

CHEMISTRY & BIOCHEMISTRY

WINTER 2019

LONG BEACH STATE UNIVERSITY

A California State University Campus



STRANGER PROTEINS

ENZYMES IN THE
UPSIDE DOWN



COLDROOM PICTURES PRESENTS A CHEM 443 FILM "STRANGER PROTEINS" STARRING CEDIE ALEXANDRA SHERRI MAE NICOLE SAMANTHA

MARLEN EDUARDO CRISTINA DARIAN CHASE JEREMY JAMIE MUSIC BY LIZETTE COSTUME DESIGNER AARON FILM EDITOR CARLOS PRODUCTION DESIGNER LINO

SPECIAL EFFECTS HORN DIRECTORS OF PHOTOGRAPHY DANIEL H JONATHAN ROXANNE CHRISTOPHER CAMILLE DALIA DANIEL Y.

BASED UPON A NOVEL BY JENNIFER DOMINICK AND SACHIN SCREENPLAY BY TRANG AND KEILA DIRECTED BY MANANDHAR PIERCE MCABEE CATERING BURDICK



COLDROOM PICTURES



NETFLIX

TOMATOMETER
95%

TV
MA
DLSV

D - biochemical dialogue
L - coarse or crude language
S - sciency situations
V - pipet violence

REMARKS BY THE CHAIR



Dr. Chris Brazier

Greetings to all alumni and friends of the Department of Chemistry and Biochemistry. Two years ago, I announced that the department hoped to offer a B.A. in Biochemistry starting in Fall 2017, then last year it was Fall 2018, now it is Fall 2019. Except, this time we really do have all the approvals; university bureaucracy works slowly but it gets there in the end. The new program provides greater flexibility for students interested in pursuing professional programs, teaching careers, or positions in industry. This will also be an opportunity for students who already take a significant amount of chemistry or biochemistry classes to complete a second major with only a few extra classes.

This summer the BS Biochemistry program was awarded a full seven year accreditation by the American Society for Biochemistry and Molecular Biology, following on from the provisional accreditation first received in 2015. This is a major recognition of the strength of the biochemistry program at Cal State Long Beach. ASBMB especially liked the partnerships with the community, communications skills learned in CHEM361, and enquiry skills in the laboratory classes. Doug McAbee took the lead in preparing the application and I would like to thank him for his efforts.

The department faculty have had continued success in obtaining research funding including two major research grants. Prof. Kasha Slowinska received a four-year \$443,000 grant from the NIH SCORE-SC3 program to study “Collagen Hybrid Peptides and Facilitators in Targeting-Free Cell Selection and Uptake of Malignant Cells.” Prof. Vas Narayanaswami received a four-year \$443,000 grant from the NIH SCORE-SC3 program to study “Transendothelial transport mediated modulations to the High Density Lipoprotein.” Congratulations to them both.

At the University Achievement Awards luncheon this year, Prof. Douglas McAbee received the Distinguished Faculty Advising Award, recognizing his dedication to helping students as first graduate and currently undergraduate advisor in biochemistry over the last ten years. At the same ceremony, Liam Twight was recognized as the Outstanding Undergraduate Research Student for his studies of the effects of radiation on solvents used in nuclear waste reprocessing. This is the third year in a row that a student from Prof. Stephen Mezyk’s group has been recognized as the top undergraduate research student at CSULB. Also for the third year in a row, a graduate of the department, this time Ms. Roxanne Jacobs, was selected by the CSULB Alumni Association as the Outstanding Graduate in CNSM. Her award was presented at the Alumni Awards banquet and Prof. Shahab Derakhshan 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 \$140K for new or replacement equipment in the biochemistry, general chemistry, organic chemistry, and inorganic chemistry laboratories. The major items were a flash column chromatographic separation system and a combined thermal gravimetric analyzer and differential scanning calorimeter.

About the Cover

Biochemistry Lab Works with ‘Stranger Proteins’

by Dr. Douglas McAbee

The biochemistry lab t-shirts for CHEM 443 students for spring 2018 semester showcased the protein on which much of the lab is focused—a recombinant hybrid of watermelon malate dehydrogenase (MDH) and green fluorescent protein (GFP), dubbed MGH. MDH catalyzes the reduction of oxaloacetate to malate using electrons donated by NADH. The GFP domain is situated at the C-terminal end of the recombinant protein and is used to visually trace the protein during purification. Students express and purify MGH, then analyze its kinetic properties. The t-shirt design announces a new Netflix series, “Stranger Proteins”, and portrays MGH as a monster devouring NADH and oxaloacetate (OAA) in this parody of the popular Netflix series “Stranger Things.” *Thanks go to artist Lilit Grigoryants (lilitgrigoryant@gmail.com) who translated our general concepts into this eye-catching and clever graphic.*

I would like to express my sorrow on the death of Prof. Nail Senozan. Nail was chair of the department when I was hired. I appreciate the warm welcome that he gave me and the help and guidance that he provided as I began my career. Nail was an excellent mentor to our students and was fondly remembered by many. As this newsletter was going to press, I learned that Prof. Van Lieu died at age 85. Van was a well-regarded professor of analytical chemistry from 1967-2001.

This year, the department was authorized to search for a new biochemistry faculty member. We were very fortunate to hire Elena Grintsevich who will join us in January from UCLA. Elena had taken on a senior staff scientist role in Emil Reisler's laboratory and delayed the start of her faculty appointment to train a successor. Elena's research studies the role of the actin cytoskeleton which is vital to eukaryotic cells. The behavior of actin is regulated by more than 150 actin-binding proteins and Elena's research aims to uncover the action of two poorly understood members of this group that are both linked to human pathologies.

After a gradual decline in the number of students choosing to major in biochemistry over the last three years, we accepted a record number of new freshmen and a significantly larger transfer class. While the number of students in the popular biochemistry program is still below its peak, the B.S. Chemistry program has continued to grow. This was most obvious in physical chemistry lab which is typically only taken by B.S. Chemistry students. Ten years ago, pchem lab was offered just once a year with only a handful of students, including once a class of one. Starting in 2019 there will be three sections a year accommodating a total of 30 students.

Prof. Deepali Bhandari visited Capitol Hill as part of the American Society for Cell Biology delegation. During her visit to the Hill in May, she met with staffers of several members of the congress including two representatives from California – Luis Correa and Alan Lowenthal. The delegation advocated for continued support for NIH/NSF and emphasized the key role that immigration plays in bringing some of the best students and postdocs from across the world to research laboratories in the United States. Congressman Lowenthal scheduled to visit the campus to tour Prof. Bhandari's laboratory and meet students in November.

On a personal note, I would like to thank the faculty and staff of the department for their continued support. This year, I was recommended unopposed for a second term as chair, I look forward to continuing to work with everyone in my second and final three year term.

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

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Executive Editor

Dr. Douglas McAbee
email: douglas.mcabee@csulb.edu

Contributors:

Dr. Christopher Brazier
Dr. Douglas McAbee
Dr. Vasanthy Narayanaswami
Dr. Xianhui Bu
Dr. Lijuan Li
Dr. Shahab Derakhshan

University Relations & Communications:

Janis Carr, Contributing Editor
Janet Romain, Art Director
Sean DuFrene, Photographer

Department of Chemistry and Biochemistry

California State University, Long Beach
1250 Bellflower Blvd, Hall of Science, Rm. 370
Long Beach, CA 90840-9401

Contact the department office at

mirna.henriquez@csulb.edu or call us at
562.985.4941



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DR. JASON SCHWANS: DISCOVERING HOW ENZYMES WORK

By Dr. Douglas McAbee

How do enzymes work? Students that take introductory biochemistry explore this fundamental question, learning about Michaelis-Menton kinetics, important kinetic constants (K_M , V_{MAX} , K_{CAT}), and how enzymes accelerate reactions in highly specific ways through the concerted action of active site amino acid side chains. Much of this information was generated in the first 50 years of the 20th century. Nonetheless, enzymology remains a robust area of current research that brings together investigative threads from organic chemistry, biochemistry, structural biology, and molecular biology. Understanding how enzymes work at a fundamental level is the focus of associate professor Dr. Jason Schwans' research, whose diverse program investigates basic biological methods of catalysis and development of therapeutic enzyme inhibitors. (See group photo, page 15.)

Dr. Schwans' lab is currently working on several projects, some as collaborative efforts with colleagues in the department and college and researchers at other universities. One major focus has been an analysis of the catalytic workings of the glycolytic enzyme triose-phosphate isomerase (TIM). TIM catalyzes the interconversion of glyceraldehyde-3-phosphate (GAP) and dihydroxyacetone phosphate (DHAP), doing so at efficiencies approaching a diffusion-controlled reaction in which nearly every collision of enzyme and substrate leads to product formation (Fig 1). Because of this, it's been described as the "perfect enzyme." The structural heart of TIM is a parallel β -barrel, and the native enzyme is a dimer—each subunit operating independently of the other. Because so much is known about the protein, it is an excellent model system to study funda-

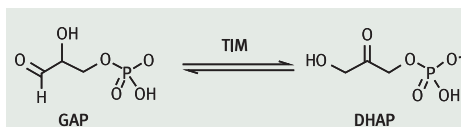


Figure 1. Interconversion of glyceraldehyde-3-phosphate (GAP) and dihydroxyacetone-phosphate (DHAP) as catalyzed by TIM.

mental properties of biological catalysis. The active site of TIM consists of three key amino acids: glutamate165 (a general acid-base), lysine 13 (substrate interaction and positioning for catalysis), and histidine 95 (an electrophile). Dr. Schwans' particular interest is understanding what role amino acids besides glutamate 165, lysine 13, and histidine 95 play during catalysis. In general, amino acids conserved at a particular position in a protein

across diverse species argue that amino acid is very important for the protein's function. For example, glutamate 97 of TIM -- not part of the active site -- is invariant from species as divergent as human, chicken, and trypanosomes. Surprisingly, mutating glutamate 97 to alanine or glutamine either shows essentially no effect (human TIM) to a 4000-fold decrease in activity (Plasmodial TIM). Dr. Schwans' findings suggest that non-active site side chains permit an overall folding pattern that promotes catalytically favorable non-covalent interactions that would otherwise be lost and even inhibited by a non-native amino acid substitution. Nature's genius in enzyme design lies in knowing what amino acids to include (and where) and what amino acids to avoid. Enzyme mutations may not abolish catalysis yet can elicit a 2- or 3-fold effect that is biologically significant. Understanding these fundamental principles in enzyme design is what drives this area of research.

In addition to his work on TIM, Dr. Schwans is also investigating another key property of all enzymes — stabilization of the transition state. Formation of a tetrahedral oxyanion configuration approaching the transition state is a common feature of enzymes that alter covalent bonds around a carbonyl group (e.g., serine proteases). Structures show enzymatic groups that can hydrogen bond with the oxyanion transition state in a charged pocket called an "oxyanion hole" and this complementary-shaped and charged pocket is often suggested to provide a substantial contribution to catalysis (Fig 2). Nevertheless, water can provide hydrogen bonds so the presence of hydrogen-bonding groups alone does not provide a description of

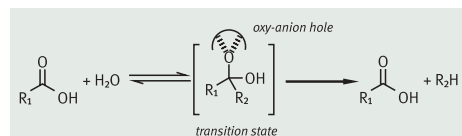


Figure 2. Generic structure of a tetrahedral oxyanion transition state using a hydrolysis reaction as an example. The curved line above the oxy-anion represents a pocket of complementary shape and charge provided by the enzyme to stabilize the oxy-anion transition state, thereby greatly accelerating the reaction.

the catalytic contribution from this feature. Working in collaboration with Dr. Dan Herschlag at Stanford, Dr. Schwans is examining oxy-anion hole architecture on the enzyme ketosteroid isomerase. Unlike other enzymes, it uses hydrogen bonds from amino acid sidechains (in this case a tyrosine and aspartic acid) rather than from the polypeptide backbone. Thus, the contributions these residues that generate the oxy-anion hole can be probed by mutation analysis or by incorporating modified tyrosines into the enzyme structure (Fig 3). In one study, tyrosines modified by addition of a fluorine atom to the phenolic ring are incorporated into the enzyme. This fluoro-tyrosine has a greatly enhanced electron withdrawing capacity compared to unmodified tyrosine and, consequently, a dramatically more acidic phenolic proton. Using organic chemistry to study enzyme function, Dr. Schwans' group studies the effects of these modifications on oxy-anion hole operation. The participants also have synthesized a variety of unnatural amino acids that can be incorporated into target enzymes to probe the specific properties of that amino acid in catalysis. This synthetic approach allows

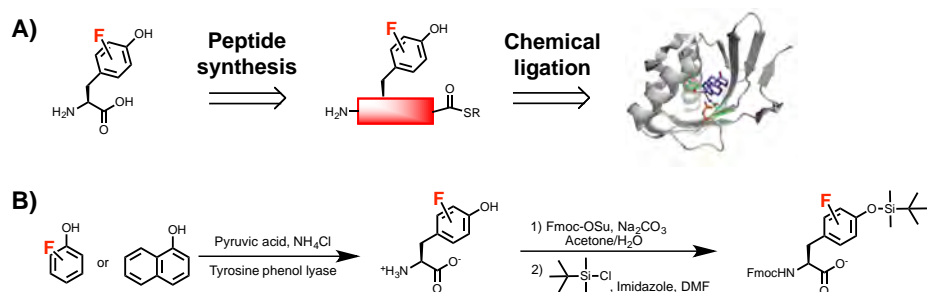
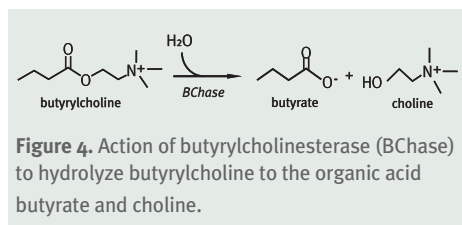


Figure 3. Unnatural amino acid mutagenesis to investigate enzyme function. A) A peptide containing the unnatural amino acid is first synthesized. The peptide is then ligated to protein fragments to generate the full-length enzyme. B) Silyl protecting groups are used to develop efficient and broadly applicable approaches for incorporating a series of fluoro-substituted tyrosine analogs in enzymes for mechanistic studies.

a variety of amino acids to be probed for catalytic participation. Another synthetic project in the lab involves generating small molecule models of an oxyanion hole that can be systematically modified and evaluated using NMR to investigate the effect of the changes on the physical properties and energetics of hydrogen bonds. The studies, in collaboration with Stanford and UCSF, were then used to compare the model systems to enzymes.

Dr. Schwans' lab also is generating specific inhibitors of the enzyme butyrylcholinesterase (BChE). Cholinesterases hydrolyze small acylcholine esters (Fig 4) and are critical for various functions, such as normal neuromuscular

computational physical chemist Dr. Eric Sorin to synthesize and analyze next generation BChE inhibitors. The prospect of collaborating with Drs. Nakayama and Sorin was one of the reasons Dr. Schwans was attracted to the department. Dr. Nakayama brings much expertise in organic synthesis and analysis, and Dr. Sorin is an expert in computational chemistry that allows mapping of BChE inhibitors docked in the enzyme. This team is pursuing multiple structural classes of BChE inhibitors (Fig 5c). One class is a series of dialkylphenyl phosphates (organophosphates; Fig 5c) that vary as a function of both substituents appended to the phenyl ring as well as the length of the alkyl chains. Phenyl ring substitutions that include



synapse function (acetylcholinesterase). The function of BChE is not fully understood, but levels of the enzyme are notably elevated in Alzheimers disease (AD) patients, and inhibition of BChE correlates with reduced AD symptoms. However, first generation BChE inhibitors also interfered with acetylcholinesterase, a highly similar enzyme that hydrolyzes the neurotransmitter acetylcholine and which is structurally almost identical to BChE (Fig 5a, b). Thus, generation of inhibitors that show a high degree of selectivity toward BChE that can be used as a treatment for AD is highly desirable.

Dr. Schwans and his students have been working alongside department colleagues, organic chemist Dr. Kensaku Nakayama and

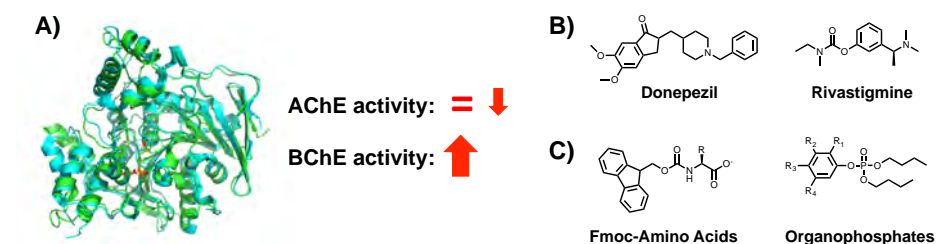


Figure 5. New classes of selective BChE inhibitors. A) X-ray structures of AChE (green, PDB ID: 1C2B) and BChE (cyan, PDB ID: 1P0I) show the overall structures of the two enzymes are essentially superimposable. AChE activity is unchanged or slightly decreased in individuals with Alzheimer's disease, while BChE activity is increased. B) Examples of current pharmaceuticals to mitigate the effects of Alzheimer's disease. C) Generalized structures of Fmoc-amino acids and organophosphates under investigation in our lab as potent and selective BChE inhibitors (in collaboration with Drs. Ken Nakayama and Eric Sorin).

choliny or coumarin groups elicit BChE inhibition at μM concentrations. Another approach is to employ unnatural amino acids (e.g., norleucine, D- rather than the standard L-stereoisomers of amino acids, Fmoc-protected amino acids) or short peptides that include a modified amino acid as BChE inhibitors. In terms of selectivity and inhibitory power, the results with these agents have been very promising.

Dr. Schwans has a relatively large group of students involved in all these research projects. Typically, four to five graduate students work on various aspects of the TIM project, while anywhere from eight to 10 undergraduates work on the BChE inhibitor project. Several graduate and undergraduate students are involved in the synthesis of unnatural amino acids. Most students are in the B.S. or M.S. biochemistry programs but some also come from B.S. chemistry and B.S. biology programs.

Dr. Schwans grew up in Sioux Falls, South Dakota where he attended Augustana College and majored in chemistry and music. He went to the University of Chicago for his doctoral studies in organic chemistry working with Dr. Joe Piccirilli, and Stanford for his postdoctoral work in the lab of Dr. Dan Herschlag before joining our department in 2012. This past year, he achieved a major milestone in his career when he was granted tenure by the university and promoted to associate professor. Dr. Schwans teaches both halves of the organic chemistry lecture sequence, as well as a graduate course of in organic mechanisms in biology, and a biochemistry graduate core course. He also is involved in teaching NSCI190A, a class that helps first-year students engage in effective study skills and identify the resources and

opportunities available. Recently, he received a perfect 6.0 score on his organic chemistry lecture course evaluation, a ridiculous and unheard-of feat for any course, much less for organic chemistry. Clearly, students greatly appreciate his teaching, a view also shared by his department colleagues! His long-standing interest in music includes playing the saxophone (alto sax in jazz band, alto and baritone sax in wind ensemble), and listening to classical music and jazz.



EXPECT DYNAMIC ACTION WITH NEW BIOCHEMISTRY FACULTY MEMBER DR. ELENA GRINTSEVICH

By Dr. Vasanthi Narayanaswami

The Department of Chemistry and Biochemistry extends a warm welcome to our new biochemistry faculty member, Dr. Elena Grintsevich, who will officially start in January 2019. Grintsevich joins our department after a highly-successful award-winning stint as Staff Research Associate working with Dr. Emil Reisler in the Department of Chemistry and Biochemistry at UCLA, a hop, skip and jump away from The Beach.

Grintsevich is all about action, locomotion and movement—her area of specialization is in the field of cytoskeletal function, specifically actin biochemistry. The independent movement of most living organisms requires actin, from the coordinated movement of microvilli, the tiny wiggle of a little finger, or the massive home-run bomb of Mike Trout—actin makes these motions possible. Ask Grintsevich about these movements over a cup of coffee, and she will gleefully explain the molecular basis of F-actin disassembly at the molecular level.

Grintsevich obtained her Ph.D. in chemistry jointly from the National Academy of Sciences of Belarus, located in Minsk, capital city of Belarus and The John Innes Centre, located in Norwich, England. Her doctoral research work focused on assessing the DNA-damaging potentials of aromatic amines following metabolic activation by thyroid peroxidase. She then moved to the United States to complete her postdoctoral training in the Department of Chemistry and Biochemistry at UCLA to gain a mechanistic understanding of F-actin disassembly and cytoskeletal regulation.

When asked what she is passionate about, Grintsevich said, “I knew I wanted to pursue science while still in high school. Growing up with three doctors in the family, there was a lot of pressure for me to pursue medicine. I

wanted to study biochemistry and I stood by my choice. Looking back, it was one of the best decisions I ever made. I find biochemistry (the world of chemistry behind biology) fascinating. Being a scientist means that discoveries are a part of your everyday life which brings a lot of excitement.”

Her proposed research program at CSULB aims to uncover new molecular pathways of cytoskeletal regulation, which involves two poorly understood actin interacting proteins – drebrin and mical (Molecule Interacting with CasL) family enzymes. Both are linked to human pathologies including neurological disorders such as Alzheimer’s disease, Down syndrome, epilepsy, and normal aging, which makes them potential biomedical targets.

Grintsevich is excited about teaching biochemistry at CSULB with an ultimate goal of being an educator to help students become future researchers, ambassadors of science, and informed citizens equipped with problem solving skills and scientific reasoning. “Specifically, I plan to connect key concepts in biochemistry to students’ everyday lives” she said.

She also plans to use specific examples of people in science to inspire students. For example, while teaching Michaelis-Menten enzyme kinetics (unfortunately, not the most

favorite topic among biochemistry students), she plans to draw students’ attention and inspire them with the life story of Maud Menten (the first Canadian woman to receive a medical doctorate in 1911 at the University of Toronto) who was initially denied an opportunity to pursue a doctoral degree because of her sex. “My courses will create an atmosphere of support and inclusion,” Grintsevich added, “My commitment to cultivating scientific reasoning in classroom will benefit students regardless of their career choices.”

Grintsevich’s recent publications in *Nature Comm.* (2017) and *Nature Cell Biology* (2016) reveal how oxidative processes cause catastrophic disassembly of actin filaments by mical enzymes, which were previously considered to be non-functional, generating novel forms of F-actin. Collectively, these studies provide the first biochemical and structural description of this novel form of actin, opening a new direction of research that will seek understanding of how different actin regulators use and interact with actin.

Grintsevich strongly believes joining CSULB gives her an opportunity to contribute to science not only as a researcher but also as an educator. “I’m very excited about starting my lab that will be focusing on cytoskeletal research as well as mentoring a new generation of scientists,” Grintsevich said. “My program will create excellent opportunities for undergraduate and graduate research and I am excited about the prospect of becoming a member of the CSULB community.”

In her spare time, Grintsevich lives an active lifestyle and enjoys hiking and snorkeling. She loves to travel and explore different countries and cultures.



DR. DOUGLAS McABEE RECEIVES THE DISTINGUISHED FACULTY ADVISING AWARD

By Dr. Chris Brazier

Dr. Douglas McAbee, professor of biochemistry, was recognized at the 2018 University Achievement Awards with the Distinguished Faculty Advising Award. This award is selected from nominees from throughout the campus by the University Awards committee of the Academic Senate. The award is designed to encourage, reward, and publicly acknowledge sustained excellence in advising by members of the University's faculty. This award is designed to honor those who have consistently demonstrated their dedication and skill in service to their advisees based on evidence of effective advising qualities and practices that distinguish the nominee as an outstanding academic adviser.

Dr. McAbee has served as department undergraduate advisor since 2012 and before that as graduate advisor in biochemistry from 2008 to 2012. As graduate advisor McAbee was responsible for recruiting and admitting students to the M.S. Biochemistry program. He served as their advisor throughout their 2-3 years in the program guiding them through any remediation needed, coursework, and along with their research advisor, thesis and graduation. There were typically 30 students in the program at any one time. McAbee did an excellent job advising graduate students and helped build our M.S. Biochemistry degree into a strong regionally recognized master's program. When the need for an undergraduate advisor arose McAbee agreed to switch from graduate to undergraduate advising duties, a very different type of

responsibility. Over the time he has been undergraduate advisor, there have been 400-600 majors in the program. Recently his heavy load was recognized as excessive and now he is responsible for the 300 biochemistry majors. His record as advisor has been excellent and he gives tirelessly of his time to help our students. I have heard from many students how helpful he has been for them. He is the go-to person for all curriculum, transfer, and course equivalency questions. "Advising is an area where faculty can positively impact student success," said Curtis Bennett, Dean of the College of Natural Sciences and Mathematics. "Dr. McAbee is a standout example of an advisor who goes out of his way to ensure appropriate services for graduate and undergraduate students."

DR. PEIDONG YANG

2018

ALLERGAN
DISTINGUISHED LECTURER

NANOWIRES AND ARTIFICIAL PHOTOSYNTHESIS

By Dr. Xianhui Bu, Dr. Lijuan Li & Dr. Shahab Derakhshan



PHOTO COURTESY OF PEIDONG YANG.

Professor Peidong Yang, S.K. and Angela Chan Distinguished Professor of Energy at University of California Berkeley, visited our department on Jan. 31, 2018 as the Allergan Foundation Distinguished Visiting Lecturer. Yang is also a senior faculty scientist at Lawrence Berkeley National Laboratory. He is the director of California Research Alliance by BASF and the co-director at Kavli Energy Nanoscience Institute, as well as the co-director at Berkeley Global Science Institute. He is the founding dean of School of Physical Science and Technology at ShanghaiTech University. He serves as an Associate Editor for the Journal of the American Chemical Society. He was elected as member of American Academy of Arts and Science in 2012 and was elected as member of National Academy of Science in 2016.

Yang's research focuses on one-dimensional (1D) nanostructures. Such materials exhibit interesting electronic and optical properties intrinsically associated with their low dimensionality and the quantum confinement effect. They can serve as the critical components in the nanoscale device applications. His group is interested in the synthesis of new classes of materials and nanostructures, with an emphasis on developing new synthetic approaches and understanding the fundamental issues of structural assembly and growth that will

enable the rational control of material composition, micro/nano-structure, property and functions to solve fundamental problems of electron, photon, and phonon confinement as well as spin manipulation within 1D nanostructures. Their work includes developing efficient chemical processes to assemble individual nanowires into desired configurations or system architectures.

During his visit at CSULB, Yang gave two lectures. The first lecture is entitled "The Science and Technology of Semiconductor Nanowires." In this talk, Prof. Yang described the history and his pioneering contribution to the synthesis of nanowires and applications of these nanowires across scientific applications such as nanowire nanolasers, nanowire dye-sensitized solar cells, and enhanced thermoelectric performance of silicon nanowires. His afternoon lecture is entitled " $\text{CO}_2 + \text{H}_2\text{O} + \text{Sunlight} = \text{Chemical Fuels} + \text{O}_2$." In this talk, Prof. Yang described his work on semiconductor nanowires and using them to convert and store energy from sunlight. His group developed a mixed system by integrating semiconducting nanowires and bacteria. This system can work like a "leaf" with nanowires harvesting sunlight and the bacteria promoting the reaction between carbon dioxide and water to drive the photosynthetic process. The process gives carbon-



based chemical fuels. Yang's talks were attended by a very large audience. His intriguing stories on the discovery and development of novel materials and applications in his group were fascinating.

Yang received his B. A. degree in chemistry from University of Science and Technology in China in 1993. He obtained his Ph. D. in Chemistry from Harvard University in 1997. Between 1997 and 1999, he did research as a postdoctoral fellow at University of California, Santa Barbara. In 1999, he began his academic career at UC Berkeley as an assistant professor. Yang has received many awards and honors including: Camille and Henry Dreyfus New Faculty Award (1999), 3M Untenured Faculty Award (2000), Research Innovation Award (2001), Alfred P. Sloan Fellow (2001), NSF CAREER Award (2001), Hellman Family Faculty Award (2001), ACS ExxonMobil Solid State Chemistry Award (2001), Beckman Young Investigator Award (2002), MIT Tech. Review TR 100 (2003), ChevronTexaco Chair in Chemistry (2003), Camille Dreyfus Teacher-Scholar Award (2004), Dupont Young Professor Award (2004), Julius Springer Prize for Applied Physics (2004), MRS Outstanding Young Investigator Award (2004), ACS Pure Chemistry Award (2005), NSF A. T. Waterman Award (2007), Scientific American 50 Award (2008), MRS Fellow (2010), Baekeland Medal (2011), MRS Medal (2011), ACS Inorganic

Nanoscience Award (2013), Thomson Reuters Citation Laureate in Physics (2014), DOE E. O. Lawrence Award (2015), Nano Today Award (2015), ACS nano Lectureship Award (2015), MacArthur Fellow (2015), Distinguished Visiting Fellowship, Royal Academy of Engineering (2016), and Nano Research Award (2016).



The Allergan Distinguished Lecturer event was funded by a generous support from the Allergan Foundation. The department is 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.

DR. MARGARET MERRYFIELD

OUR COLLEAGUE IN THE CHANCELLOR'S OFFICE

By Dr. Douglas McAbee

Faculty and students new to the department since 2005 might not have met one of their departmental colleagues and professors, **Dr. Margaret Merryfield**. Dr. Merryfield—Margy—joined the department in 1984 as junior faculty member in biochemistry with expertise in enzymology. A native of New Braunfels, Texas, Margy did her undergraduate work at Rice University (Houston). She completed her doctoral work at the prestigious Institute for Enzyme Research in the Department of Biochemistry at the University of Wisconsin Madison working with Henry Lardy on various aspects of phosphoenolpyruvate carboxykinase and its involvement in gluconeogenesis. She then returned to Texas for a few years to do post-doctoral work at the University of Texas Austin working with Lester Reed on branched-chain α -keto acid dehydrogenase.

Like any new faculty member at CSULB, Margy was immersed in research and teaching, but under the tutelage of her department colleague Dr. Dorothy Goldish, she learned much about the inner workings of the university and had opportunities for academic leadership as an assistant professor. During that time, she joined California Women in Higher Education and gained an appreciation for what talented women could do at the university. By the time she came up for tenure, Margy had become president of the local chapter.

With tenure came more freedom and opportunities for various university projects and activities. She became a member of the Faculty Council and was at the forefront of the debate arguing for the value of research



Dr. Margaret Merryfield

on the quality of teaching within the CSU. She served on the PACE (Provost's Advisory Committee on 'Everything'), and authored much of the narrative that emerged on the role of research, teaching, and service on faculty retention, tenure, and promotion, the influence of which persists to the present. In 1994-1995, she served as chair of the task force for undergraduate education with a focus on general education and student advisement out of which emerged in 1997-1998 the university's current general education requirements for undergraduate degree programs as well as an emphasis on more rigorous advising of students. She also chaired the Planning and Educational Policy Council that advised the provost on various aspects of academic policy.

In 2000, CNSM Dean Glenn Nagel asked Margy to serve as principal investigator on the Howard Hughes Grant Initiative, which was awarded and funded a multi-disciplinary undergraduate research program in the college and also established Honors in the Major tracks in both the biology and chemistry departments. At that time, she also authored the successful MBRS institutional grant from the NIH—predecessor of the current RISE program—that supported underrepresented minority students in biomedical research. Margy's involvement in faculty leadership continued to expand as she was elected to the Faculty Senate and served in her first term on the executive committee as Senate Secretary. Within a few years, she was elected chair of the senate. These major responsibilities meant ever increasing release time from teaching, and in 2004 Margy's involvement in the biochemistry core instruction (CHEM 441A/B) had pretty much ended.

President Robert Maxson's departure from CSULB coincided with major administrative personnel changes at the university. Margy's colleague, Provost Gary Reichard, moved to the chancellor's office and Dr. Dee Abrahamse—a close friend and colleague—became interim provost. This was a watershed moment for Margy as Dr. Abrahamse asked her to become interim Associate Vice President of Academic Personnel, a position she held for over a year. When a position in academic personnel became available at the Chancellor's Office, she felt it was the right time for that transition and took the

appointment. She is now Assistant Vice Chancellor for Academic Human Resources. In Margy's words, "They pay me to think about faculty." In general, Margy oversees what happens on all 23 CSU campuses in faculty affairs. She and her staff deal with the intricacies of faculty compensation and provide expertise for a wide range of faculty affair issues for all CSU campuses. Besides strategic thinking and planning, Margy and her staff provide options to CSU campuses when difficult problems arise. Most of the

development of new faculty through the Chancellor's Doctoral Incentive Program, which she oversees.

Despite no obvious similarity with what she does now and her scientific background, Margy attributes many qualities and skills cultivated as a biochemist as fundamentally important in her current work. As Margy explains it, training in sciences is training in problem-solving—the research process constantly trouble-shooting, coming up with

learn new things quickly. She has also developed what she calls "...a high tolerance for ambiguity....," an essential quality for her job. "If the answer to a problem is either 'yes' or 'no', then it is unlikely that someone would seek me out for assistance," said Margy. "Training as a scientist is helpful in this regard. If the weight of the facts don't support your position, then you have to let your opinion go. Sometimes there are only choices."



time, the task is to find solutions to problems that are amenable to the goals of both the university and the impacted individual.

When asked what is the toughest thing about her job, Margy said it is staying aware of a very political environment, knowing when and with whom to talk and include in key meetings and conversations. Balancing the goals and needs of the CSU system with the goals of an individual campus is also a challenge. The need for thoughtful input is critical, as Margy said, "One cannot shoot from the hip and expect to survive and do a good job." To that end, having the right people in the decision-making process is crucial. Some of the most enjoyable parts of her job include training and professional development where she finds herself on the familiar ground of teacher and discussion leader. She also enjoys supporting the

alternate explanations, and trying novel approaches. Margy relishes this sort of process, which is directly applicable to her current activities. In addition, critical thinking and competence at analyzing and interpreting quantitative data is also pertinent to her job. In these nearly daily tasks, her science background has been extremely helpful. Reading for content and meaning, making sense out of things—all routine for a practicing biochemist—are her daily bread. Margy believes it is not by accident that chemists tend to be over-represented in academic administration as having to run a lab, acquire and manage grants, and handle the group dynamics of lab personnel all are essential management skills. Nonetheless, Margy said she's learned a lot about herself in her current administrative position. She's found that she enjoys the steep learning curve and the push to

Margy anticipates staying in her current position for another year or two, then perhaps return to CSULB to take on specific administrative projects and maybe teach a course (e.g., Critical Thinking). Overall, her career path has been rich and impactful at all academic levels (department, college, and university) though certainly not what she might have envisioned emerging as a newly-minted post-doc from University of Texas. As Margy said, "When one starts an academic career, one cannot predict where it will end up." As our colleague in the Chancellor's Office, Margy continues to positively impact the university community state-wide.

Margy was married to the late Kent Merryfield, a popular CSULB mathematics professor who died of cardiac arrest Nov. 27.



FACULTY REPORTS

DR. DEEPAI BHANDARI

This has been another great (and busy) year for our group. We presented our work at several meetings including the 2017 annual joint meeting of American Society for Cell Biology (ASCB) and European Molecular Biology Organization (EMBO); the 2017 Annual Biomedical Research Conference for Minority Students (ABRCMS); the 2018 annual meeting of the American Society for Biochemistry and Molecular Biology (ASBMB); and the 2018 CSUPERB annual symposium. Graduate student Clariss Limso won the prestigious Don Edén Graduate Research Award at the CSUPERB symposium. She was also awarded the 2017 McAbee-Overstreet fellowship. Jordan Ngo (BUILD Associate and MARC Scholar) won the first place prize for poster presentation at the ABRCMS meeting. Undergraduate students Stephanie Leal (BUILD Scholar) and Jordan Ngo were accepted into very competitive summer programs at UC Los Angeles and UC Berkeley, respectively. While Stephanie learned proteomic approaches in Dr. James Wohlschlegel's laboratory, Jordan got to study intracellular membrane traffic in Nobel Laureate Dr. Randy Schekman's lab!

We welcomed six new students to the group: graduate students - Iris Marquez, Kelly Araujo and Koyinsola Bolutife Oloja (RISE M.S. to Ph.D. Scholar) and undergraduate students - Aida Husain, Amara Brooks and Reyalyn Villegas (BUILD Associate). It is a great new cohort of students and I am thoroughly enjoying mentoring and working with them.

We bid a fond farewell to the graduating students who are moving on to the next step in their promising careers. Peter Nguyen, Clariss Limso and Rosanna Calderon (NIH RISE M.S. to Ph.D. scholar) are starting their Ph.D. programs this fall at the Cedars Sinai Medical Center, Duke University and University of Southern California, respectively. Peter won the 2017 AIC Biochemistry graduate award, Clariss graduated with the Dean's list honor and Rosanna with departmental honors. Brett Roach got a research associate position at UC Los Angeles. Undergraduate student May Luong is starting at the New York University College of Dentistry this fall. I wish them the best of luck in their new endeavors. Oh, the places they will go...

Another highlight of the year was my visit to the Capitol Hill as part of the Science Advocacy delegation from the American Society for Cell Biology in May 2018. During my visit, I met with staffers of several members of the congress from different states including two representatives from California - Luis Correa from the 46th and Alan Lowenthal from the 47th district. In our meetings, we advocated for their continued support for NIH/NSF and the key role immigration plays in bringing some of the best and very talented students/postdocs from across the world to our research laboratories in the United States. It was a remarkable experience and I certainly intend to use my newfound advocacy skills in the future.

Overall, it was a very productive and exciting year for us and of course, much of the credit



Dr. Deepali Bhandari's research group.

goes to my students. I am very proud of their accomplishments and their dedication to the lab. It is very fulfilling and rewarding to see them succeed and achieve their goals. Here's to their continued success. *Go Beach!*

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

DR. PAUL BUONORA

For the last five years the Buonora organic research lab has been slowing down as leadership responsibilities in the university's NIH funded Building Infrastructure Leading to Diversity (BUILD) and Research Initiative for Scientific Enhancement (RISE) programs have pulled Dr. Buonora into other areas of scholarship. Dr. Buonora's work in creating the university-wide research curriculum has contributed to published papers about the CSULB BUILD program and presentations and an in-revision publication specifically on the development of the Research Curriculum. Dr. Buonora continues to be involved in the

curriculum development he left the BUILD program leadership at the end of 2017 to give him time to better balance his chemistry research and teaching with his student development and curriculum work.

In Spring 2018, Dr. Buonora submitted the application for renewal of RISE program funding to the NIH. The program provides training and support for 25 undergraduates and 12 M.S. degree candidates who are planning to earn Ph.D.s and establish research careers in the biomedical sciences. In the last fifteen years many alumni have participated in the program.

Anthony Acuna, an undergraduate biochemistry major joined the research group last spring and has made progress on a new synthetic methods development project in which photocatalytic acylation reactions are being explored. Success in this work will support the synthesis of families of target molecules long of interest in the Buonora group. Welcome support for the work comes from Dr. Ken Ishida, a CSULB alumni.

SHAHAB DERAKHSHAN

The 2017-18 academic year was a wonderful year for us. Our National Science Foundation funded research program on magnetic materials has reached to an extremely exciting stage, resulting in multiple interesting new publications and placing our team in a very strong position for future grant applications. We continue to collaborate with Jet Propulsion Laboratory (JPL) on design and synthesis of novel thermoelectric materials, which are of central importance for energy needs in space missions. Our Araseli Cortez (M.S. student in our group) was awarded an internship position at JPL and is a key person in this collaborative work. Shahab's role as a part-time faculty member at JPL will enable continuous collaborative research between his group at CSULB and JPL.

Several members of our team who graduated last year are starting new challenges, while new talents have joined our team. Roxanne Jacobs, named as the outstanding graduate of CNSM, is heading to Stanford University to start her Ph.D. program. Her interesting research project on development of facile routes for synthesis of transition metal



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oxynitrides will be continued by Max Chang, a new undergraduate talent in our team. Stephanie Araiza, who recently defended her M.S. thesis on discovery of novel light emitting materials, starts her Ph.D. studies at the University of Houston. Steph's legacy will be followed by another newly joined brilliant member of our team, Shinta Tanamas. Gia Thinh Tran, who completed his B.S. degree with departmental honors and whose instrumental role on our magnetism project resulted in a great success, is joining the chemistry department at Colorado State University to pursue his Ph.D. Marie Donato, a second-year M.S. student in our team, will continue to lead this project. Marie will work closely with another new brilliant undergraduate student Elmira Baghdadi and our own Kevin Nguyen to push the boundaries of our knowledge on magnetic materials. Hailey Schollnick, Jasmin Nguyen and Evelyn Martinez will effectively contribute to this field as well. Our wonderful Charles (CJ) Bloed is defending his M.S. thesis (also with departmental honors degree) this fall, and has been accepted in the industry as a materials scientist. Last but not least, our great former undergraduate student Jiam Vuong has returned to CSULB as a graduate student and will continue his outstanding work on development and characterization of novel electro-catalysts, which is jointly conducted between Derakhshan's and Tavassol's labs.

Our two amazing high school student teammates started their college experience in fall 2018. Asaph Lee went to University of Pennsylvania and joined the Vagelos Integrated Program in Energy Research (VIPER), and Sharan Raghavan started his undergraduate study at UC Berkeley in the Department of Chemical Engineering.

In Fall 2018, Shahab starts his 10th year of affiliation with CSULB and is involved with new duties and activities. He has accepted the associate chair position and will work more closely with the Teaching Associates in the department. He has developed and coordinated a new one unit course, CHEM 95, which is expected to improve students' performance on CHEM 111A. In collaboration



Dr. Shahab Derakhshan's research group.

with Professors Lijuan Li and Xanhua Bu, he will be teaching CHEM 531, a newly developed graduate level course in Inorganic Chemistry. Along with Prof. Stephen Mezyk, he has developed a new Honors course in General Chemistry. This course is offered for the first time during the current academic year. Dr. Derakhshan is teaching both lecture and lab sections of the first semester Advanced General Chemistry, CHEM 112A, in Fall 2018 and Dr. Mezyk will teach the second semester of this course, CHEM 112B, in Spring 2019. It should also be noted that Shahab will continue to play soccer with CSULB faculties (including Dr. Paul Weers), students and alumni every Sunday!

STEPHEN MEZYK

It was another busy year for the CSULB RadKEM research group, with many lab members leaving amid all the successes that we enjoyed together. Gregory Horne left for Idaho National Laboratory last year, where he is now employed as a distinguished post-doctoral fellow in their Radiochemistry and Aqueous Separation group. I had one M.S. student, Trevor Reutershan, graduate. He will start his Medical Scientist Training Program at UC Irvine, where he plans on entering the M.D./Ph.D. program. Five students from my research group also completed their undergraduate studies: Jamie Gleason will be entering the Chemical

Biology program at UC Berkeley; Anneka Miller will start her Ph.D. at UC Irvine; Stephanie Arciva is joining the Ph.D. Chemistry program at UC Davis; Monica Tejada is starting her M.S. Engineering degree at CSULB, and Amir Lechner will stay with me for his M.S. Chemistry degree starting next fall. My continuing group consists of my postdoctoral fellow, Kristian Larsson, who is running our research on the kinetics of lanthanide complexation by extraction ligands; M.S. students Jennifer Castillo, who is investigating chlorine species radical reactions in advanced oxidation process systems, Tin Do, who is measuring bacterial responses to oxidized antibiotic Chetna Vasudeva, who is studying the formation of carcinogens in treated waste Priscilla Prem, who is studying the role of bismuthate in oxidizing actinides in aqueous solution, and My Luong, who is looking at alternative oxidizing radical chemistry with phthalates and estrogenic mimic chemicals. They will be joined by undergraduate researchers Liam Twight, who is studying chloramine quantum yields; Landon Watts, who is working on trichloramine thermal reactions; Elaine Walker, who is measuring the kinetics of dichloramine reactions; Richard Tran, who is studying the use of sulfate radicals to remediate explosive-contaminated waters, and Michael Chin, who is looking at radical-induced

degradation of organophosphorus flame retardants. As usual, there was several new students who joined the lab in the Fall 2018.

With such a large change in our laboratory, this was the time for completing projects, amidst my starting to write grants for external funding. Over the past 12 months our lab had seven peer-reviewed papers published/in-press, several more currently under review, and we combined for 25 conference presentations at venues around the world, notably the New Orleans American Chemical Society meeting where 12 of us attended and presented!

The RadKEMTM group also continued to obtain honors and awards this past year. Liam received the CSULB Academic Affairs Award for Outstanding Undergraduate Research Student, as well as a CSULB Women and Philanthropy research award. Jamie received the CNSM Richard D. Green award for being the best undergraduate student in the Department of Chemistry and Biochemistry, Richard became a MARC scholar, Landon continued as a BUILD associate, and My obtained a Monahan summer research scholarship in addition to his TIES mentorship program. I am extremely proud of all my students for their accomplishments, in addition to their efforts in getting the research done. Their successes also helped me achieve a new award this past year; the CSULB's President's Award for Outstanding Faculty Achievement.

My teaching load remained heavy this past year, as I remained on my CSU GRIF for 2017/2018. In Fall 2017, I taught three courses, the Graduate Kinetics and Dynamics course, Physical Chemistry CHEM377B lecture, and Instrumental Analysis (CHEM451) laboratory. In Spring 2018, I co-taught both physical chemistry courses (CHEM371B and CHEM377B), as well as co-coordinating the General Chemistry CHEM111B course. I am looking forward to a much lighter load in the next year, including teaching the second-half of our new Advanced General Chemistry class, CHEM112B. As always, the RadKEMTM group has continued to be busy and productive, and we are looking forward to another successful year at CSULB!

DR. KENSAKU NAKAYAMA

I would like to report on the progress of several recent research students in my group. Ambreen Tahira obtained her M.S. degree in the fall of 2017. Her thesis was a comprehensive work on the synthesis of two classes of bivalent inhibitors of butyrylcholinesterase, an enzyme known to be over-active in Alzheimer's patients and research into which Roger Acey and I began a collaboration some time ago. Ambreen did a great job in patiently completing the synthesis of about 15 bivalent inhibitor analogs. These are currently being studied by the groups of both Drs. Jason Schwans and Eric Sorin. Mandy Wei defended her M.S. thesis this past March, her work involving the difficult problem of kinetically resolving a stereoisomeric mixture of organophosphorus compounds using a chiral catalyst. While our initial plan did not result in the discovery of effective asymmetric catalysts, by changing the focus on chiral Lewis acidic systems, she began to see some very promising results. This work is going to be continued by my new M.S. graduate student, Luyen Nguyen. Phillippe Ly, a second year M.S. student, is currently wrapping up various loose ends of several projects to put them into publication form.

I also received some updates from past research group students, all of whom I am very proud of. Trina Tran (M.S., 2016) is now an adjunct faculty of chemistry at Fullerton College and Golden West College. Jacques Lowe (B.S., 2016) will start in the Ph.D. program in biochemistry at the University of Iowa starting this fall. Astor Suriano (M.S., 2013) has continued to work at Johnson and Johnson Medical Devices Companies and is currently pursuing a Ph.D. in education. Dr. Ricardo Macias Gallardo (M.S., 2009) has recently accepted a senior scientist position with the Medicinal Chemistry department in the College of Pharmacy at the University of Minnesota. I also recently received an email from a past HHMI research student, Dr. Lulu Chen, informing me that she has accepted a tenure track position at UCI starting this fall. Congratulations to all of you, thanks for keeping in touch and best wishes in your endeavors.

DR. VASANTHY NARAYANASWAMI

With the graduation of five graduate students from our lab last year (Lek, Chuang, Tun, Donovan, Taiwo), a void was created that was quickly filled by new students. We were delighted to welcome graduate students Muhammad Abeer, Kyle Meyer and Vernon Benedicto, and undergraduates Joseph Pedregon, Brendan Ly, Nathan Rafisiman, Mani Vu, Alyssa Ruiz. Working alongside Siobanth Cruz, Grace Yomogida, Devan Abhari, Tina Nguyen, Diana Hernandez and Vien Tran, the students continued investigations on: (i) structure function analysis of apoE and its role in cardio- and cerebrovascular disease, (ii) use of high density lipoprotein (HDL) nanodiscs as vehicles for drug transport and drug delivery, (iii) the effect of oxidative stress on structure and function of apoE, and, (iv) transendothelial transport of HDL.

The hard work by this talented group of young researchers resulted in various awards and recognition:

M.S. Biochemistry graduate student Vernon Benedicto was selected for the NIH M.S.-to-Ph.D. RISE and undergraduate student Brendan Ly for the NIH BUILD Scholars program.

Skylar Chuang, M.S. Biochemistry graduate student (2015-2017) received the 2018 College of Natural Sciences and Mathematics Outstanding Thesis Award. He continues to do well in the Chemistry and Chemical Biology graduate program, at Rutgers University where he was recently accepted into the NIH-sponsored biotechnology training program for Ph.D. candidates. Thank you, Dr. McAbee: The confidence you planted in this young man with the 2015 McAbee-Overstreet Graduate Research Scholarship is blossoming beautifully.

Grace Yomogida, undergraduate student researcher in my lab won the 2018 Doris A. Howell Foundation - CSUPERB Research Scholar Award for her project on "Structural and Functional Analysis of Myeloperoxidase-oxidized ApoE3." She was invited to attend the Doris Howell Research Foundation luncheon at the La Jolla Country Club in February 2018, where she had the opportunity to meet representatives from the Doris Howell Foundation and other donors.



Dr. Vasanthi Narayanaswami's research group.

Graduate student Siobanth Cruz, won the 2018 Outstanding Teaching Associate Award. Well deserved, Sio! New graduate student researcher Kyle Myer received the 2018 McAbee-Overstreet Graduate Research Scholarship for his proposal to examine structural and conformational changes in apoAI following transendothelial transport across aortic endothelial cells.

In March 2018, Noor Bala returned from her busy schedule at Amgen Inc, South San Francisco to defend her thesis "The Conformation of Apolipoprotein E4 In Discoidal High-Density Lipoprotein by Crosslinking and Fluorescence Spectroscopy."

Undergraduate researcher Tina Nguyen received the highly competitive and prestigious 2017 CSULB Student Summer Research Award. She won the first-place award at the 2018 CSULB Annual Student Research Competition for her presentation on transcytosis of apoAI in bovine endothelial cells and went on to win the first-place award in the 2018 CSU Systemwide Student Research Competition (Biological and Agricultural Sciences). *Go Beach!* Tina, we are very proud of you!

Overall, the students have done extremely well in their research efforts in the NIH SCORE, BUILD and CSUPERB Joint Venture grant funded research projects in our lab. This promises to be a fun and hard-working group. I look forward to working with them toward yet another fruitful academic year.

DR. YOUNG SHON

I continuously served as a PI for SCORE-funded research project – colloidal nanoparticle catalysis for enzyme site mimics. Three research papers, one review paper and one proceedings were published in this past year from our research group. One book chapter is also currently in press in a book titled "Hydrogenation and Hydrogenolysis." Three former graduate students from our research group, May Maung, Khin Aye San, and Ting-An Chen, and one co-advisee, Skylar Chuang, contributed by serving as first authors of these papers. Several new graduate students joined our lab this past year. Kevin Vargas is working on the colloidal nanoparticle catalysis project with a focus on systematically controlling the surface ligand density and composition of nanoparticle catalysts while maintaining the same core

size. Mohammed Mahdaly is studying the application of colloidal palladium nanoparticle catalysts for chemoselective hydrogenation. Bingli Wang is investigating the activity of two dimensional nanodisc-supported metal nanoparticles for photo-enhanced catalysis. Nicholas Pavlakovich is working on the liposome-nanoparticle catalysis project with a focus on understanding the influence of liposome structure and composition. I would like to congratulate Kevin and Bingli again for receiving Henderson Scholarships for their outstanding accomplishments this past year. New undergraduate students, Quinn Tufono and Vincent Nguyen, have also joined our research group with several talented undergraduate researchers including Carlos Garcia, Sachin Neupane, and Dominick Ortega. I am looking forward to an exciting time with these new and continuing research students in the new academic year.

DR. MICHAEL P. SCHRAMM

"Everything I do is for the host." - Rūmī
Molecular recognition is the study of how and why molecules interact. At its essence lies the attraction of molecules at energy levels "weaker than covalent." Truly this is a paradigm of host and guest, or host and visitor should the stay be short. How then does the guest treat the host? Of course it does something, as together they arrive at an energetic minima each doing for the other. Hydrogen bonding, metal coordination, and the hydrophobic effect cover some of these possible forces enticing one to another – stabilizing each other – filling empty space which nature simply will not allow to exist for any long period of time. And when the visiting guest fits just right, we can hope that the stay is long and sweet! NSF (CHE 1708937) is currently supporting our directed efforts at using Gold-Cavitands to test these questions.

Sinead King, Tam Ho, Teodora Nedic, Angel Wei, Grant Bostwick, Lisa Rusali and Ashley Parbo dove into cavitands head first, with many posters presented from CNSM to ACS Boston. Martha Guerrero began an endeavor to understand how calixarenes transport molecules using cell culture techniques.



Dr. Hadi Tavassol's research group.

Tam Ho and Teodora Nedic traveled to Japan to learn secret techniques in large-scale cavitand preparation with our gracious Japanese collaborators.

We are happy to report that Sinead King joined a Ph.D. program in Microbiology! Tam Ho received the department ACS award in Organic Chemistry.

Finally we published results in several distinct areas of chemistry over the past several years, please see the publications section of this newsletter for details or visit <http://schrammlab.wordpress.com>.

DR. HADI TAVASSOL

This year marked the second year of our lab at Cal State Long Beach, which was a very

exciting year for us. In our group, we have 12 students participating in projects related to interfacial electrochemistry in energy devices and nature. This past summer we had two visitors as part of the Bridges program and two of our members spent their summer performing research as part of the NSF Research Experiences for Undergraduates (REU) at UC Santa Barbara and Old Dominion University. One of our members, Emily Marquez, also won a poster award in 2017 ABRCMS conference. We also held an Electrochemistry and Spectroscopy workshop as part of CSULB BUILD program for local students.

This past year, our students had seven poster presentations at local and national conferences. We have also been active in submitting several proposals and received two internal grants. We urge you to visit us at <http://web.csulb.edu/~htavasso> for more info about our work and our team, as well as if you are interested in visiting our lab. We are very excited about the coming year, as we will welcome new members and share our findings with the scientific community.

DR. FANGYUAN TIAN

We have achieved great student success in the past year. M.S. student, Andy Sua, was admitted to the Bridge to M.D. Program at Rosalind Franklin University of Medicine and Science; Kristi Ishihara and Cecilia Cisnero will enter the M.S. program at CSULB; Savannah Rousselto and Wen-Jin Chai (Department Honor) graduated with excellent academic records. We wish them continued success in their future careers. Funded by the Environmental Research and Education Foundation, our lab investigated the conversion of waste (landfill gas) to energy (pure methane) as well as water remediation using porous solid materials. We published a paper on this topic with several group members as co-authors, including Michael Chin (MARC Scholar), Cecilia Cisnero, and Kristi Ishihara. Additionally, Angela Bui (RISE and MARC Scholar) and Trenton Nguyen (BUILD Scholar) have worked on the drug delivery project involving iron-containing metal-organic framework thin films.



Dr. Fangyuan Tian's research group.

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Dr. Paul Weers' research group.

We attended several local and national meetings to present our research. Among all, senior student Kristi Ishihara gave an oral presentation in the 255th ACS meeting on the topic of porphyrin-containing thin films. Michael Chin presented a poster in the same meeting. Angela Bui gave a poster presentation in the 2017 CNSM Research Symposium. Johana Aviles (BUILD Scholar) presented her research of drug encapsulation by metal-organic frameworks at the BUILD Research Symposium.

Lastly, we welcome several new lab members: Jack Aldrich (2018 ORSP Summer Research Scholarship Awardee), Mark Weber, Daniel Lu, John Dinh (BUILD Associate), Kim Ramos (Bridges Scholar), and Hao Pham (Bridges Scholar). We look forward to another exciting year with more interesting findings!

DR. PAUL WEERS

The following students participated in research activities in the Weers research group last year: Angela Tran, Melissa Saluta, Bahareh Haeri, Rohin Basi, Nairuti Patel, James Horn, Heather Hershberger, John Burdick, Jamie Solorsa, and Calvin Voong. There were several highlights. We published a paper in *ACS Biochemistry* in which we engineered a monomeric version of apolipoprotein A-I, which plays an important role in reverse cholesterol transport. Calvin Voong was accepted into the Biochemistry Ph.D. program of the University of Colorado in Boulder. Another highlight was our 10th annual Bonfire party at Bolsa Chica State Beach, which we have organized since 2008. Continuous support for our research activities came from a SCORE SC₃ grant from NIH, and from the BUILD and RISE programs to support selected students who are on a career path to obtain a Ph.D. degree in the biomedical sciences to enhance diversity in the biomedical workforce. Members of our group attended the following scientific meetings to present our research progress: American Society for Biochemistry and Molecular Biology in San Diego, CSU Annual Biotechnology Symposium in Santa Clara, and Atherosclerosis Thrombosis and Vascular Biology from the American Heart Association in San Francisco.



ROXANNE JACOBS EARNS HIGHEST COLLEGE HONOR

By Dr. Douglas McAbee

Roxanne Jacobs, who completed the double undergraduate major in chemistry and biochemistry, was named 2018 Outstanding Graduate for the College of Natural Sciences and Mathematics. The award, the most prestigious distinction given by the college and the university Alumni Association, is given to the undergraduate who best demonstrates the highest ideals for academic and research excellence. Jacobs graduated in Spring 2018 with a 4.0 GPA. She worked as a research student in the lab of Dr. Shahab Derakhshan, who by virtue of Roxanne's award, was named the "Most Valuable Professor" for 2018.

Roxanne grew up in Long Beach and attended Milliken High School. From an early age, she heard nothing but great things about the school from her mom, an alumna (physical therapy). Getting a guaranteed four years of support through the President's Scholarship was a major factor in choosing CSULB. Plus, she had several friends coming to CSULB, making the decision to come to CSULB an easy one.

Interested in science or engineering, Roxanne signed up for the chemical engineering program in her first semester. She was advised at freshman orientation to take general chemistry – a requirement for almost any science or engineering degree. Dr. Derakhshan was her CHEM 111A instructor in her first semester and Roxanne tended to sit near the back of the lecture hall. At term's end, Dr. Derakhshan asked in class, "Who is Roxanne Jacobs? She is the only person to ever get 100 percent scores on all my mid-term exams. Please come and talk to me after class."

2017-18 M.S. THESES

Dr. Derakhshan realized Roxanne was an extraordinary talent and invited her to join his research lab, which she did and eventually became a B.S. chemistry student. Wanting to take full advantage of the President's scholarship, she decided to add the B.S. biochemistry degree to her academic program. She had always like biology and thought studying biochemistry would broaden her chemical training. Having completed this demanding and uncommon double major with a flawless GPA while excelling in the research lab testifies to Roxanne's intellectual and personal abilities.

Her research project in Dr. Derakhshan's lab was to develop and characterize novel photocatalysts for remediation of organic pollutants in drinking water. More specifically, she focused on the design of facile routs for synthesis of transition metal oxynitrides as photocatalysts. She also worked in a collaboration between Dr. Derakhshan and Dr. Young Shon on characterization of nano-particles on graphene oxide substrate for catalytic reactions, work that led to a co-authorship on a paper published in the New Journal of Chemistry in 2017.

Roxanne's family played a large part in her academic success. Her parents cultivated a learning environment at home, encouraging her to find a balance in work and activities, and engendered the idea that school work was a privilege, not a chore. Her outside interests include athletics (distance running is a passion), reading (science fiction is a favorite), and music. In spring 2017, her father, a mechanical engineer, passed away suddenly. In the face of such an enormous loss, she managed to finish the semester and continue the following academic year, relying heavily on the support from her extended family.

Roxanne's advice to new students? "Find a good support group in the first year of college as well as a good mentor, if possible. Work hard to balance life – don't let academics define your life. Health and happiness should be the top priority."

Excellent advice! We congratulate Roxanne on all her accomplishments and the wonderful example she has set, and wish her all the best in her future endeavors.

MASTER OF SCIENCE CHEMISTRY

OMAR BECERRA

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

Advisor: Dr. Lijuan Li

CYRUS ANDREW KORONI

Thesis: Synthesis and Characterization of Dinitrosyl Iron Complexes containing Phenanthroline Derivatives

Advisor: Dr. Lijuan Li

TREVOR A. REUTERSHAN

Thesis: Chemical Kinetics and Adsorption in Wastewater Treatment Systems

Advisor: Dr. Stephen Mezyk

AMBREEN TAHIRA

Thesis: Synthesis of Bivalent Organothiophosphate Inhibitors and Their Inhibition of Butyrylcholinesterase: Studies Towards a Potential Treatment of Cognitive Loss Associated With Alzheimer's Disease

Advisor: Dr. Kensaku Nakayama

TZYH MANN WEI

Thesis: Studies in the catalytic asymmetric synthesis of optically active organophosphate triesters.

Advisor: Dr. Kensaku Nakayama

MASTER OF SCIENCE BIOCHEMISTRY

NOOR SALAH BALA.

Thesis: The Conformation of Apolipoprotein E4 in Discoidal High-Density Lipoprotein by Cross-linking and Fluorescence Spectroscopy.

Advisor: Dr. Vasanthy Narayanaswami.

ROSANNA CALDERON

Thesis: Investigating role of the PI3K-Akt Pathway in Adaptation to Endoplasmic Reticulum Stress in MDA-MB231 Cells.

Advisor: Dr. Deepali Bhandari

TIMOTHY CHANG

Thesis: Evaluating the Functional Role of Glu97 in Triose-phosphate Isomerase from Trypanosoma brucei.

Advisor: Dr. Jason Schwans

AHN COLQUHOUN

Thesis: Evaluating the Role of Glu97 in Human Triose-phosphate Isomerase

Advisor: Dr. Jason Schwans

ALICIA ANN GAMBOA.

Thesis: Characterization and Evaluation of Collagen/Cell Penetrating Peptides for siRNA Delivery.

Advisor: Dr. Kasha Slowinska

BAHAREH SADAT HAERI

Thesis: Reconstituted High-density Lipoprotein Is Less Active in Binding to Lipopolysaccharides and Phosphatidylglycerol Compared to Lipid-free Apolipoprotein A-1.

Advisor: Dr. Paul Weers

MD SHARIF HASAN

Thesis: Genetic Analysis of K4-SURF Transcription Factors During Leaf Senescence in Arabidopsis thaliana.

Advisor: Dr. Judy Brusslan

JAMES HORN

Thesis: Apolipoprotein Chimeras Provide Insight into Their Domain Organization.

Advisor: Dr. Paul Weers

CLARISS ANN LEE LIMSO

Thesis: Characterization of GIV-GPR78 Interaction During Endoplasmic Reticulum Stress: A Promising Target to Curb Cancer Cell Survival.

Advisor: Dr. Deepali Bhandari

HIEU HUU NGUYEN

Thesis: Water Remediation by a Metal Binding protein: A Method to Offset Environmentally Hazardous Practices.

Advisor: Dr. Roger Acey

PETER TN NGUYEN

Thesis: Ga-Interacting Vesicle Associated Protein Mediates Cell Survival During Endoplasmic Reticulum Stress

Advisor: Dr. Deepali Bhandari

JULIE HEEJIN PARK

Thesis: Investigating the Structural Role of a Conserved Residue Glu97 in Triosephosphate Isomerase from Saccharomyces cerevisiae.

Advisor: Dr. Jason Schwans

KEHINDE MARY TAIWO

Thesis: Determining the Conformation of Apolipoprotein E4 in Spherical High-Density Lipoprotein by Crosslinking and Fluorescence Spectroscopy.

Advisor: Dr. Vasanthy Narayanaswami

SHOW TAKENAKA

Thesis: Tetraalkyl and Tetraaryl Bisphosphates: Potential Therapeutics for Treating Alzheimer's Disease.

Advisor: Dr. Roger Acey

2017-18

RESEARCH PUBLICATIONS FOR DEPARTMENT FACULTY

DR. DEEPALI BHANDARI

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DR. XIANHUI BU

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DR. SHAHAB DERAKHSHAN

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DR. MICHAEL SCHRAMM

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DR. JASON SCHWANS

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DR. ENRICO TAPAVICZA

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YOUR DONATIONS AT WORK

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STUDENT TRAVEL
RESEARCH AWARDS

26

DEPARTMENTAL HONORS
AND SPECIAL AWARDS

7

SCHOLARSHIP AWARDS

3

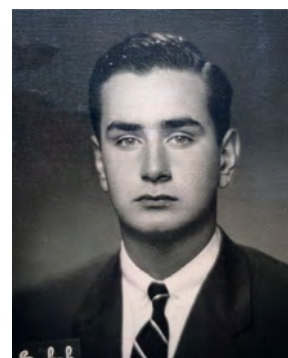
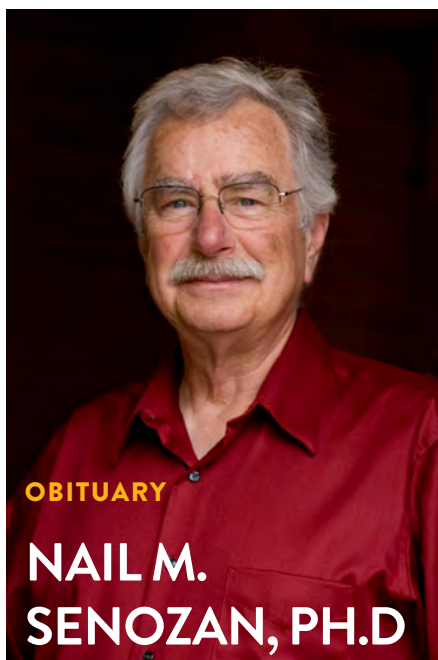
SUMMER RESEARCH AWARDS

23

SEMINARS BY DISTINGUISHED
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PREEMINENT INSTITUTIONS AS
UNIVERSITY OF COLORADO,
WAYNE STATE, TEXAS STATE,
BECKMAN RESEARCH INSTITUTE,
UC RIVERSIDE, UCLA,
UC SANTA CRUZ, UC BERKELEY,
ARIZONA STATE, JPL, CHORI,
UC SAN DIEGO,
UNIVERSITY OF TEXAS, AND
FLORIDA INTERNATIONAL UNIVERSITY.

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Senior Director of Development, College
of Natural Sciences and Mathematics,
562.985.1687, maryanne.horton@csulb.edu.



with the blood protein in collaboration with his department colleague, Dr. Jerold Devore. During his career, Nail published more than 25 papers in peer-reviewed journals including several papers in the *Journal of Chemical Education*, most of which focused on metal and carbon monoxide interactions with hemoglobin and co-authored with department colleagues.

Nail enjoyed traveling, especially by train. No matter how big or small a place was, there was always something interesting to discover. He took several trips across the U.S. with his son and grandchildren by train as well as several train trips in other countries with family and friends.



One trip, however, was not without interruption. In the summer of 1966, Nail returned to Turkey for what he thought was a brief vacation but was abruptly drafted into the army. Professor Nail Senozan was now Lieutenant Nail Senozan, serving in the Corps of Engineers, Turkish Armed Forces. He was

Nail M. Senozan passed away on April 29, 2018, in Long Beach, California, at age 81.

Nail was born in Istanbul, Turkey in 1937 and immigrated to the United States in 1956 to study chemistry at Brown University, graduating with highest honors in 1960. He then entered the Ph.D program in physical chemistry at the University of California Berkeley, completing his studies in 1965. He joined our department faculty in late 1964, was granted tenure in 1970, then promoted to full professor in 1975. In 1996, he succeeded Dr. Ken Marsi as department chairman, serving in that capacity until 2002. He continued teaching part-time in the department as emeritus professor until his full retirement in 2008.

Nail's doctoral research interest was low temperature calorimetry but he expanded his focus in his early years at CSULB on the thermodynamic properties of various gaseous ammoniates of calcium, barium, strontium, europium, and ytterbium. This work led to numerous publications in the *Journal of Chemical Physics*, *Bulletin of the American Physical Society*, and *Journal of Inorganic and Nuclear Chemistry*. He then developed a research interest in the physical aspects of metal acquisition by marine animals, particularly copper, iron, and vanadium. This led to theoretical research in hemoglobin-ligand dynamics, including analysis of carbon monoxide interactions

stationed in Erzurum, a city in eastern Turkey (Anatolia) not far from the Turkish border with Georgia and Armenia, countries then part of the Soviet Union. The Cold War was still very much raging, and Turkey was part of the NATO alliance. Lt. Senozan, with his background in chemistry, became a demolitions expert in the Turkish army. He returned to the U.S. and CSULB in 1968.



The following is a story about Nail shared by his friend and departmental colleague, Dr. Henry Po that helps capture elements of Nail's character. Dr. Po writes:

Nail and I were having our coffee break in my office when a friend, a colleague from another department, came by to say hello to me. After he had left Nail asked me if the visitor was Professor so and so. I said he was and asked him

Nail taught many courses during his time at CSULB, and he was also a Fulbright scholar and NSF visiting professor at Ege University (Izmir, Turkey) on multiple occasions. He even taught as a lecturer in chemistry at Ataturk University in Erzurum while serving in the army there. At CSULB, he taught major and non-major courses at all levels including general chemistry, physical chemistry, nursing chemistry, graduate colloquia, and advanced physical chemistry. He had a particular passion for CHEM 111B (second semester general chemistry) and CHEM 371A (physical chemistry, particularly thermodynamics). He was an accomplished gifted teacher, much beloved by his students despite giving rather demanding exams. On one occasion, it so happened that Nail was giving tests to his nursing chemistry and quantum mechanics classes on the same day. A page from the quantum mechanics exam managed to find its way into the nursing chemistry exam. One can imagine the utter bafflement of the nursing students attempting to solve simple pH problems only to turn the page and find they were to derive Schrodinger's wave equation for hydrogen! Nail showed genuine interest in his students, not the least in those who struggled with general chemistry, and he worked vigorously with students taking introductory chemistry during the latter stages of his career. In recognition for his sustained excellence in teaching and research, Nail received various awards and honors including the Phi Beta Kappa University Scholar Award (1979) and Outstanding Lecturer of the Year (Student Affiliate of the ACS, 1986). In 1994, he was named University Outstanding Professor for

CSULB and was the university's nominee for the statewide CSU outstanding professor award.

Throughout his career, Nail was involved in faculty governance. In addition to his tenure as department chair (1996-2002), he served on many significant committees including the department and college Retention, Tenure, and Promotion committees, the Academic Senate, the University Financial Affairs Council, and the College Council. He was highly respected by his colleagues for his thoughtful and even handed manner. He was also famous for his faculty/student parties at his home, where he was the perfect host.

The following was contributed by Nail's wife Diane:

He loved reading. This was another journey for him. He read everything. Our home is full of maps and we have many more atlases and dictionaries than most people. His close friends would make fun of him because he had five or six dictionaries. Of course, this didn't faze him. His vocabulary was incredible. Way beyond any native I've met. There was always a new word to learn. He enjoyed going to bookstores, especially used bookstores and browse for hours.

He was also interested in languages, collecting stamps, visiting zoos, walking in the Nature Center/El Dorado Park or various other destinations in Long Beach, and enjoyed doing things with his family. He wanted to share his enthusiasm for the world around him and to help navigate the right path for his family, friends, and students or for anyone else who needed him.

why. Then Nail told me that he had been on the advancement committee of a different department and there were two candidates being considered for promotion. One candidate was favorably recommended while the other was denied. Being from a different department, Nail didn't know the people so he read the curriculum vitae of both candidates carefully. Both had met the criteria for advancement and their curriculum vitae were practically 'identical'. He consulted the RTP documents and decided that he could not agree with the decision. He requested the committee for a review of the decision. They met to discuss Nail's concern. According to Nail, the discussion lasted for several hours, but, at the end, they agreed with Dr. Senozan, and recommended both candidates for promotion.

I have not mentioned this story to anyone, including my professor friend. This is the kind of man Dr. Senozan was: a man of courage and integrity, and one who will do the right thing.

Nail is survived by his wife Diane and three children, Nila Wallace, Erin Steiner, and Sean Senozan.

(The author is indebted to Diane Senozan, Dr. Henry Po, Dr. Peter Baine, and Pat Pierce for their contributions to the content of this article.)

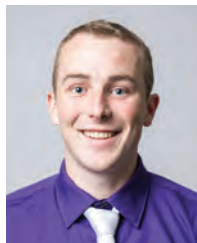
AWARDS & SCHOLARSHIPS

Chemistry and Biochemistry Students 2018

ANNUAL AND ENDOWED AWARDS



Kevin Vargas



Parker Bremer

Robert B. Henderson Memorial Scholarship

Recipients: KEVIN VARGAS; PARKER BREMER; BINGLI WANG

Dr. Henderson was one of the founding faculty of our department. He was a distinguished scientist and a teacher of organic and general chemistry (1955-1982). Dr. Henderson also served as Chairman of Physical Sciences and as Associate Dean of the College of Natural Sciences & Mathematics (CNSM). This award is given to a student best exemplifying Dr. Henderson's scholarship and commitment to the profession of chemistry and who plans to enter a Ph.D. program.



Bingli Wang



Liam Twight

James L. Jensen Undergraduate Research Fellowship

Recipient: LIAM TWIGHT

The Jensen Undergraduate Research Fellowship has been established to recognize and support an outstanding undergraduate student engaged in research with a faculty member in the College of Natural Sciences and Mathematics. This fellowship is awarded in honor of Dr. James L. Jensen, Dean of the College of Natural Sciences and Mathematics during the years 1993-1995, who as a faculty member was known for his excellence in teaching and mentoring students engaged in research.



Tam Ho



Huy Nguyen

Kenneth L. Marsi Award

Recipients: TAM HO, HUY NGUYEN

This scholarship began in 1996 when Dr. Marsi retired as Chair of the department after 21 years of service. A teacher-scholar, Dr. Marsi twice earned the Mayfield Outstanding Professor Award by vote of the students of the college. He was the CSULB Outstanding Professor in 1984 and the CSU System Outstanding Professor in 1985. This award is given to an outstanding junior or senior majoring in chemistry or biochemistry.

McAbee-Overstreet Award

Recipient: KYLE MEYER

The McAbee-Overstreet Graduate Research Scholarship was established in 2008 from an endowment made to the department by Dr. Cathie Overstreet, a former MS Biochemistry student with Dr. Douglas McAbee from 2000-2003. The scholarship recognizes a graduate student in the MS Chemistry or MS Biochemistry program for excellence in scholarship and strong commitment to research in chemistry or biochemistry.



Kyle Meyer

Michael Monahan Memorial Summer Research Fellowship

Recipients: JULIE PARK, MY VO LUONG

This award was established through a bequest of Dr. Michael Monahan, an alumnus of our department who received his BS in Chemistry in 1963. After receiving his Ph.D. in Chemistry in 1968 he joined the Salk Institute and was subsequently a Senior Research Scientist with Beckman Instruments. Dr. Monahan was founder and President of California Medicinal Chemistry Corporation and a member of our faculty during the period 1985-1987. This competitive award is presented to an outstanding undergraduate or graduate student in chemistry or biochemistry to support summer research.



Julie Park



My Vo Luong



Yumeng Cheng

Spyros Pathos IV Award

Recipient: YUMENG CHENG

Spyros Pathos was an undergraduate chemistry major in our department at the time of his death in 1993. The award was established in his honor by members of the Greek Folk Dance community of which he was a member. This award is presented to a student excelling in the second semester of General Chemistry, Chemistry 111B.



William Wellman

David L. Scoggins Memorial Award

Recipient: SANDY HANNA

This award memorializes David L. Scoggins, a graduate student in our Department 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.

John H. Stern Award in Physical Chemistry

Recipient: WILLIAM WELLMAN

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.



Heather Hershberger

Dr. Gregory Whitaker Graduate Recruitment Scholarship

Recipients: HEATHER HERSHBERGER, KEVIN VARGAS

Dr. Gregory L. Whitaker D.O. is a 1990 graduate of CSU Long Beach and an anesthesiologist in Phoenix, AZ. Greg is a proud alumnus and longtime supporter of the Chemistry and Biochemistry Department. He participated in the University Honors Program and completed an undergraduate thesis under the direction of Professor Dennis Anjo. 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.



Daniel Quiroz

Leslie K. Wynston Scholarship

Recipient: DANIEL QUIROZ

Dr. Wynston was a biochemistry professor in our department from 1965-1998. He served as Chair of the Pre-Professions Health Advisory Committee for many years and was active in both the Western and National Association of Advisors for the Health Professions. The award recognizes an outstanding Biochemistry major who is planning to enter a health-related professional school the following year.

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, Monahan, 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.

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CNSM Outstanding Thesis Award in
Chemistry & Biochemistry

Skylar Chuang

CSULB Graduate Research Fellowship

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Graduate Dean's List

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CNSM Outstanding Graduate Award

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Jing Jin; Charles Bloed; Rosanna Calderon

Undergraduates:

Jennifer Ramirez; Wen Jin Chai; Thinh Tran

SPECIAL DEPARTMENTAL AWARDS

American Institute of Chemists Baccalaureate Award

Biochemistry: **Helen Dinh**

Chemistry: **Zubin Patel**

American Institute of Chemists Graduate Award

Biochemistry: **Luladey Ayalew**

Chemistry: **Julie Trieu**

Toni Horalek Award

Jennifer Ramirez and Helen Dinh

Outstanding Teaching Associate Award

Siobanth Cruz



Jennifer Ramirez



Wen Jin Chai



Thinh Tran



Helen Dinh

SUBJECT AREA AWARDS

American Chemical Society Organic Chemistry Award

Tam Ho

American Chemical Society Polymer Chemistry Award

Grace Yomogida, 2017

Easter Thames and Scott Novom, 2018

American Chemical Society Analytical Chemistry Award

James Le

Analytical Chemistry Award

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American Chemical Society Physical Chemistry Award

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Hypercube Award

Walter Alvarado

Inorganic Chemistry Award

Tam Ho

Organic Chemistry Award

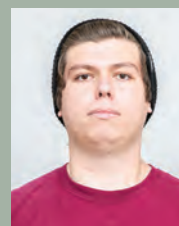
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(JULY 1, 2017 - JUNE 30, 2018)

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 \$165,175 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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