSF in collaboration with Stanford and UCSF for the "Systematic Investigation of the Structure, Dynamics and Energetics of Hydrogen Bonds and the Protein Interior Using Ketosteroid Isomerase and Model Systems".
- Professor Fangyuan Tian received a three-year, \$100,000 grant from EREF (Environmental Research and Education Foundation) to investigate "Renewable energy from waste: A study of landfill gas purification by hybrid porous materials".
- Professor Enrico Tapavicza received a three year, \$442,000 grant from the NIH AREA program to investigate "Ab initio modelling of vitamin D photochemistry in biological membranes".
- Professor Stephen Mezyk received a three-year, \$75,000 award from DOE via UC Irvine to study the "Effects of alpha and gamma irradiation on complex and metal-loaded solvents for advanced solvent extraction processes".

Additionally, professors Eric Marinez and Vas Narayanaswami are PI's on major student support grants that were recently renewed, HSI-STEM and MARC-U*STAR respectively. Congratulations to them all. An additional 10 major grant proposals are currently under review.

At the University Achievement Awards luncheon this year Jamie Gleason was recognized as the Outstanding Undergraduate Research Student. And Mezyk received the Outstanding Faculty Mentor for Student Engagement in Research, Scholarly & Creative Activity as recognition for mentoring Gleason, and Brittany Dawes, last year's Outstanding Undergraduate Research Student.

Once again a graduate of the department, Lukas Fuentes, was selected by the CSU Long Beach Alumni Association as the Outstanding Graduate in CNSM. His award was presented at the Alumni Awards banquet and Professor Paul Weers was recognized as the Most Valuable Professor in the college.

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. We received about \$80,000 for new or replacement equipment in the biochemistry, general chemistry, organic chemistry, and physical chemistry laboratories.

This year, we said goodbye to Professor Roger Acey who entered full retirement after five years in the faculty early-retirement program. I would also like to express my sorrow on the death of Professor Darwin Mayfield at the age of 97. Darwin was one of the founders of the department, joining the faculty in 1956. It was my pleasure to work with Darwin as a volunteer for the Science Olympiad "Can't Judge a Powder by Its Color" experiment for several years.

Finally I would like to once again thank 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.

Fall 2017

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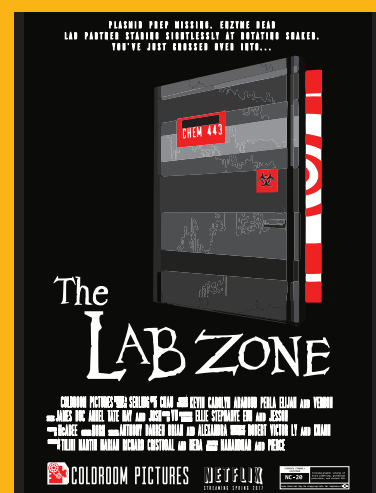
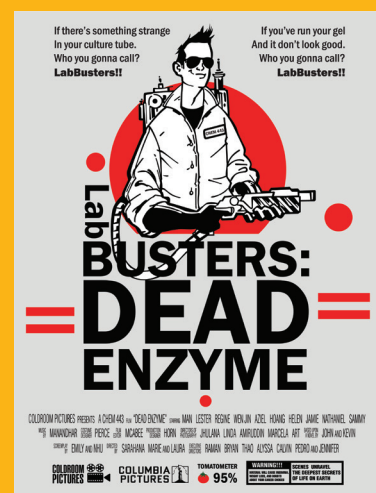
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About the Cover
For several years, the biochemistry lab (CHEM 443) has made lab t-shirts as a whimsical commemoration of life in CHEM 443. With input from lab students and instructors, Dr. McAbee developed themes that were converted into clever eye-catching graphics by students from CSULB's nationally recognized graphic arts program. Student artists have been Christine Ball, Jamie Fujimoto, Krista Paulsen, Nolawi Wolde-Yohannes and Lilit Grigoryants. Featured here are "Biochemiland" (cover), "Guardians of the Laboratory" (Jamie Fujimoto), "The Lab Zone" (Nolawi Wolde-Yohannes), and "LabBusters: Dead Enzyme" (Lilit Grigoryants). Each semester's design is unique—33 different shirts since Fall 2010—but all list students and instructors names for that term. Movie poster graphics have been a popular way of portraying the themes. Dr. McAbee said, "The shirts have been a lot of fun for me and the students. The creativity of our graphics arts students next door is pretty amazing, capturing our ideas with cool graphics in short order! They are so talented! We could not do this, or nearly this well, without their help."

Featured artist contact information: Jamie Fujimoto, jamie.fujimoto@gmail.com; Nolawi Wolde-Yohannes, nom4djohanns@gmail.com; Lilit Grigoryants, lilitgrigoryants@gmail.com.



DR. KASHA SLOWINSKA: NOVEL APPROACHES TO TARGETED DRUG DELIVERY

By Dr. Douglas McAbee

Anti-cancer drugs kill rapidly growing tumor cells, but most lack selectivity and kill normal cells as well, causing serious side effects in persons undergoing treatment. Targeted drug delivery – the process where an efficacious drug can be selectively delivered only to diseased cells without harming healthy cells, has been a goal of medicinal chemists for decades. Chemistry faculty member **Dr. Kasha Slowinska** is working to develop novel methods using short folded peptides for specific delivery of anti-cancer drugs.

For a drug to have therapeutic effect, it must enter a diseased cell by passing through the outer cell membrane. Slowinska's approach uses short synthetic collagen peptides, about 15 amino acids long, that have been modified to include 4-6 positively-charged groups (arginines) contiguously situated at the front end of the peptide. The other end of the

peptide contains an attachment site for a particular cancer drug (e.g., Paclitaxel). Under permissive conditions, the collagen peptides will naturally fold to form trimers with each other, thereby generating a large cluster of positive charges at one end of the folded trimer.

It's well-known that short proteins or peptides with clustered positive charges can enter cells, though the mechanism remains obscure. Slowinska's folded peptide trimers only have a sufficient number of positive charges to cross a membrane; unfolded individual peptides do not cross the membrane.

The key element of Slowinska's design is temperature-dependent control of peptide trimer formation. Because of their length and amino acid content, folded trimers form only when the temperature is at or below 25°C

(room temperature). At physiological temperature (37°C), the peptides remain unfolded and do not form trimers and, therefore, cannot enter cells. Slowinska's lab confirmed this experimentally by showing the temperature-dependent uptake of fluorescently-tagged collagen trimers by cells in culture (see Fig. 1; Oh M *et al.*, 2016, *Analytical Chemistry* 88:9654-9661).

Slowinska's group extended this by showing temperature-dependent uptake by cultured Jurkat cells (human acute T-cell leukemia cells) of collagen peptide trimers derivatized with Paclitaxel. These cancer cells were highly-sensitive to the effects of the peptide-linked drug but were unaffected when incubated with Paclitaxel alone (Ayalew L *et al.*, 2017, *ACS Medicinal Chemistry Letters* 8:814-819).

How would this approach be applied for cancer treatment? The collagen peptide linked to a cancer drug would be introduced into a tissue containing a tumor amenable to external temperature manipulation (e.g., skin or breast tumor). Using an external cooling device, the temperature of the tumor could be selectively lowered to a point at which the anti-tumor peptide would form folded trimers, thereby allowing the anti-tumor peptides to enter only those cells. Other tissues, if maintained at normal temperatures, would remain unaffected by the anti-tumor peptides. Slowinska's lab has been able to generate a temperature gradient of 12°C over 600 μm distance (roughly the thickness of about 20 cells). The temperature-dependent uptake occurs on all cells tested so far, though not all cells are sensitive to the effects of the drug. In general, cells show sensitivity if the peptide-linked drug gets into the cytoplasm, but not if it is sequestered in intracellular membrane compartments (endosomes). With these results in hand, Slowinska plans to push the project further by collaborating with both biomedical engineers and investigative oncologists to bring this novel technology into practice.

In addition to collagen-based drug delivery, Slowinska's group is also working on using collagen peptides and collagen gels as enhancing treatments for wound healing and gene delivery that would be used for the treatment of antibiotic-resistant bacteria. Typically, Slowinska's lab group includes 3-4 MS students and about eight undergraduate research students, many of which are BUILD, MARK, or RISE students. Her lab attracts students from chemistry, microbiology, biochemistry and electrical engineering. That's not surprising considering her research projects address significant biomedical problems that are multidisciplinary by nature. She also works with College of Engineering faculty as collaborators on some of these projects.

In 2013, she was granted a sabbatical leave and worked with Dr. Aaron Esser-Khan (UC Irvine) on the development of new vaccine design using conjugated biomolecules that enhance the immune response. These

studies were reported in a recent publication (Ryu KA *et al.*, 2016, *ACS Chem Biol* 11:3347-3352). Her research has been funded mainly by NIH, Research Corporation and DARPA (via collaborators at University of Washington and Duke University). She is currently writing a grant proposal to fund the development of non-plasmid delivery devices of antibiotics to antibiotic-resistant bacteria.

In addition to her research, Slowinska has been heavily involved in making major upgrades in how analytical chemistry is taught at CSULB. Several years ago, she made major revisions in *Instrumental Methods of Analysis* (CHEM 451), incorporating many active learning approaches new to this course. These efforts led her to give two presentations at national ACS meetings on the changes she incorporated into CHEM 451 laboratory (Denver, 2015) and lecture (San Diego, 2016), and resulted in a collaboration with Dr. Tom Wenzel from Bates College (Lewiston, Maine) on an NSF-grant that funds workshops on developing and incorporating active learning approaches in analytical

chemistry. Slowinska will hold one of these workshops at CSULB in October. She is now in the process of revising the structure and content of *Quantitative Analysis* (CHEM 251) using approaches she adopted in CHEM 451. While students like the active learning approaches, the changes are more challenging on the instructors because CHEM 251 enrollments are much larger than those in CHEM 451.

Slowinska was born and raised in Warsaw, Poland, and received her degree in chemistry from Warsaw University. From there, she moved to UC Berkeley and got her Ph.D. in 2003 in physical chemistry working with Dr. Marcin Majda. She spent one year working at GE Global Research (Niskayuna, NY) on development of organic light-emitting diodes. She joined the chemistry faculty at CSULB in 2004 as an assistant professor, promoted to associate professor in 2011, and is now a full professor. She is a mother of two active boys – Ian, 11, and Kai, 8 – and enjoys gardening and cooking and family vacations in Hawaii.

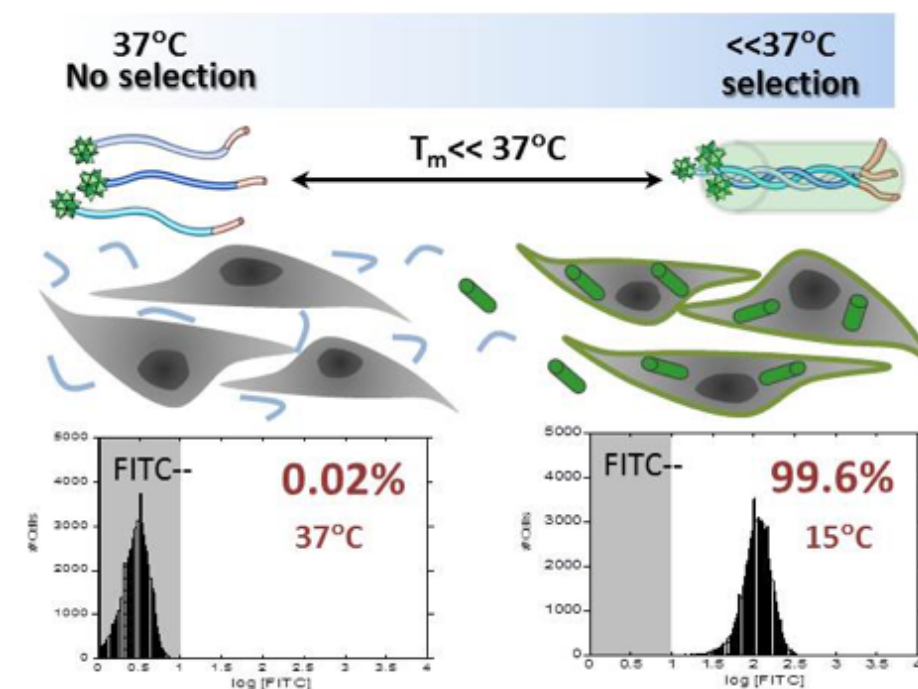


FIG. 1. Schematic describing the temperature-dependent uptake of FITC-tagged collagen peptides. Lowering the temperature to 15°C causes the peptide (blue) to fold into the nanocarrier (green) and be internalized by the cells. The temperature acts as an ON/OFF switch: ON(15°C) 99.6% cell uptake; OFF (37°C) 0.02% cells uptake. Uptake was monitored using a laser cell sorter.



WILLIAM MOERNER: SCIENCE SHINES IN TALK

By Janis Carr

William Moerner quickly dabbed a cheap orange highlighter in a tube of water. Although the water remained clear, it turned a neon shade of yellow when the Stanford University scientist shone a green laser through the liquid. It was a simple

Moerner said at the 38th Nobel Laureate Lecture in March. “They do have partners, but they work on their own.”

Moerner, along with Eric Betzig of Howard Hughes Medical Institute, and



demonstration of a complex research project that earned Moerner the 2014 Nobel Prize in Chemistry.

Moerner told a gathering at the University Student Union that even the small number of molecules from the orange marker were enough to interact with light, which has enabled scientists to delve deeper into the inner workings of cells at the molecular level. The florescent light helps visualize a molecule.

Scientists can now see how cells work and divide, and how ribosomes manufacture proteins.

They can also better understand DNA and RNA, plus have insight to various diseases.

“They (molecules) are like little machines,”

Stefan W. Hell of the Max Planck Institute for Biophysical Chemistry in Germany, shared the Nobel Prize for their roles in developing the microscopy techniques that make the molecular research possible.

“We are just normal people but we’ve done something significant,” Moerner said. He said for years, scientists thought it was “impossible to detect single molecules.”

Then in the late 1990s, Moerner and Betzig created a method in which fluorescence in individual molecules is steered by light. An image of very high resolution is achieved by combining images in which different molecules are turned on and off. This allows scientists to track processes occurring inside the living cells.



He likened the process to finding fireflies in tree branches. He said if you watch them flicker on and off, track the activation of lights then put the dots together, it would give a picture of how super resolution reconstruction works in revealing individual molecules.

Moerner said working at the ultimate single molecule limit has helped solve complex problems in chemistry, physics and biology worldwide.

“Super resolution provides an amazing window beyond the diffraction limit,” he said.

The lecture was presented by the College of Natural Sciences and Mathematics Student Council, the College of Natural Sciences and Mathematics and CSULB Associated Students, Inc.



BARBARA TAYLOR: CNSM’S NEW ASSOCIATE DEAN FOR RESEARCH

Dr. Barbara Taylor, Associate Dean for Research in the College of Natural Sciences and Mathematics, was asked to introduce herself to the University and its research community. Here is her self-introduction:

I am delighted to be part of CSULB. I arrived at The Beach in mid-August, coming from the University of Alaska Fairbanks (UAF), culminating experience at six different institutions in the U.S. and Canada. It is easy to see why CSULB is one of the most popular universities in the nation and why staff and faculty become happily entrenched here. (Two recent retirements in CNSM celebrated 37- and 50-year careers at the University!)

I am a broadly trained physiologist, who began a research career as an undergraduate student at the University of British Columbia (UBC) with published research in marine ecological physiology. My graduate degrees (also completed at UBC) focused on nutritional and metabolic physiology, and as a postdoc, I moved to biomedical neurophysiology. At UAF, my research program centered on mechanisms by which exogenous metabolites (nutriceuticals and

toxins) influence neural function during development and over lifespan. While research questions have always captivated me, the most rewarding aspect of research has been mentoring junior investigators at all levels from high school students to postdocs. I also find great reward in teaching and outreach and have a distinguished record in both.

My previous experience in academic leadership includes serving as the inaugural director of UAF’s office of Undergraduate Research and Scholarly Activity, interim director of the University Honors Program, and Principal Investigator of Alaska’s NIH-funded BUILD program. These experiences prepared me for my new duties, which broadly include:

- Providing leadership and vision in seeking external support for research initiatives;
- Promoting research and assisting faculty/staff in the grant proposal process;
- Promoting and seeking external support for student research;

- Facilitating collaboration and interdisciplinary research; and
- Increasing the visibility of CNSM on campus and in the community.

Previously, I have had the good fortune to work within collegial leadership teams that were a good fit for my personal approach, which is to be organized and outcome-driven, through measured, realistic, and iterative processes. I believe leaders are people with a vision, who can engage colleagues in that vision so that as a team they achieve what none of them would have achieved alone. Teamwork is the key, specifically, it’s synergy. Good teamwork combines the strengths and skills of individuals so that the team’s ability is greater than the sum of the individuals’ abilities. My leadership style is one of service; I strive to operate as a team member and serve as an advocate and a resource for faculty, staff and students.

I look forward to working with colleagues across campus to advance research in the College of Natural Sciences and Mathematics and the university as whole.

DR. VASANTHY NARAYANASWAMI APPOINTED FELLOW OF THE AMERICAN HEART ASSOCIATION

BY DR. DOUGLAS MCABEE



In May 2017, Dr. Vasanthi Narayanaswami, biochemistry faculty member, was honored by appointment as Fellow of the American Heart Association (AHA) in recognition for her sustained record of research excellence, volunteer service, and commitment toward the mission of AHA. Dr. Narayanaswami was nominated for Fellow status by Dr. Mary Sorci-Thomas, Medical College of Wisconsin (Milwaukee), also an AHA Fellow. The appointment was made by the Arteriosclerosis, Thrombosis, and Vascular Biology (ATVB) Council of the AHA.

Besides her excellent publication record in the investigation of apolipoprotein E, Dr. Narayanaswami and her trainees have received multiple research and fellowships from AHA, and she has served at the national level on grant study sections, as chair of the ATVB Women’s Leadership Committee, and Liaison of the ATVB Diversity Committee. Fellow standing is achieved by only a very small fraction of AHA members. We congratulate Dr. Narayanaswami for this noteworthy and much deserved recognition.

DR. NATHAN LEWIS

2017 ALLERGAN DISTINGUISHED LECTURER

CAN SOLAR ENERGY POWER OUR PLANET?

By Dr. Fangyuan Tian & Dr. Kasha Slowinska



PHOTO BY:
THE ANSYLN RESEARCH GROUP

Professor Nathan S. Lewis, the George L. Argyros Professor of Chemistry at the California Institute of Technology, visited our department on February 1st as the Allergan Foundation Distinguished Visiting Lecturer. We were honored by his visit, as he is one of the foremost solar energy researchers in the world. Prof. Lewis is renowned for functionalization of silicon and other semiconductor surfaces, as well as analytical-electrical sensing with chemiresistive sensor arrays. His research interests include the discovery of new semiconducting materials, semiconductor integration, solar fuels devices, and vapor sensors (electronic noses). He has been working on the development of solar energy active components, such as

semiconductors, catalysts, and membranes for artificial photosynthesis to generate fuels using sunlight.

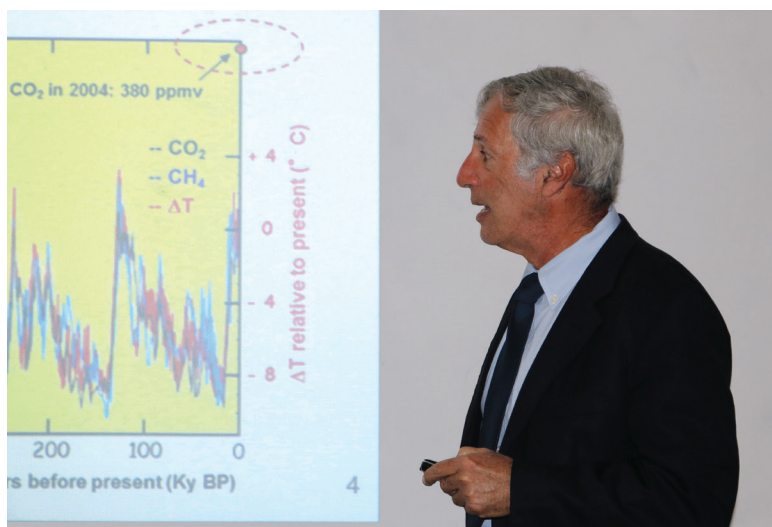
Prof. Lewis received his B.Sc. and M.S. degrees in Chemistry from Caltech in 1977 and his Ph.D. in Chemistry from MIT in 1981. He began his career as an Assistant Professor at Stanford University. In 1988, Prof. Lewis joined the faculty at Caltech where he also serves as the Principal Investigator at the Beckman Institute since 1992. Prof. Lewis has published over 400 papers, and his research has been mentioned numerous times in the media, including Scientific American, CNN, ABC News, NPR, PBS, and the World Economic Forum 2015 in Davos. He is currently the Editor-in-Chief of the leading journal in sustainable energy R&D, *Energy and Environmental Science*, and is a distinguished advisor to industry, government, and academia. He was named as the director of the U.S. Department of Energy (DOE) Energy Innovation Hub, the Joint Center for Artificial Photosynthesis in 2010. Prof. Lewis has received numerous awards, including the Fresenius Award in 1990, the ACS Award in Pure Chemistry in 1991, the Orton Memorial Lecture award in 2003, the Princeton Environmental Award in 2003 and the Michael Faraday Medal of the Royal Society of Electrochemistry in 2008. He was ranked No. 17 overall in the 2009 Rolling Stone magazine's top 100 "Agents of Change in America".

During his visit at CSULB, Prof. Lewis gave two lectures, the first one for general audience titled "Research Opportunities in Renewable Energy: The Case for Solar Fuels." The room was packed! The standing audience was a proof, how much interest of our students and faculty is directed towards the subject of renewable energies. Prof. Lewis introduced major challenges and highly innovative ideas relative to global climate change and solar energy conversion. Solar, as the primary leading alternative energy source along with natural gas, wind, and nuclear, has garnered a significant amount of attention in the last decades. Prof. Lewis described three technologically distinct approaches to solar energy utilization: solar electricity, solar thermal, and solar fuels technologies. One approach to improve the solar electricity system has been to maximize the light absorbing capability of the inorganic solid materials, while minimizing the charge recombination velocity on the surfaces. His group has contributed tremendous efforts to improve the solar electricity conversion efficiency with nanostructured silicon arrays. He presented another approach: conversion of solar energy to heat. Although the solar heat conversion facilities are expensive, the efficiency of the energy conversion (60-70%) is much more appealing compared to the quantum based-photon solar electricity conversion systems (32% at the theoretical maximum).

The third focus of his lecture was the solar fuels which extend from biofuels to inorganic solar fuel cells. One of the breakthroughs is to adapt biological photosynthesis into artificial systems, such as water splitting by solar photovoltaics and membranes. This topic was further discussed in his research seminar. Overall, Prof. Lewis outlined major scientific challenges and many research opportunities for advanced solar energy conversion. After the presentation, lively discussion lasted a long time. Some of the questions for the audience touched not only science, but also the policy issues concerning California, the United States, and the world. Prof. Lewis recommended to "focus on the science", to propagate the notion, that while his research has important policy ramifications, keeping it on the purely scientific level allows for open discussion about progress in energy field, without being ideologically engaging. His general presentation was not only informative and appealing to a broad range of In the afternoon, Prof. Lewis presented a research seminar, "Sunlight-Driven Hydrogen Formation by Membrane-Supported Photoelectrochemical Water Splitting." The principal focus was the Lewis lab's development of the polymer-based water-splitting system. The system takes sunlight and water as inputs and employs tandem semiconducting light absorbers to reduce H⁺ (or H₂O) to H₂ gas

while oxidizing H₂O (or OH⁻) to O₂ gas. The photoactive components are the silicon microwire-arrays, which decouple the light-absorption and carrier-collection distances, and provide high surface areas for catalyst loading. He demonstrated the Ni-Mo alloys are promising earth-abundant catalysts of the hydrogen-evolution reaction on the microwire-arrays. Furthermore, he described these silicon arrays are embedded in a gas-impermeable membrane and supported in a flexible polymer structure, providing a route to an inexpensive, efficient, durable, safe, and scalable artificial photosynthetic system. The research talk received many questions from our students and faculty, also stimulated interesting discussions after the lecture.

The Allergan Distinguished Lecturer event was funded by a generous support from the Allergan Foundation. The department are grateful to the Allergan Foundation for the continued support of the annual Distinguished Visiting Lecturer program, which provides our students and faculty with fantastic opportunities to learn and interact with a distinguish researchers whose research has global impacts.





JAMIE GLEASON RECEIVES UNIVERSITY RESEARCH AWARD

By Dr. Douglas McAbee

Jamie Gleason, a biochemistry student and Beckman Scholar, was named the Outstanding Undergraduate Research Student for 2017 by the Office of Research and Sponsored Programs (ORSP). This is a remarkable achievement as it considers student applicants from across the university, evaluating research accomplishments, meeting presentations, and published peer-reviewed papers in scholarly journals. Gleason, a student in Dr. Stephen Mezyk's research lab, received her award at the ORSP awards ceremony in April 2017.

Gleason has worked in Mezyk's lab for three years. Her original intent when she started at CSULB was to become a veterinarian, but she was encouraged by Dr. Mezyk, after being introduced to him by her general chemistry TA, to consider doing research as an undergraduate." After reviewing research programs of a number of faculty, she ended up in the Mezyk lab.

She has worked on a number of projects in the Mezyk lab, all of which relate to the use of advanced oxidation technology to

detoxify organic compounds commonly found in fresh water supplies. Her first project, done in collaboration with the Orange County water district, was to examine hydroxyl radical induced breakdown of chloramines, a family of stable disinfectants in common usage. Gleason's work on this project appears in the journal, *Chemosphere*.

Since then, she has examined the reactivity of common water contaminants with free amino acids as well as nitrosamine degradation by reactive oxygen species. Her current project entails understanding the breakdown of estrogen compounds by reactive oxygen species sufficient to render them biologically inactive. Estrogens are a common contaminant in drinking water, primarily from run-off of animal waste used as farming fertilizers. Gleason measures the efficacy of oxidation (mostly hydroxylations) by loss of growth of human breast cancer cells growth-dependent on estrogens. Her work on this project during the summer of 2017 took her to Western Michigan University, University of Notre Dame

and Valparaiso University. Much of the in vitro cell culture work will be accomplished at CSULB this coming year.

Besides collecting and analyzing experimental data, Gleason's focus this next year will be submitting papers that describe the chloramine and nitrosamine studies, as well as a manuscript describing the estrogen oxidation work. She will graduate this next year with a B.S. biochemistry degree and plans to pursue doctoral studies the following year. She is particularly interested in Ph.D. programs in physical biochemistry and chemical biology.

Gleason has a strong interest in radiation and cancer biology. While she's not decided yet where to go, doctoral programs at University of Washington, Penn, Harvard, Yale, and Queen's University, Belfast, are high on her list, given their programs and faculty research interests.

We congratulate Gleason for her excellent accomplishments and wish her well.

DR. STEPHEN MEZYK RECEIVES UNIVERSITY RESEARCH MENTOR AWARD

BY DR. DOUGLAS McABEE



Dr. Stephen Mezyk, professor of physical chemistry, was named Outstanding Faculty Mentor for Student Engagement in Research, Scholarly and Creative Activity for 2017. The award was conferred by the university Office of Academic Affairs in recognition for Mezyk's exemplary mentoring of research students over the past 18 months. Mezyk was nominated by

department chair, Dr. Chris Brazier. During this period, Mezyk mentored six master's students, two senior thesis honors students and 19 undergraduate research students. This coincided with an extraordinarily productive time of publication and grant-getting: 15 peer-reviewed papers, 67 conference presentations, mostly by students, and receipt of \$3

million in external funding. He also has been involved in student advisement associated with freshman chemistry courses.

We congratulate Mezyk on this deserved recognition by the university and his strong commitment to the success of our students.



LUKAS FUENTES EARNS HIGHEST COLLEGE HONOR

By Dr. Douglas McAbee

Lukas Fuentes, a biochemistry major and a Beckman Scholar, was named the Outstanding Graduate for the College of Natural Sciences and Mathematics for 2017. This is the most prestigious distinction given by the college and the university Alumni Association, and is awarded to the college undergraduate who best demonstrates the highest ideals of the college for academic and research excellence. Lukas graduated in December 2016 with a perfect 4.0 GPA and with Honors in the Major. He worked as a research student in the lab of Dr. Paul Weers, who by virtue of Lukas's award, was named the "Most Valuable Professor" in the college for 2017.

A native of southern California, Mr. Fuentes opted to attend CSULB over other universities because the new science buildings and facilities on campus reflected strong support from the university for science education. He started at CSULB in fall 2012 and chose the biochemistry major because for him it was an ideal mix of biology, chemistry, math, and physics. Originally, he planned to prepare for medical school but became fascinated by the research process showcased in his first year courses. Says Lukas, "I was largely unaware of the world of research until I took BIOL 212 (Introduction to Cell and Molecular Biology) where they actually talked about the experiments that were done to figure out what is now in our textbooks." Deciding to explore research, he joined Dr. Weers' lab during his second year.



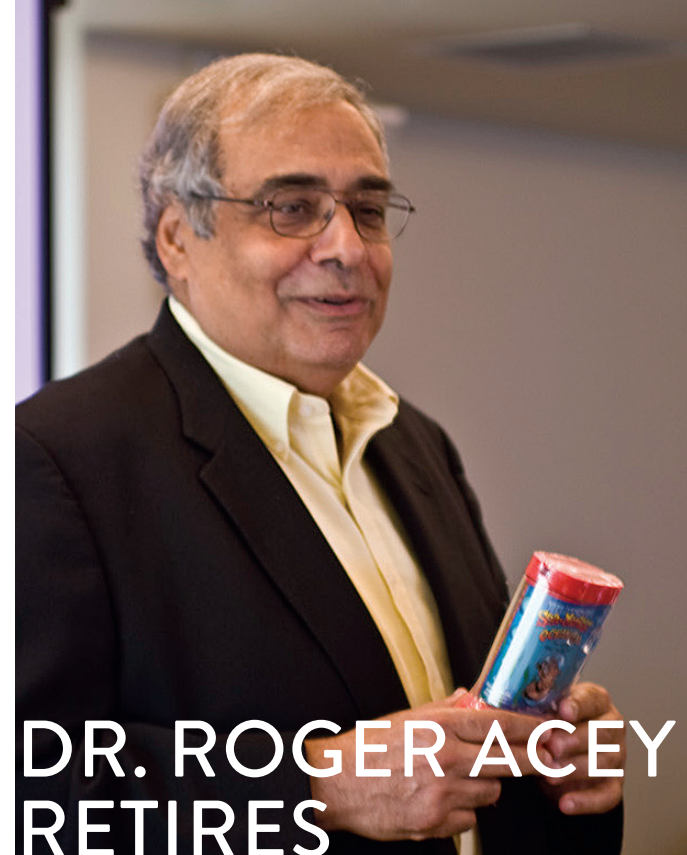
After learning the basics of recombinant protein expression, he began structure-function analysis of apolipoprotein A-I (apoA-I), the main protein component of high-density lipoprotein (HDL) particles (aka, "good cholesterol"), which ferry cholesterol in blood from non-liver tissues for excretion or steroid hormone synthesis. He examined mutants of recombinant apoA-I for protein structure and stability, lipid binding, and oligomerization. These efforts may help push the field towards explaining a three-dimensional structure of apoA-I. In 2015, he was designated a Beckman Scholar, a highly competitive and prestigious award through the college that has provided him a measure of year-round financial support.

In the summer of 2016, Mr. Fuentes received an NIH-supported fellowship to study at the Rockefeller University (New York), working in the lab of Dr. Shixin Liu examining the process of simultaneous replication and transcription of a single DNA molecule, which routinely leads to

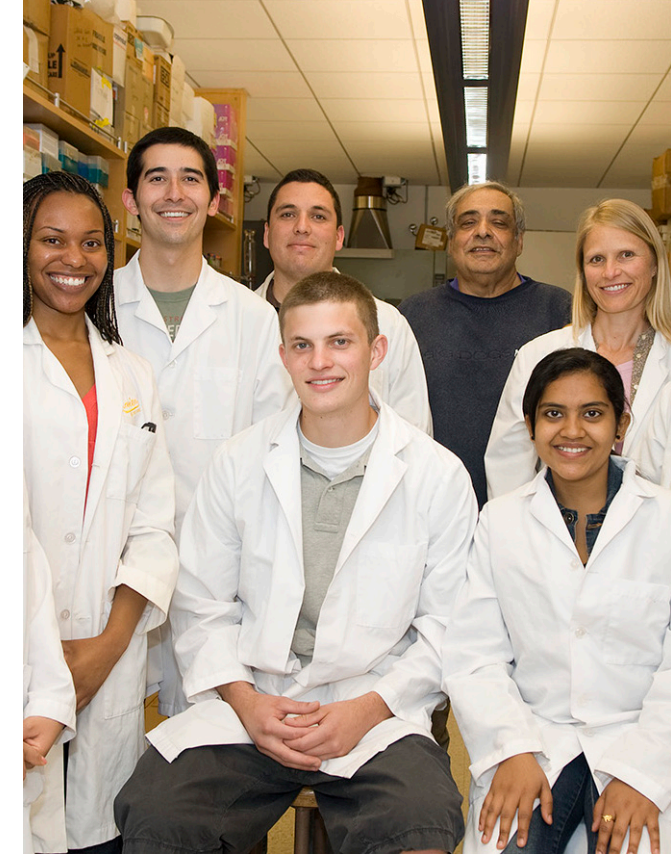
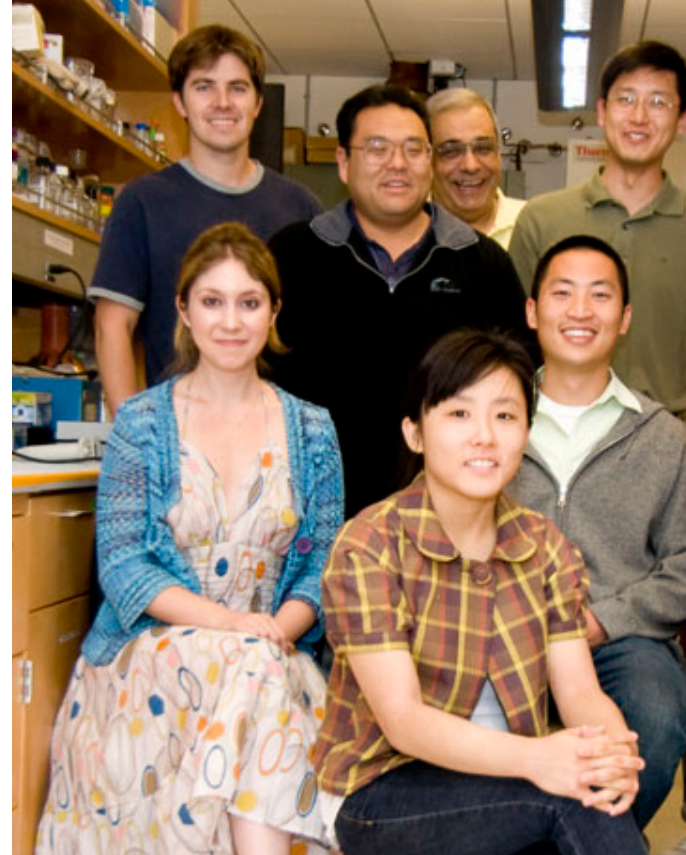
molecular collisions between DNA polymerase and RNA polymerase. Lukas' task was to generate and isolate recombinant components of DNA polymerase for use in these single-molecule studies. This experience was novel in several ways, including working exclusively with post-docs and learning to live in a

very large, crowded, and noisy city. Not surprisingly, his research experiences have had a transformative impact on his view of science, his coursework, and his career goals. This fall, he begins his PhD studies at Yale University in the multi-disciplinary Biological & Biomedical Sciences program within the Biochemistry, Biophysics, and Structural Biology track. He plans to eventually do research and teach in an academic setting.

In his down time, Lukas enjoys a variety of board sports, hiking, water polo, and strategy board games. His main advice to new students? "Time management is key in college. Allocate plenty of time ahead of deadlines so there are no surprises!" Good advice! We wish Lukas all the best in his future endeavors.



DR. ROGER ACEY RETIRES



By Dr. Douglas McAbee



Dr. Roger Acey

Long-time faculty member **Dr. Roger Acey** retired this year after 34 years of service to the department and university. Acey did his undergraduate work at Wayne State University in Detroit, then completed his Ph.D. studies in biochemistry at the Wayne State Medical School in 1977. For the next few years, he stayed on at the medical school as a post-doctoral fellow while lecturing in general chemistry at Wayne County Community College. During his post-doctoral work, he started using *Artemia* as a model system to study development of adrenergic nervous systems.

Wanting to leave the Midwest, he took a chemistry lecturer position at Cal State Bakersfield in 1982. A few months later, he met Dr. Ken Marsi, chair of the chemistry department at CSULB. Impressed, Marsi invited Acey to join the CSULB chemistry department faculty as a lecturer the following year and apply for the biochemistry tenure-track position. Acey was hired and started as an associate professor at CSULB in Fall 1984.

In his first year at CSULB, Acey acquired a grant from the State of California to develop an immunoblotting technique for the early detection of the virus that went on to devastate the citrus industry in Orange County in the 1980s. These funds helped him equip his new lab in the department. His biochemistry colleagues at the time were Drs. Jeff Cohlberg, Margy Merryfield, Les Wynston, and Jack Berry. Annie Bianchino and Izzie Goodman were serving as biochemistry lecturers at the time, as well.

Besides teaching in the biochemistry lecture sequence (CHEM 441A/B), Acey helped in the general chemistry course and biochemistry teaching lab (CHEM 443).

“In those days, we had to cover 15 units of instructional time each semester, so teaching schedules were pretty heavy,” he said. Acey also was assigned to teach Nucleic Acids (CHEM 547), part of a four-course graduate biochemistry program called “*Proteins, Enzymology, Nucleic Acids, and Metabolism*” that was shared by the biochemistry faculty. About that time, the group began to update the biochemistry

teaching lab (CHEM 443) using Dr. Acey’s *Artemia* model system for various purification and analytical procedures. A few years later, an NSF grant enabled the department to purchase equipment and instrumentation for CHEM 443, which used Acey’s *Artemia* system every semester for 25-plus years.

When asked how the department has changed since he first started, Acey said the main difference he sees is the level of research conducted by department faculty.

“Back then, a lot of research done in the department was merely a way to involve students, but the research done now is much more mainstream and competitive, impacting society,” Acey said.

He also noted the department faculty changed dramatically in terms of their increased focus on research, while being excellent instructors and mentors at the same time. Plus, there are more research collaborations between faculty in the department and college than when he started, and the extent and quality of high-end instrumentation has been hugely benefi-

cial. That has included recent university funding for equipping the biochemistry teaching lab.

“It’s had enormous impact on the level of biochemistry instruction we give to our students,” Acey said.

The longtime professor has mentored hundreds of students in his research lab over the years, and he said that he stays in touch with many of them, even meeting occasionally to catch up on their lives. Many of these students went on to M.S. and Ph.D. programs, professional school or pharmaceutical/biotechnology industries. Even though he is officially retired, Acey will retain his current lab space in MLSC until January 2018, and his final three graduate students will be defending their theses this fall. “I’d like to thank all my students for a hell-of-an experience over the years. Working with them has been simply great,” he said.

Acey has patented the technology for metallothionein-based remediation of water contaminated with heavy metals under the company MGP Biotechnologies he founded a few years ago. Recently, he and department colleague Dr. Kensaku Nakayama founded JAL Therapeutics to develop various organophosphate compounds as medications to treat Alzheimer’s disease, and now are collaborating with Dr. Kevin Sinchak (Department of Biological Sciences) to examine the effects of these compounds on amyloid formation and dissolution in Alzheimer’s animal models. The state of both research projects is now mature enough for him to be courting corporate partners to develop and bring to market his bioremediation technologies and Alzheimer disease medications. The onset of his “retirement” is professionally an exciting time.

We will miss him and wish him all the best in his future endeavors.



Standing, left to right: Dr. Tom Maricich, Dr. Michael Schramm, Dr. Young-Seok Shon, Dr. Eric Sorin, Dr. Stephen Mezyk, Dr. Kasha Slowinska, Dr. Hadi Tavassol, Dr. Kensaku Nakayama, Dr. Shahab Derakhshan, Dr. Xanhui Bu

Seated, left to right: Dr. Douglas McAbee, Dr. Deepali Bhandari, Dr. Vasanthi Narayanaswami, Dr. Lijuan Li, Dr. Paul Weers, Dr. Chris Brazier, Dr. Jason Schwans, Dr. Enrico Tapavicza, Dr. Fangyuan Tian, Dr. Eric Martinez

FACULTY REPORTS

DR. DEEPAI BHANDARI

This has been a great year for our group with one of the major achievements being funded by the NIH SCORE SC2 grant to support our research on understanding cancer cell survival in the face of stress. We also published a manuscript in *Current Protocols in Chemical Biology*. My students presented their work at several meetings including the 2017 CSUPERB annual symposium and the 2017 Annual

Meeting of American Society for Biochemistry and Molecular Biology (ASBMB), in addition to the CNSM research symposium. My students also received many awards, honors and scholarships – making me a proud mentor. Undergraduate student May Luong received the Wynston award in Biochemistry and graduated with departmental honors. Graduate students Clariss Limso and Peter Nguyen received the prestigious McAbee-Overstreet Graduate Research Scholarship and the AIC Graduate Biochemistry Award, respectively.

This year was also special because we bid a fond farewell to the graduating students – Andrew Cruz, May Luong and Adam Maddox. Cruz and Maddox will be pursuing doctoral programs at University of Southern California and City of Hope, respectively, starting this fall. May is focusing her energy and effort into

applying to dental schools. These are the first batch of students to graduate from the lab and I wish them the best of luck in their new endeavors. They'll surely be missed!

While the graduating students flew the nest, we welcomed new BUILD scholars Stephanie Leal and Vera Yangildina to the flock this summer. Overall, it was a very productive and great year for us and much of the credit goes to my students. None of this would have been possible without their hard work and long hours spent in the lab generating data. Here's to another successful year and many more. *Go Beach!*

DR. PAUL BUONORA

In Fall 2016, I taught the Catalysis in Organic Chemistry course. While a graduate-level class, roughly a quarter of the students were undergraduates who have since matriculated to Ph.D. programs. The focus of the course was on Asymmetric Catalysis, which provided a more in-depth treatment within the field of catalysis.

Much of my time the past year was spent working on student development activities, for the BUILD, RISE and S-STEM grant programs on campus.

In the NIH-funded, BUILD program, a major effort of my team has been on developing a campus-wide research curriculum to better engage and develop research-career interests and skills in our students. We developed a Research Career Exploration course that will help students identify potential careers and develop and implement career-focused individualized development plans.

Our Interdisciplinary Approaches to Health Disparities course covers health disparities in

communities and how researchers across social/behavioral, physical, biological and engineering fields address and mitigate these issues. In the Introduction to and Advanced Research Methods courses, students learn skills and techniques that will help them successful researchers in their fields, from data keeping and collaborative teamwork to developing and writing fundable research proposals.

In the Scientific Research Communication course, students master the art of accessing the scientific literature and communicating their own science to fellow experts and the general public. All but one of the courses also count as required General Education courses, avoiding adding time to the student's degree, while preparing them for research careers and/or graduate study.

The NH funded, Research Initiative for Scientific Enhancement (RISE) program continues to prepare students to pursue advanced degrees and biomedical research careers. Our undergraduate Fellow, Annabelle Cantu, (Michael Schramm's lab) earned NSF Graduate Research Fellowship Program support to continue her training in graduate school. She began graduate study at UCLA this fall. The RISE program also has a M.S.-to-Ph.D. component to support and train CSULB M.S. candidates to matriculate to Ph.D. study and biomedical research careers.

In the Fall of 2016, the first paper was published from my collaboration with psychology faculty Dustin Thoman, of San Diego State, and Gino Galvez, of CSULB, under the NSF Research in Education and Learning (REAL). The work centers on the importance of cultural connection in underrepresented students' pursuit of science degrees. Further data collection looking at interventions that support student engagement in their STEM courses was completed in Spring 2017 and additional publications are being developed as we analyze the data.

In my traditional organic chemistry lab work, I want to thank those donors who continue to support our research work through their generosity. We are tying up some old projects this year and moving to new projects which benefit from the seed support of our benefactors.

This year one, research group member, Dustin Nguyen, finished his work on the Dynamic Kinetic Resolution project as he moved on to the Chapman University School of Pharmacy to pursue his PharmD. Former research group member Hannah Pham started PharmD studies at the University of New England this fall. In

notes from other former members of the Buonora group, Joe Badillo joined the chemistry department at Seton Hall University this fall.

DR. TOM MARICICH

Because of the renovation of PH2 beginning this fall, I will be continuing my research in MLSC-326. I will be sharing an office with Dr. Jean Lee-Lin in HSCI-346.

Seven undergraduate students (Marie Donato, Kate Korotkova, Ian Fitzpatrick, Robert Crowley, Gurshan Singh, Briana Lee, Brian Vieane, Roland Ernst and Zubin Patel) have worked in my research group this past year. Several have graduated or moved on. Dr. Tang and Faraz Hussain assisted as volunteers. Robert, Zubin, Gurshan and Briana will continue in the fall.

We are continuing our studies of SNAAP® (Substitution Nucleophilic of Acids, Alcohols and Phenols) isopropyl sulfonimidate alkylation reactions.

I have been in touch with alumni from my group (Christos Angeletakis, Brett Kislin and M. H. Khalil) and would be happy to hear from others. My grandson, Dominic (who shadowed my group in Summer 2015), begins at UCLA this fall in chemical engineering. My wife, Suzanne, begins her second year on her novel course through Stanford University. You can email me at tom.maricich@csulb.edu and reach me on my cell phone at (562) 209-4306.

STEPHEN MEZYK

With my research funding established for this past year, being in the middle of two Department of Energy Nuclear Energy University Programs (NEUP) grants, and co-PI on a new NEUP award starting October 2017, the focus of the Mezyk RadKEMTM group was on obtaining our required experimental data, and catching up on compiling these, and past results for journal publication. Both of my NEUP-sponsored postdoctoral fellows, Gregory Horne and Kristian Larsson, were successful in both aspects, in addition to their assisting my regular research students in their varied projects. Over the past 12 months, our lab had 14 peer-reviewed papers published/in-press, one more is currently in review, and we combined for 36 conference presentations at multiple venues across the world.

This was a unique year for us in that we only celebrated the graduation of one undergraduate in the RadKEM group, Nicole Moulton, in December 2016. My continuing MS students are Trevor Reutershan, who is completing his

study on the degradation of absorbed pharmaceuticals (antibiotics, estrogenic steroids, carcinogens) onto dissolved organic matter; Jennifer Castillo, who is investigating chlorine species radical reactions occurring in advanced oxidation process systems; Tin Do, who is measuring bacterial responses to oxidized antibiotics; Chetna Vasudeva, who has started investigating the radical-induced degradation of atrazine pesticides, and recently we welcomed My Luong.

My undergraduate research students are Amir Lechner, who is studying bromine atom aqueous chemistry; Jamie Gleason, who is investigating the removal of estrogenic steroids in wastewaters; Stephanie Arciva, who is synthesizing contaminant alkyl nitrates for future radical studies; Liam Twight, who is studying chloramine quantum yields; Landon Watts, who is working on trichloramine thermal reactions; Anneka Miller, who is studying degradation of buffer systems in nuclear extraction solutions, and Michael Chin, who is looking at radical induced degradation of organophosphorus flame retardants. These students and their multiple projects makes us a busy laboratory, but we all want to get as much done as possible before the large graduation of the lab occurring in Spring 2018.

The RadKEMTM group also continued to obtain scholarships this year. Jamie received the CSULB Academic Affairs Award for Outstanding Undergraduate Research Student as well as becoming my latest national merit Arnold and Mabel Beckman Scholar, and Nicole received the Rhodes award for 2016/2017 from our department. Jamie was a MARC scholar before receiving her Beckman award, Michael became a MARC scholar this year, Stephanie is a RISE scholar, and Landon is a BUILD associate. I am extremely proud of all my students for their accomplishments and their assistance in getting my research done! Their successes also helped me achieve an award this past year – the CSULB Academic Affairs Award for Outstanding Faculty Mentor for Student Engagement in Research, Scholarly and Creative Activity.

In terms of teaching, this was also a busy year for me. My focus was in General Chemistry lecture and Physical Chemistry lab during fall 2016, but I was only coordinating the CHEM111B course in Spring 2017, giving me time to write papers. Next fall, I will again



Dr. Deepali Bhandari's research group.



Dr. Vasanthy Narayanaswami's research group.

coordinate General Chemistry, but in addition I will be teaching Physical Chemistry lecture, Physical Chemistry laboratory, and a graduate class in Kinetics and Dynamics. I recognize that I'm not going to get much research done in those four months so am trying to do as much as possible now. However, that heavy fall load will again leave me the spring to focus on writing renewal grants.

So although the time always flies by quickly, the RadKEMTM group continues to be busy and productive, and as always we are looking forward to another successful year at CSULB!

DR. VASANTHY NARAYANASWAMI

The Vas lab saw an exodus of MS Biochemistry graduate students last year, with five students presenting their thesis and moving on to explore different avenues. Mark Lek defended his thesis in November 2016, published his work in *PLOS One* in 2017 and took a job as a laboratory associate at Clariant Client Resources/NeoGenomics Laboratories.

Skylar Chuang did his thesis presentation in spring 2017, submitted his work for publication in the *International Journal of Nanomedicine* and joined the Nanosciences Ph.D. program at Rutgers University, starting this fall. Skylar and Siobanth Cruz jointly presented their work on *Transcellular Transport of HDL Bearing Gold Nanoparticles Across the Blood Brain Barrier* at the 2017 Arteriosclerosis, Thrombosis and Vascular Biology (ATVB)/Peripheral Vascular Disease Scientific Sessions of the American Heart Association in Minneapolis, Minnesota.

Kai-Han Tun generated a novel hybrid of apoE3

and apoE4 and defended his thesis in spring 2017 as well. His work is of great relevance to heterozygous individuals bearing both these isoforms (a significant fraction of the population) and bears direct implications in cardiovascular and Alzheimer's disease.

Alexandra Donovan completed her first year in the Neuroscience PhD graduate program at USC. She defended her thesis in spring 2017.

Mary Kehinde Taiwo will be starting her Ph.D. program at the University of Calgary, Alberta, Canada this fall after successfully defending her thesis presentation in August 2017. Canada: 1, US: 0!

Lastly, Noor Bala, obtained several offers for research positions and finally decided to join Amgen Inc. in San Francisco. She received the CSUPERB Spring 2017 Student Travel Award, which allowed her to present her results at the 29th American Society for Biochemistry and Molecular Biology 2017 Annual Meeting, Chicago in an Oral Spotlight Session and as a poster. She hopes to do her thesis presentation soon.

We wish them the very best in all their future endeavors. The void they left in the lab was quickly filled by six undergraduate students (Devan Abhari, Micahel Hakimi, Diana Hernandez, Tina Nguyen, Vien Tran, Grace Yomogida) and one graduate student (Muhammad Abeer.)

The academic year closed with me being named as Fellow of the American Heart Association (FAHA) in May 2017. This career achievement national award is an honorary title conferred by the American Heart Association via the ATVB Council and is reserved for scientists deeply

committed to the mission and goals of the AHA. The title signifies meritorious contributions in the fields of ATVB, significant volunteer service and involvement in leadership activities at the national, council and local levels.

DR. JASON SCHWANS

This past year was an interesting and productive time in our lab. Nathan Alade and Chris Khoury defended their theses for their MS Biochemistry degrees. Karlo Artiga, Nicholas Nieto, Sheila Panez, Naomie Ranatunge, and Kevin Whitney graduated and are pursuing programs in graduate school and medical school.

Overall, the lab continued our investigation of enzyme function. It was rewarding to see several projects result in publications and other projects that are nearing points for publication. Briefly, we are conducting studies to investigate the catalytic role of second-shell residues, synthesizing and evaluating cholinesterase inhibitors, and using enzymatic and synthetic methods to generate unnatural amino acids.

Enzymes are more than a collection of the few residues directly involved in catalytic reactions (such as general acids/bases), but are much larger. While it is known that groups surrounding the active site are involved in positioning active site residues, the relative catalytic importance of these residues is not well understood. Tim Chang, Heejin Park, Azriel Coronel and Khoury are using the enzyme triosephosphate isomerase and a battery of functional and structural approaches to evaluate the catalytic role of a conserved second shell residue. Alade used similar approaches to evaluate the catalytic role of a conserved residue near the active site in RNase A.

Our continued collaboration with Drs. Kensaku Nakayama and Eric Sorin investigating inhibition of cholinesterases was extremely rewarding. Inhibition of butyrylcholinesterase has been suggested as a possible approach to mitigate the effects of neurodegenerative diseases such as Alzheimer's disease. We recently identified amino acid compounds as potent and specific cholinesterase inhibitors. Building on the initial results of Jennifer Ramirez and Jeannette Gonzales, other members of the lab, including Karlo Artiga, Ranatunge, Panez, and Alex Viera are exploring the second generation of inhibitors. In the exciting collaboration with Nakayama, we are evaluating organophosphates as cholinesterase inhibitors and Helen Dinh, Nieto, Phillippe Ly, and Whitney made great progress in identifying several highly potent inhibitors. In a related study, Alexa Novales is using



Dr. Jason Schwann and his research group.

cholinesterases to evaluate the effects of cosolvent on protein structure to better understand protein stability. We are also evaluating another class of compounds, coumarins, as cholinesterase inhibitors and Lee Macklin has made great progress in the challenging synthesis of this class of compounds. All of this work is done in collaboration with Sorin's computational modeling expertise to help understand inhibitor binding site(s) and to help guide the design of new inhibitors.

Another continual goal in the lab is the synthesis of unnatural amino acids for use in biochemical studies. Noel Chau made great progress in our efforts to synthesize a series of fluoro-substituted tyrosine analogs, and Christian Loo is working on an enzymatic approach to synthesize a naphthyl amino acid analog that can be used as a fluorescent probe.

In summary, it was a delightful year working with such a talented group and the enthusiasm and interest in the lab is continually impressive. This was complimented with another exciting year in the classroom in the organic chemistry series and in my involvement in the biochemistry class for first-year graduate students. I look forward to more discoveries in the coming year.

DR. YOUNG SHON

Our research continued on the synthesis and application of nanoparticle-based materials with applications in colloidal nanoparticle catalysis, enzyme site mimics, and multifunctional bio-nanohybrids. Two funded projects, SCORE-SC₃ and Keck Energy Materials Program, that I serve as a PI, also continued to be productive. Our group published three research papers (three others under review) this past year. May S Maung (M.S., May 2016) and Khin Aye San (M.S., May 2017) are the first authors of the papers published in *Colloid and Surfaces A* and *ACS Applied Materials & Interfaces*, respectively. Vivian Chen (B.S., May

2016) first-authored a paper published in *New Journal of Chemistry*. Former students - Tommy Dinh, Christian Salazar, Vivian Chen, and Hanqing Pan - also are listed as co-authors in these papers.

Several graduate students completed their degree programs the past few months. Khin Aye San successfully completed her MS thesis in May and will join the Department of Chemistry at UC San Diego for her Ph.D. studies. Ting-An Chen successfully defended her thesis in July and will continue her Ph.D. training at Georgetown University. She also completed her first manuscript which is currently under review in *Catalysis Science and Technology* - the Royal Society of Chemistry journal. Serena Low also finished her MS thesis defense in June and is working on completing her two manuscripts for publications. Serena will continue to work in our research lab as a research associate.

Skylar Chuang who I have co-advised with Dr. Vasanthy Narayanaswami, also completed his degree program in May and headed to Rutgers



Dr. Eric Sorin and his research group.

University to continue his training as a Ph.D. student. His manuscript submitted to the *International Journal of Nanomedicine* is accepted for publication. Kevin Vargas, a new graduate student, has started working on the lipid-nanoparticle catalysis project this summer. Undergraduate students, Sylvia Wedderburn (KEMP summer fellow), James Park (KEMP summer fellow), Hiep Nguyen (KEMP summer fellow), Ashley "Eun Ae" Park (BUILD scholar), Carlos Garcia, Bavly Ibrahim, Dominick Ortega, and Linda Lam 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.

DR. ERIC SORIN/SORIN LAB

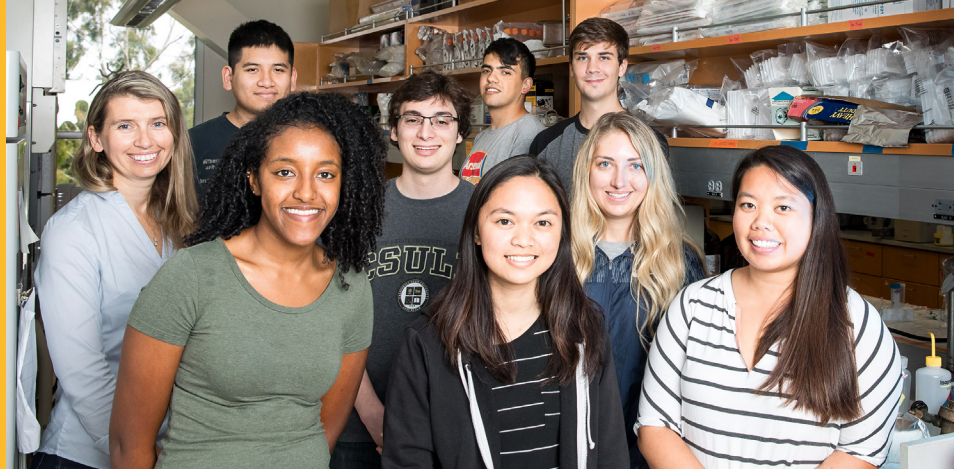
The 2016-17 academic year was a hectic one for my students and I. In fall I had the opportunity to develop and offer our new BUILD-initiated course *NSCI 496 Advanced Biomedical Research Methods* for the first time, which afforded me a unique teaching experience with 11 BUILD/RISE students from two colleges and six different majors and, though I put these students "through the ringer" to prepare them, those in this cohort who enter advanced degree programs in fall are undoubtedly prepared to succeed. In spring I began my first residence in our General Chemistry sequence, teaching CHEM 111B (my first lower division course @ CSULB) for the first time. With over 175 students from a myriad of majors, I found the experience demanding but also exhilarating, and I was very impressed with the enthusiasm our lower division students have for their studies. Indeed, I recruited new Sorin Lab researchers Christine Chung, Kevin Trinh, and Thomas Hoke from that class!

The Sorin Lab published three research

articles early in 2017, including a collaborative article with the Nakayama and Schwans Labs, and these articles included the effort of two Sorin Lab graduate students and nine current and former Sorin Lab undergraduates. As Chair of our College Council, I also served as a member of the search committee for our new CNSM Dean this spring, and maintaining our lab's research momentum was thus very tricky, but my current crop of students are already in the process of composing a new manuscript (methods/results of modeling apolipoproteins) and an educational article describing an interdisciplinary computational lab exercise to study drug design/molecular recognition in a wide range of applicable fields/courses, both of which we expect to submit in the summer of 2017.

I would like to commend continuing Sorin Lab students who have earned numerous awards, scholarships, and research opportunities. MS Computer Science major Vardo Barsegyan earned a paid internship at Panasonic and received both a CSULB Summer Research Stipend and a 2017 CoE Engineering Alumni Scholarship. BS Chemical Engineering junior Angela Choy received a 2017 Engineering Endowed Fund Scholarship. BS Chemical Engineering senior Nick Humphrey received a CSULB Summer Research Stipend, earned an opportunity to work part-time in the Goddard Lab at CalTech this summer, and will be presenting his work from that effort and our lab at this year's national ACS conference before applying for Ph.D. programs in physical/computational chemistry this fall. I look forward to continued productivity from this group as they complete their degree programs!

While I am grateful to have lost only a few of my research students this year, numerous Sorin Lab alums are now moving on to pursue a variety of graduate programs. Recent BS Biochemistry/BA Physics graduate Yessica Gomez, who first-authored our recent article in will begin her Ph.D. in Biophysics/Bioinformatics at UC San Francisco this fall and her partner-in-crime, BS Biochemistry alumnus and co-author Dakota Rochelle, begins the D.D.S. program there this fall as well. BA Chemistry graduate Mariel Sanchez will begin the teaching credentials program here at The Beach in fall, BS Biochemistry alumnus Sean McCoy is in the process of entering the nursing program at Azusa Pacific, and BS Biochemistry alumna Analisa Garcia has just finished her first year of pharmacy school at USC. I have no doubt that this cohort of Sorin Lab researchers will be highly successful in



Dr. Slowinska's research group.

their graduate studies and future careers, and I wish them the best!

DR. HADI TAVASSOL

My first year at Cal State Long Beach has been exciting and rewarding. The highlight has been the addition of seven undergraduate students to the group. We also have started a collaboration with Derakhshan lab, where three undergraduate and one graduate students are working on complex oxide materials for energy applications. We also welcomed two visiting students over the summer.

Our group uses chemistry and materials science to study the energy cycle of our planet, both biologically and industrially, and develop devices for a sustainable production and consumption of energy. Our team, which had been working on design and setup of our experimental methods, has started several projects. Our work has resulted in five poster presentations in local and national conferences. We have also been active in submitting several grant proposals, and received two internal grants from College of Natural Science and Mathematics at CSULB. We urge you to visit us at <http://web.csulb.edu/~htavasso> for more information about our work and our team. We are excited about the coming year, as we will welcome new members and share our new findings with the scientific community.



Dr. Hadi Tavassol's research group.

DR. FANGYUAN TIAN

It has been an exciting and busy year for the Tian Lab. We have achieved several accomplishments, starting with having our first paper with only CSULB students published. We also saw senior undergraduate student, Melissa Yang, present her research in the 253rd ACS meeting and several other students receive prestigious national and university level awards. Those included the AIC Undergraduate Award in Chemistry (Hadiyah Fattal), the Kenneth L. Marsi Scholarship (Nicholas Pavlakovich), and the 2017 CSULB Student Summer Research Award (Lester Carachure). In addition, Tian received seeding grants, including BUILD RSG and SEG, HOGAR mentor grant and CNSM SFG, to keep the lab running. This next year, we are looking forward to working happily in the lab.

DR. PAUL WEERS

The students of the Weers research group had a successful year, with students, who were accepted into Ph.D. programs -- Lukas Fuentes (Yale), Heajin Hong (UC Riverside), Kriti Shah (UC Riverside) and Tillini Wijeratne (UC Santa Cruz). Jesse Tran was admitted to the Maurice H. Kornberg School of Dentistry at Temple University in Philadelphia.

Fuentes was among the award winners last year, earning the CNSM Outstanding Graduate,

while Rachel Elena received the CNSM Outstanding Thesis Award in Chemistry & Biochemistry. Department awards were given to Fuentes (American Institute of Chemists Baccalaureate Award), James Horn (Michael Monohan Memorial Summer Research Fellowship), Bahareh Haeri (Robert B. Henderson Memorial Scholarship), and Wijeratne (Departmental Undergraduate Honors).

Funded by a SC3 grant from the National Institutes of Health, the research group investigated the antimicrobial properties and lipid binding interaction of apolipoproteins, which play a critical role in lipid transport. This year we were able to publish our work with chimera proteins, swapping or adding apolipoprotein domains of human apoA-I, apoE, and insect apoLp-III. This work started several years ago and is collaborative effort with colleague Dr. Vasanthy Narayanaswami to better understand the domain organization of apolipoproteins.

Our group published five papers, three on chimera proteins, and two with Dr. Robert Ryan (University of Nevada, Reno) for which we carried out secondary structure analysis. Several members earned authorship on these peer reviewed publications, including Nejiuwa Ibe (MARC scholar), Daniel Sallee (MARC scholar), Fuentes (Beckman scholar), Jesse Tran, Wendy Beck, Horn and Elena.

We attended several meetings to present our research progress:

Annual Biomedical Research Conference for Minority Students, Tampa, FL (Lukas Fuentes, received award for his poster presentation)

CSU Annual Biotechnology Symposium, Santa Clara (Bahareh Haeri, Leesa Kakutani (BUILD scholar), Calvin Voong, and Tilini Wijeratne)

Biophysical Society, New Orleans, LA (Paul Weers); **American Society for Biochemistry and Molecular Biology, Boston, MA** (Bahareh Haeri, Leesa Kakutani)

Atherosclerosis, Thrombosis and Vascular Biology, Minneapolis, MN (Heajin Hong, Paul Weers)

We welcome several new members to the lab and hope that we have another productive year. These are Nairuti Patel (MS Biochemistry), Melissa Saluta, Angela Tran (BUILD Scholar), Jamie Solorsa, and Rohin Basi (BUILD Associate).

2016-17 M.S. THESES

MASTER OF SCIENCE CHEMISTRY

OMAR BECERRA

Thesis: *Synthesis and structural characterization of dinitrosyl iron complexes with (bis)phosphine ligands.*

Advisor: Dr. Lijuan Li

TING-AN CHEN

Thesis: *Selective Hydrogenation of Conjugated and Cumulated Dienes Using Partially Poisoned Palladium Nanoparticle Catalyst.*

Advisor: Dr. Young Shon

ARIANA GRACE GILMORE

Thesis: *Quantification of Oxidative Reaction Efficiencies for Hydroxyl Radical Oxidized Antibiotics*

Advisor: Dr. Steven Mezyk

EDWARD TRI NGUYEN

Thesis: *Synthetic Design of Homochiral Metal-Organic Frameworks*

Advisor: Dr. Xianhui Bu

KHIN AYE SAN

Thesis: *Synthesis of Alkanethiolate-Capped Metal Nanoparticles Using Alkyl Thiosulfate Ligand Precursors for Selective Catalytic Reactions*

Advisor: Dr. Young Shon

SERENA SIN MAN LOW

Thesis: *Molecular Interactions Between Pre-formed Ligand-capped Gold Nanoparticles and Two Dimensional Atomic Layered Materials*

Advisor: Dr. Young Shon

MASTER OF SCIENCE BIOCHEMISTRY

AYOADE NATHANIEL ALADE

Thesis: *Investigating the Catalytic Role of Lysine Residue 41 in Pancreatic Ribonuclease A*

Advisor: Dr. Jason Schwans

SKYLAR CHUANG

Thesis: *Biomimetic High Density Lipoprotein Gold Nanoparticles Reconstituted with Apolipoprotein E3: Potential Photothermal Systems for Targeted Brain Delivery*

Advisor: Dr. Vasanthy Narayanaswami

ALEXANDRA DONOVAN

Thesis: *Comparative Biophysical Analysis of ApoE3 and ApoE4: A Mechanistic Investigation*

Advisor: Dr. Vasanthy Narayanaswami

HEA JIN HONG

Thesis: *Acrolein Modification of Human Apolipoprotein A-I Impairs Binding to Phosphatidylglycerol and Lipopolysaccharide of Gram-Negative Bacteria.*

Advisor: Dr. Paul Weers

CHRIS KHOURY

Thesis: *Evaluating the Structural Role of a Conserved Glutamate Residue in Triose-phosphate Isomerase from Trypanosoma brucei brucei*

Advisor: Dr. Jason Schwans

MARK LEK

Thesis: *Design of Novel Chimeras Provides Insight into Structure/Function Activity of Apolipoprotein E3 and Apolipoprotein AI*

Advisor: Dr. Vasanthy Narayanaswami

ALEX LYZLOV

Thesis: *In vivo efficacy of lanthanum carbonate on intestinal phosphorus absorption in stage five chronic kidney disease patients undergoing peritoneal dialysis.*

Advisors: Dr. Joel D. Kopple M.D./Dr. Paul Weers

ADAM L. MADDOX

Thesis: *Secondary Structure Analysis of the C-Terminus of Ga-Interacting Vesicle Associated Protein Using Circular Dichroism Spectroscopy*

Advisor: Dr. Deepali Bhandari

ELISE B. NGUYEN

Thesis: *Electrical Stimulation of Human Dermal Fibroblasts and the Quantification of Collagen, Collagenase, and Elastin*

Advisor: Dr. Katarzyna Slowinska

KRITI SHAH

Thesis: *Role of Lysine Residues of Locusta migratoria Apolipoprotein III in Structure and Function.*

Advisor: Dr. Paul Weers

KEHINDE MARY TAIWO

Thesis: *Determining the Conformation of Apolipoprotein E4 on Spherical Reconstituted High-Density Lipoprotein by Crosslinking and Fluorescence Spectroscopy*

Advisor: Dr. Vasanthy Narayanaswami

KAI-HAN TU

Thesis: *Structural and Functional Analysis of Apolipoprotein E3/E4 Hybrids.*

Advisor: Vasanthy Narayanaswami

2016-17 RESEARCH PUBLICATIONS FOR DEPARTMENT FACULTY

DR. DEEPALI BHANDARI

Ghosh P, Aznar N, Swanson L, Lo I-C, Lopez-Sanchez I, Ear J, Rohena C, Kalogriopoulos N, Joosen L, Dunkel Y, Sun N, Nguyen P, Bhandari D. 2016. Biochemical, Biophysical and Cellular Techniques to Study the Guanine nucleotide Exchange Factor, GIV/Girdin. *Curr Protoc Chem Biol.* 8(4): 265-298.

DR. XIANHUI BU

Wu, Xue-Qian; Huang, Dan-Dan; Zhou, Zhi-Hang; Dong, Wen-Wen; Wu, Ya-Pan; Zhao, Jun; Li, Dong-Sheng; Zhang, Qichun; Bu, Xianhui, (2017) Ag-NPs embedded in two novel Zn₃/Zn₅-cluster-based metal-organic frameworks for catalytic reduction of 2/3/4-nitrophenol, *Dalton Trans*, 46, 2430-2438.

Zhai, Quan-Guo; Bu, Xianhui; Zhao, Xiang; Li, Dong-Sheng; Feng, Pingyun, (2017) Pore Space Partition in Metal-Organic Frameworks, *Acc Chem Res*, 50, 407-417.

Wu, Y.; Xu, G.; Dong, W.; Zhao, J.; Li, D.; Zhang, J.; Bu, X., (2017) Anionic Lanthanide MOFs as a Platform for Iron-Selective Sensing, Systematic Color Tuning, and Efficient Nanoparticle Catalysis, *Inorg Chem*, 56, 1402-1411.

Liu, Y.; Ye, K.; Wang, Y.; Zhang, Q.; Bu, X.; Feng, P., (2017) Multitopic Ligand Directed Assembly of Low-Dimensional Metal-Chalcogenide Organic Frameworks, *Dalton Trans*, 46, 1481-1486.

Lin, J.; Hu, D.; Zhang, Q.; Li, D-S; Wu, T.; Bu, X.; Feng, P., (2016) Improving Photoluminescence Emission Efficiency of Nanocluster Based Materials by In-Situ Doping Synthetic Strategy, *J Phys Chem C*, 120, 29390-29396.

Yang, H.; Luo, M.; Luo, L.; Wang, H.; Hu, D.; Lin, J.; Wang, X.; Wang, Y.; Wang, S.; Bu, X.; Feng, P., Wu, T., (2016) Highly Selective and Rapid Uptake of Radionuclide Cesium Based on Robust Zeolitic Chalcogenide via Stepwise Ion-Exchange Strategy, *Chem Mater*, 26, 8774-8780.

Zhai, Q-G; Bu, X.; Mao, C.; Zhao, X.; Daemen, L.; Cheng, Y.; Ramirez-Cuesta, A. J.; Feng, P., (2016) An Ultra-Tunable Platform for Molecular Engineering of High-Performance Crystalline Porous Materials, *Nat Commun*, 7, 13645. DOI: 10.1038/ncomms13645.

Zhao, Xiang; Bu, Xianhui; Nguyen, Edward; Zhai, Quan-Guo; Mao, Chengyu; Feng, Pingyun, (2016)

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Li, K., Han, M., Chen, R., Li, S. L., Xie, S. L., Mao, C., Bu, X., Cao, X. L., Dong, L. Z., Feng, P., Lan, Y. Q., (2016) Hexagonal@Cubic CdS Core@Shell Nanorod Photocatalyst for Highly Active Production of H₂ with Unprecedented Stability, *Adv Mater*, 28, 8906-8911.

Sun, Yan-Qiong; Wan, Fang; Li, Xin-Xiong; Lin, Jian; Wu, Tao; Zheng, Shou-Tian; Bu, Xianhui, (2016) A lanthanide complex for metal encapsulations and anion exchanges, *Chem Commun*, 52, 10125-10128.

DR. PAUL BUONORA

Jackson MC, Galvez G, Landa I, Buonora P, Thoman DB (2016) Science That Matters: The Importance of a Cultural Connection in Underrepresented Students' Science Pursuit. *CBE Life Sci Edu.* 15:ar42, 1-12

DR. SHAHAB DERAKHSHAN

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Chen V, Pan H, Jacobs R, Derakhshan S, Shon YS, (2017), Influence of graphene oxide supports on solution-phase catalysis of thiolate-protected palladium nanoparticles in water, *New J Chem*, 41, 177-183.

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DR. LIJUAN LI
Lijuan Li and Linlin Li, "Recent Advances in Multi-nuclear Metal Nitrosyl Complexes", *Coord. Chem. Rev.* 306, 678-700 (2016).

DR. STEPHEN MEZYK

McKay, G.; Couch, K.D.; Mezyk, S.P.; Rosario- Ortiz, F.L., Investigation of the Coupled Effects of Molecular Weight and Charge Transfer Interactions on the Optical and Photochemical Properties of Dissolved Organic Matter, *Env. Sci. Technol.*, 50(15), 8093-8102, (2016).

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Mezyk, S.P.; Cullen, T.D.; Rickman, K.A.; Mincher, B.J., The reactivity of nitrate radical (NO₃) in aqueous and organic solution. in *Int. J. Chem. Kinet.*, 49, 635-642, (2017).

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autoreduction of hexavalent americium in aqueous nitric acid. *Inorg. Chem.* 56, 8295-8301, (2017).

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DR. KEN NAKAYAMA

Nakayama K*, Schwans JP*, Sorin EJ*, Tran T, Gonzalez J, Arteaga E, McCoy S, Alvarado W. (2017) Synthesis, biochemical evaluation, and molecular modeling studies of aryl and arylalkyl di-n-butyl phosphates, effective butyrylcholinesterase inhibitors. *Bioorg Med Chem* 25, 3171-3181.

DR. VASANTHY NARAYANASWAMI

Lek MT, Cruz S, Ibe NU, Beck WHJ, Bielicki JK, Weers PMM, Narayanaswami V., (2017) Swapping the N- and C-terminal Domains of Apolipoprotein E3 and AI Reveals New Insights into their Structure/Activity Relationship. *PLOS One* 12, e0178346.

Horn JVC, Ellena RA, Tran JJ, Beck WHJ, Narayanaswami V. Weers PMM., (2017) Transfer of C-terminal residues of human apolipoprotein A-I to insect apolipoprotein III creates a two-domain chimeric protein with enhanced lipid binding activity. *Biochim. Biophys. Acta (Biomembranes)* 1859, 1317-1325.

Skylar T. Chuang, Young-Seok Shon, Vasanthi Narayanaswami (2017) Apolipoprotein E3 Mediated Cellular Uptake of Reconstituted High Density Lipoprotein Bearing Core 3, 10, or 17 nm Hydrophobic Gold Nanoparticles. *International Journal of Nanomedicine* (In Press)

DR. MICHAEL SCHRAMM

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Vasdev R, Preston D, Scottwell S, Brooks H, Crowley JD, Schramm MP., (2016) Oxidatively locked [Co₂L₃]⁶⁺ cylinders derived from bis(bidentate) 2-pyridyl-1,2,3-triazole "click" ligands: synthesis, stability and antimicrobial studies. *Molecules* 21: 1548.

Collins JL, Fujii A, Roshandel S, To CA, Schramm MP., (2017) Calixarene-mediated liquid membrane transport of choline conjugates 3: The effect of handle variation on neurotransmitter transport, *Bioorgan Med Chem Lett*, 27:2953-2956.

DR. JASON SCHWANS

Gonzalez J, Ramirez J, Schwans JP., (2016) Evaluating Fmoc-amino acids as selective inhibitors of butyrylcholinesterase. *Amino Acids* 48, 2755-2763.

Corpus N, Schwans JP., (2017) Generation of a cysteine sulfinic acid analog for incorporation in peptides using solid phase peptide synthesis. *Bioorg Med Chem Lett* 27, 4510-4514.

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DR. YOUNG-SEOK SHON

Khin AS, Chen V, Shon YS. (2017) Preparation of Partially Poisoned Alkanethiolate-Capped Platinum nanoparticles for Selective Hydrogenation of Activated Terminal Alkynes. *ACS Appl. Mater. Interfaces* 9, 9823-9832.

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Chuang S, Shon YS, Narayanaswami V. (2017) Apolipoprotein E3 Mediated Cellular Uptake of Reconstituted High Density Lipoprotein Bearing Core 3, 10, or 17 nm Hydrophobic Gold Nanoparticles. *Int J Nanomedicine*, 12, in press.

Chen TA, Shon YS. (2017) Alkanethioate-Capped Palladium Nanoparticle for Selective Catalytic Hydrogenation of Dienes and Trienes. *Catal. Sci. Technol.* 18, in press.

Maung, MS, Shon, YS. (2017) Effects of Noncovalent Interactions on the Catalytic Activity of Unsupported Colloidal Palladium Nanoparticles Stabilized with Thiolate Ligands. *J. Phys. Chem. C* 121, in press.

DR. KASHA SLOWINSKA

K. Slowinska (2017) Cross-linked collagen gels using gold nanoparticles, in *Methods in Molecular Biology series* (Springer), edited by A. Udit "Protein Scaffolds: Design, Synthesis, and Applications" (in press)

L. Ayalew, J. Acuna, S.F. Urfano, C. Morfin, A. Sablan, M. Oh, A. Gamboa, K. Slowinska* (2017) Conjugation of Paclitaxel to Hybrid Peptide Carrier and Biological Evaluation in Jurkat and A549 Cancer Cell Lines, *ACS Medicinal Chemistry Letters*, 8, 814-819

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DR. ERIC SORIN

Nguyen KKQ, Gomez JK, Bakhom M, Radcliffe A, La P, Rochelle D, Lee JW, Sorin EJ, (2017) Ensemble simulations: folding, unfolding and misfolding of a high-efficiency frameshifting RNA pseudoknot, *Nucleic Acids Res* 45, doi:10.1093/nar/gkx012.

Sorin EJ, Alvarado W, Cao S, Radcliffe A, La P, An Y, (2017) Ensemble Molecular Dynamics of a Protein-Ligand Complex: Residual Inhibitor Entropy Enhances Drug Potency in Butyrylcholinesterase, *Bioenergetics* 6(1), DOI:10.4172/2167-7662.1000145.

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DR. HADI TAVASSOL

Tavassol, H.; Jones, E. M. C.; Sottos, N. R.; Gewirth, A. A. *Nat Mater* 2016, 15 (11), 1182-1187.

Lee, D.-G.; Kim, S. H.; Joo, S. H.; Ji, H.-I.; Tavassol, H.; Jeon, Y.; Choi, S.; Lee, M.-H.; Kim, C.; Kwak, S. K.; Kim, G.; Song, H.-K. *Energy and Environmental Science* 2017, 10 (2), 523-527.

DR. ENRICO TAPAVICZA

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DR. FANGYUAN TIAN

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DR. PAUL WEERS

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ALUMNI GIVING MAKES A DIFFERENCE! YOUR DONATIONS AT WORK



DR. JOANN TREJO, professor of pharmacology at UC San Diego gave a seminar in April 2017 detailing her recent work on protease-activated receptor signaling, particularly related to events in vascular inflammation and endothelial cell dysfunction. The signaling contributes to pathological conditions, such as cardiovascular disease and cancer progression. *Trejo's visit was made possible through individual and corporate donations to the department.*

YOU CAN MAKE THE DIFFERENCE IN 2017-18!

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



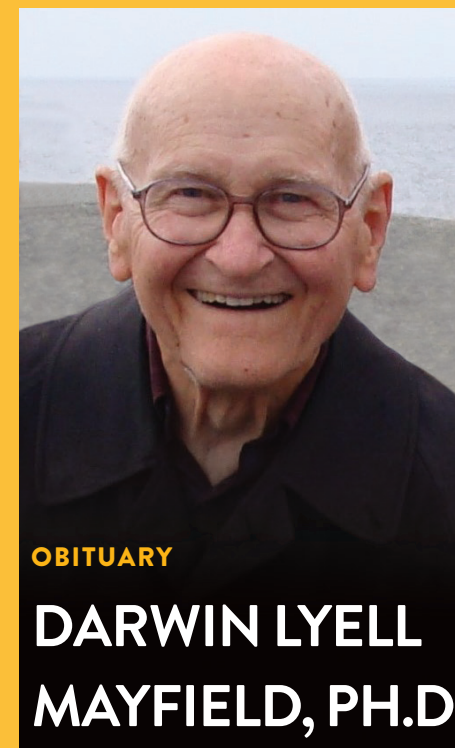
29
STUDENT TRAVEL
RESEARCH AWARDS

25
DEPARTMENTAL HONORS
AND SPECIAL AWARDS

7
SCHOLARSHIP AWARDS

4
SUMMER RESEARCH AWARDS

25
SEMINARS BY DISTINGUISHED
VISITING SCIENTISTS IN
FALL 2016 AND SPRING 2017
FROM PREEMINENT INSTITUTIONS
AS UCSD, CALTECH,
UNIVERSITY OF PITTSBURGH,
UCLA, AND OTHERS.



OBITUARY

DARWIN LYELL MAYFIELD, PH.D

Darwin Lyell Mayfield, Ph.D., died peacefully at his home in Pasadena, California, on April 29, 2017, at age 97.

Darwin was born on February 22, 1920, in Somerset, Kentucky, to Samuel and Flora Mayfield. The family lived in Berea, Kentucky, until Darwin was 12, after which they moved around the country during the Great Depression, living in Oregon and Montana before finally settling in Bowling Green, Ohio, where Darwin graduated from high school. Darwin continued his education at Bowling Green State University, earning a B.S. in chemistry.

During World War II, Darwin pursued graduate studies in chemistry at the University of Chicago, fulfilling his World War II service on matters related to the Manhattan Project. While at Chicago, he met and fell in love with fellow University of Chicago graduate student Norma Louise Grill. The couple were married in October 1945 and began a lifetime of love, laughter, and adventurous world travel together, beginning with a trip to Europe shortly after the war.

Following the war, Darwin completed his Ph.D. in chemistry at the University of Wisconsin, Madison. He and Norma then moved to Moscow, Idaho, where Darwin taught chemistry at the University of Idaho, Moscow, until 1955, when both he and Norma were awarded Fulbright lectureships to teach in Bangkok, Thailand. Their first child, Diane, was born during their year there.

Following their year in Bangkok, Darwin and Norma returned to the U.S., settling in Long Beach, California, where their second child, Nancy, was born. Here, Darwin taught organic chemistry at California State University, Long Beach, from 1956 until his retirement in 1990 at age 70. During his tenure at CSULB, he also served as chemistry department chair and as Director of Research. In the summers, Darwin took his family on many exciting trips across the United States and abroad. Longer adventures included a sabbatical year in France, where he conducted research at a scientific research center in Paris, and another in Egypt, where he taught chemistry at Ain Shams University in Cairo on his second Fulbright lectureship.

Upon Darwin's retirement from teaching, his students honored him by founding the Mayfield Outstanding Professor Award, an award given each year by vote of the students of the College of Natural Sciences and Mathematics to a teacher or professor who exemplifies the enthusiasm and excellence in teaching that Dr. Mayfield brought to his classes.

Darwin remained active in retirement as a teacher, leading his popular "Paws and Jaws" biology course for elementary school students, and later teaching a pre-freshman course at CSULB to help prepare incoming students for the rigors of college. He also served as a volunteer docent at the Aquarium of the Pacific in Long Beach for many years, all while continuing his far-flung travels with Norma. In all these activities, he continued to display the intellectual curiosity that was a hallmark of his life.

Darwin is survived by his two daughters, Diane Mayfield (John Laughney) and Nancy Wilms (Robbie Wilms); grandchildren Shauna O'Brien (Jeremy O'Brien) and Nick Wojdak (Tiffany Holm); great-grandson Benjamin O'Brien; niece Erin Cressida Wilson (John MacKenzie); and great-nephew Liam MacKenzie.



He was preceded in death by his parents; his beloved wife of nearly 67 years, Norma; and his sister Lois Mayfield Wilson.

Many thanks to the staff of Pasadena Highlands, who took such good care of Darwin in his later years.

A private celebration of life will be held by Darwin's family at a later date.

AWARDS & SCHOLARSHIPS

Chemistry and Biochemistry Students 2017

ANNUAL AND ENDOWED AWARDS



Roxanne Jacobs



Gia Tran



Bahareh Haeri



Nicholas Pavlakovich



Clariss Limso



James Horn



Luladey Ayalew



Tzyh-Mann Wei

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 **Roxanne Jacobs**, **Gia Tran** and **Bahareh Haeri**.

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. **Nicholas Pavlakovich** received the 2017 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 **Clariss Limso**.

Michael Monahan Memorial Summer 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. **James Horn** and **Luladey Ayalew** are the 2017 recipients.

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 **Tzyh-Mann Wei**, is meant to recognize and inspire an international graduate student with research interests in compounds leading to therapeutics or prevention of disease.

Continued on pg. 23



Edward Nguyen



Maureen Dougherty



Khin Aye San

COLLEGE AWARDS

CNSM Outstanding Thesis Award in Chemistry & Biochemistry

Rachel Elena

Graduate Dean's List

Skylar Chuang

Robert D. Rhodes Award

Nicole Moulton

CNSM Outstanding Graduate Award

Lukas Fuentes

Phi Beta Kappa Inductee

Helen Dinh

DEPARTMENTAL HONORS

Graduates:

Omar Becerra, Alex Donovan, Edward Nguyen

Undergraduates:

Tilini Wijeratne, Tate Lane, May Luong

SPECIAL DEPARTMENTAL AWARDS

American Institute of Chemists Baccalaureate Award

Biochemistry: **Lukas Fuentes**

Chemistry: **Hadiyah Fattal**

American Institute of Chemists Graduate Award

Biochemistry: **Peter Nguyen**

Chemistry: **Khin Aye San**

Toni Horalek Award

Annabelle Cantu & Lori Digal

Outstanding Teaching Associate Award

Joshua Feng

SUBJECT AREA AWARDS

American Chemical Society Analytical Chemistry Award

Zubin Patel

American Chemical Society Organic Chemistry Award

Annabelle Cantu

American Chemical Society Polymer Chemistry Award

Joel Monroy

Analytical Chemistry Award

Hongjing Zhang

Biochemistry Award

Maureen Dougherty

Freshman Chemistry Award

Russel Barie

Hypercube Award

Yessica Gomez

Inorganic Chemistry Award

Roxanne Jacobs

Organic Chemistry Award

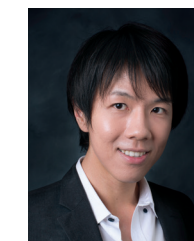
Roxana Rohani

Spyros Pathos IV Award

Mandy Vuong



Rachel Elena



Skylar Chuang



Nicole Moulton



Lukas Fuentes



Helen Dinh



Omar Becerra



Alex Donovan



Tilini Wijeratne



Tate Lane



May Luong



Hadiyah Fattal



Peter Nguyen



Annabelle Cantu



Lori Digal



Joshua Feng



Zubin Patel



Joel Monroy



Yessica Gomez



Roxana Rohani



Mandy Vuong

AWARDS & SCHOLARSHIPS

Chemistry and Biochemistry Students 2017

Continued from pg. 22



Anthony Sablan

David L. Scoggins Memorial 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. **Anthony Sablan** is this year's recipient.

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. **Anneka Miller** received this year's award.



Anneka Miller

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 2017 recipient is **May Luong**.

Dr. Gregory Whitaker Graduate Recruitment Scholarship

Dr. Gregory L. Whitaker D.O is a 1990 graduate of CSU Long Beach and anesthesiologist in Phoenix, AZ. Greg is a proud alumnus and longtime supporter of the Chemistry and Biochemistry Department who participated in the University Honors Program and completed an undergraduate thesis under the direction of Professor Dennis Anjo, Ph.D. Dr. Whitaker has graciously funded scholarships that are awarded to the top incoming master's student in both biochemistry and in chemistry each academic year, to help support their first year in the program. This year's recipient is **My Vo Luong and Lee Macklin**.



My Vo Luong



Lee Macklin

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 or by contacting Maryanne Horton, maryanne.horton@csulb.edu, 562.985.1687.



HONOR ROLL OF DONORS (JULY 1, 2016 - JUNE 30, 2017)

The student, faculty, and staff community in the Department of Chemistry and Biochemistry extends its heartfelt appreciation for the donations received from alumni, friends, corporations and foundations made to the department this past fiscal year. These funds, totaling \$120,338 this past year, positively impact the entire department community, and we are most grateful for your generosity. We are pleased to acknowledge our individual and corporate/foundation contributors.

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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.