CHEMISTRY & BIOCHEMISTRY

WINTER 2022

LONG BEACH STATE UNIVERSITY

California State University Campus

Inside:

About the cover
"over the breaks, the shining"
Dr. Michael P. Schramm

Dr. Michael P. Schramm
Editor's corner

As incoming editor for the department newsletter, I take this opportunity with great appreciation. As the digital world ever expands, the tangible nature of objects we can touch, flip through, fold and draw on is not lost on me and certainly I hope not you. Our department has been incredibly busy over the past 18 months, facing the challenges that a global pandemic has wrought and in this, found new opportunities for teaching and engaging in service and research. The full extent of how we've adapted extends beyond online instruction and zoom meetings. You'll hear a little more about this within and in future issues.

Welcome to our winter issue.

REMARKS FROM THE CHAIR


Dr. Lijuan Li

Dear Colleagues, Students, Alumni, and Friends:

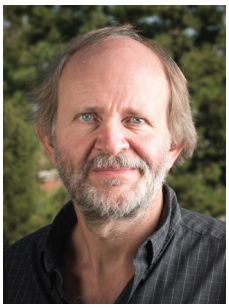
I am very humbled and privileged to have been chosen by the department and the Dean as your new Department Chair starting Fall 2021. I wish to take this opportunity to sincerely thank you all for having confidence in me. I would also like to represent the department in expressing our sincere gratitude to Dr. Chris Brazier for his 6 years of dedicated service as the Department Chair.

I am honored to lead a department with excellent faculty and a diverse student population. Many of our faculty are experts in their fields and are holding active research grants, with annual research spending of over $2 million. Our faculty actively pursue research with students and publish 60+ scientific papers annually with students as co-authors. Our program was recently reviewed by the American Chemical Society (ACS): "The chemistry program at California State University-Long Beach has a long record of training students to enter the workforce, graduate school, or professional school. Evident by the large number of students engaged in undergraduate research and your growth in the number of chemistry majors, faculty and staff are successfully engaging students both in and outside of the classroom. The department also does an excellent job of building student skills such has technical writing, problem solving, and teamwork." The ACS also commented on our strengths such as the amount of undergraduates we involve in research, incorporation of instrumentation, and the growth in our number of majors.

In the next few years, we will build on our strengths and focus on student success. We will work on curriculum and assessment to ensure students have the key skills they need to succeed after graduation. Our department will continue and expand diversity, equality, and inclusion programs. We will also work on outreach and student recruitment. We want our students to not only learn fundamental chemistry/biochemistry knowledge but to also feel the excitement and passion of our faculty for science. I am looking forward to working with the members of our department and our community to serve our students – to teach them new knowledge and inspire them to be their best selves.

Sincerely,

Lijuan Li, Ph.D


Dr. Chris Brazier

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

This is my last message as chair having completed my second term and a total of seven years of service to the department. I would like to welcome Prof. Lijuan Li as a worthy successor, I am confident that she will do an excellent job. This fall I am serving as "Chair Emeritus" to aid in the transition. I have returned to teaching physical chemistry and plan to join the Faculty Early Retirement Program next year.

Looking back over the last 7 years I am amazed at how quickly time has passed. It has been a great honor to serve such a wonderful group of people. I am especially impressed by how hard everyone worked to move classes online with essentially no notice. The numbers of students, and graduates have fluctuated but overall have remained fairly steady over the last seven years. We have fewer tenure track faculty to teach and mentor those students as more have retired than been hired. At the end of the 2020 academic year Prof. Doug McAbee retired and Profs. Ken Nakayama and Marco Lopez moved to teaching half time as they joined the Faculty Early Retirement Program. In 2021 Prof. Stuart Berryhill completed FERP and fully retired. I wish both Doug and Stuart many years of enjoyable retirement and thank them both for all they have done for our students.

It was a great disappointment that the University Achievement Awards could not be celebrated in person the last two years. Two of our faculty were recognized as Outstanding Professor in the University, Vas Narayanaswami in 2020 and Paul Weers in 2021. To have the top professor from among 900 two years in a row is an incredible distinction for the department, congratulations Vas and Paul. In 2021 Prof. Deepali Bhandari received the Outstanding Faculty Mentor Award recognizing her dedication to mentoring students in their research and Prof. Shahab Derakhshan received the Distinguished Faculty Scholarly and Creative Achievements Award for his impressive research record. In 2020 Prof. Paul Weers was honored with the Distinguished Faculty Advising Award, Prof. Fangyuan Tian received the Early Academic Career Excellence Award, and Prof. Jason Schwans received the Distinguished Faculty Teaching Award. Within the College of Natural Sciences and Mathematics Prof. Michael Schramm was recognized for his overall accomplishments with the CNSM Faculty Award for Excellence, aka The Pretty Darn Good Professor Award. In 2020 at the University Achievement Awards Ms. Stephanie Leal was recognized as the Outstanding Undergraduate Research Student for her studies on cancer biology. This was the fifth year in a row that a Chemistry and Biochemistry student was been recognized as the top undergraduate research student at CSU Long Beach. Congratulations to everyone.

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 $470K for new or replacement equipment in the teaching and student research laboratories over the last two years. The major items were a fluorescence microscope, tabletop Scanning Electron Microscope and Chiral HPLC instrument.

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. I would also like to express my thanks for all the help and support I have received over the last seven years from our outstanding faculty, staff, and students.

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.

Winter 2021

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Faculty Focus: Dr. Fangyuan Tian

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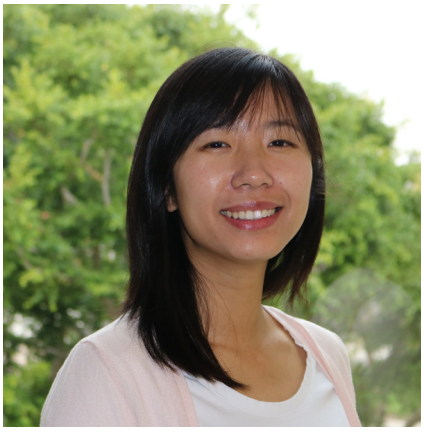
By Dr. ???



Dr. Fangyuan Tian

When the alarm went off at 4 AM, Dr. Fangyuan Tian woke up immediately as she knew the proposal deadline was approaching and she must hurry. There was still an important part left unfinished. She planned to finish this 6-page proposal at least one week before the deadline. But now the soft deadline she set for herself has passed three days. Ironically, she taught freshmen on stopping procrastination in NSCI-190A – Experience Success in College. But something she did not mention in her class was that productivity will, in fact, increase exponentially as the deadline getting closer. She was benefitting from the high productivity this week, meanwhile suffering enormous stress. The proposal she had been working on was about building a drug eluting stent coating with a novel crystalline material, known as metal-organic framework (MOF).

MOFs are a type of materials that are composed of metal ions or clusters connected with organic ligands by forming three-dimensional porous structures, Figure 1.
Due to the high surface area, large pore volume, and versatile chemical structures, MOFs have been used in gas capture, storage, and separation; catalytic reactions; analytical separation; energy storage; and biomedical applications. However, bulk MOFs are not suitable for being integrated into molecular devices, therefore, it is practically important to fabricate MOF films on solid surfaces or with supporting materials, also known as surface-supportive MOFs or SURMOFs, Figure 1. Dr. Tian's lab has been studying the surface and interface chemistry of MOFs and SURMOFs in the past six years since she joined CSULB.

Dr. Tian was trained as a surface chemist with background of modification and functionalization of semiconductors in Dr. Andrew Teplyakov's lab at the University of Delaware. The first time when she knew about MOFs was during her postdoctoral training in Dr. Lauren Benz's lab at the University of San Diego. Dr. Tian was amazed by how versatile MOFs can be. Changing a metal center or an organic ligand may generate a new MOF structure. Sometimes different synthesis conditions result in various crystals and morphology. Dr. Tian decided to start her independent career focusing on the surface chemistry of this magic material.

After joining CSULB, Dr. Tian noticed that several programs on campus sponsored by the National Institutes of Health (NIH) promote diversity in health-related fields. She seized the opportunity to propose a relevant research project that can benefit more students. Considering her background in surface modification and MOFs, she realized the project would include materials science that can be applied to health. One idea was to use SURMOFs as medical device coatings to decrease infection and prevent biofilm formation. However, most MOFs are not quite stable in aqueous conditions for a long period of time. Additionally, for testing infection rate or biofilm growth, cell studies and animal models are usually required, however, Dr. Tian did not have any experience in those in vitro or in vivo studies. Another idea was to use MOFs for drug delivery, but several groups have done remarkable works in this field. To avoid competitions with those research-intensive universities, Dr. Tian had a great idea to combine the drug delivery concept and the medical device coating application together. Eventually, she decided to pursue the study of using MOFs as biodegradable coatings on drug eluting stent.

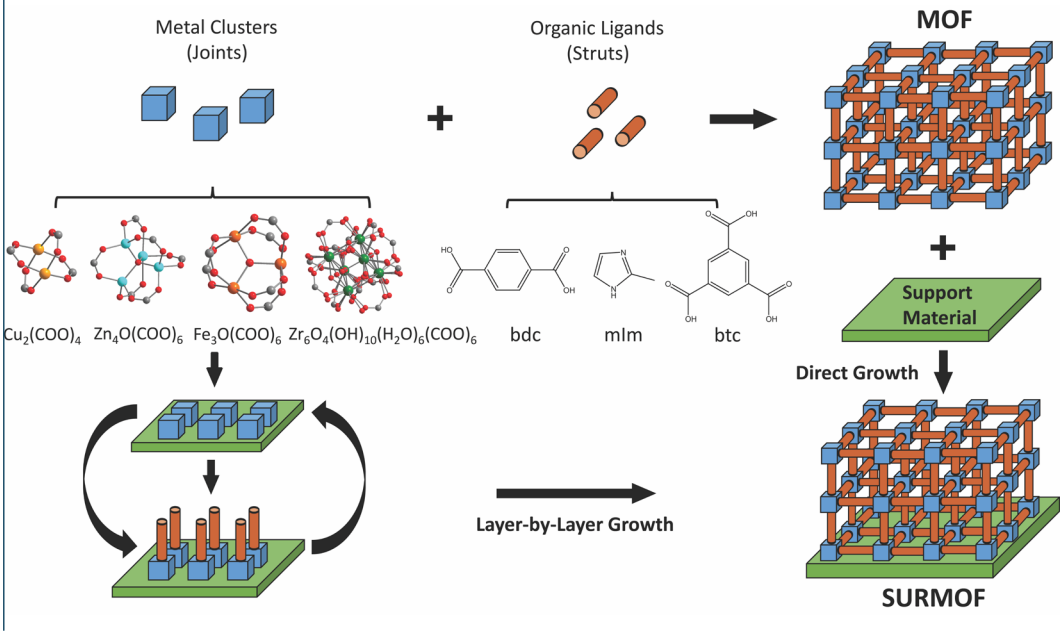


Figure 1. An illustrative scheme showing the formation of metal-organic framework (MOF) formation and fabrications of surface-supportive MOF (SURMOF).

Stent is a small metal mesh tube that can be introduced to artery through a catheter in a balloon angioplasty surgery to treat atherosclerosis, Figure 2. A healthy artery is covered with a smooth layer of endothelial cells, however, they can be damaged by many factors, such as toxins from cigarette smoking and a high level of cholesterol. Cholesterol carried in blood can be attracted and attached to an injured area in artery. Once the cholester-

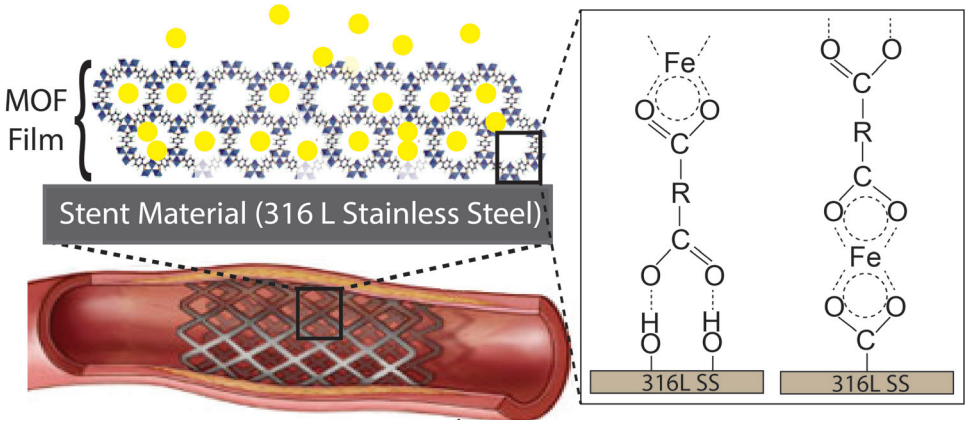


Figure 2. An illustrative scheme of showing use MIL-88 as a potential drug elution stent coating.

ol starts getting oxidized, our immune system will send out monocytes to attack and remove adsorbed cholesterol. These monocytes now become macrophages. However, if too much cholesterol attached on the artery wall, macrophages cannot engulf and digest all, resulting in a failed phagocytosis and macrophages will become foam cells, piling up with cholesterol. Because macrophages contain calcium, which will be released in the same area, this will cause the injured artery brittle and easy to rupture. The hardening in coronary arteries and the built-up of plagues will narrow the blood vessel, decreasing blood flow to heart. 50% of patients who suffer from atherosclerosis undergo a procedure known as balloon angioplasty with a stent being introduced to the wounded area. The process involves delivering a stent with a balloon and a catheter to the narrowed region. Then, the balloon will be inflated, expanding the stent and restoring blood flow. After that, the balloon will be deflated and removed from the artery, but the stent will be left in the wounded area to hold endothelium layer to prevent plague to re-grow. The first generation of stent is made from bare metal, such as medical grade stainless steel. However, clinical studies found that patients with bare metal stents tend to have a high rate of restenosis, growth of endothelial cells on the surface of stent, resulting in re-narrowing the coronary artery. The second generation of stent was developed: the drug eluting stent, which is coated with porous polymer that can be loaded with antiproliferative drugs, such as paclitaxel and everolimus. However, these polymer-based drug eluting stents are associated with late-stent thrombosis. The goal for the newer generation of stent is polymer-free drug eluting stent. There are several strategies, including direct drug coating, nanoparticle-based coating, self-assembled monolayer, stent reservoir, and porous inorganic coating.

Among all these methods, Dr. Tian's lab mainly focuses on using porous inorganic materials, more specifically biodegradable iron-containing MOFs (Fe-MOFs), as a potential coating material for drug delivery, Figure 2. Due to the low toxicity of selective Fe-MOFs, it is safe to apply surface-supportive Fe-MOFs on medical grade stainless steel. The goal is to design and evaluate certain Fe-MOFs as drug eluting stent coatings in terms of safety, efficacy, and flexibility. To achieve the objective, the project has been divided into three parts: 1) study drug delivery on selective MOF bulk materials; 2) prepare and characterize Fe-MOF thin films on functionalized solid substrates; and 3) evaluate drug encapsulation and delivery kinetics on Fe-MOF coated medical grade stainless steel. All research activities in these three parts are suitable for undergraduate and MS students. So far, 14 students have been involved in this project, many of them are undergraduate students.

Former undergraduate student Lester Carachure (Class of 2017) and MS student Andy Sua (Class of 2018) started the study of using MIL-88, a type of Fe-MOF, for drug delivery. They successfully synthesized four materials in the MIL-88 family, MIL-88A through D. After examining the toxicity and pore size, they decided to focus on MIL-88B, composing iron clusters connected with terephthalate ligands. Another two undergraduate students, Hao Pham (Class of 2021 from UC San Diego) and Kimberly Ramos (Class of 2022 from UC Davis), who worked in Dr. Tian's lab through the Bridges-to-Baccalaureate Program, confirmed that the drug loading capacity is 19.6 wt% for MIL-88B loaded with ibuprofen as a model drug and the drug release process can last over three weeks which is sufficient for drug eluting stent. Former undergraduate student Angela Bui (Class of 2020) continued the project and initiated the surface modification of gold surfaces for attaching MIL-88B thin film on top. She did extensive work to explore the film formation on COOH-terminated gold substrate and confirmed the binding between carboxylate end groups from a self-assembled monolayer and MIL-88 film. Current MS student Steven Guillen (Class of 2021) and undergraduate student Angel Ruiz (Class of 2022) are working on functionalizing stainless steel and fabricating MIL-88B film as a drug delivery layer on top. Steven also worked on computational chemistry to predict the MIL-88B SURMOF binding mechanism, and he found that the uncoordinated iron site is the key binding spot for carboxylate ligands to anchor. So far, two articles have been published on peer-reviewed journals from this project with CSULB students as co-authors. Two oral presentations and one poster presentation from this project have been given in American Chemical Society (ACS) National Conferences in the past three years.

Besides the drug delivery project, Dr. Tian's lab also focus on exploring environmental and energy related topics. One example is to purify methane from landfill gas by hybrid porous materials. Landfill gas is generated during the decomposition process of municipal solid waste landfills. It consists of 50-55% CH4, 45-50% CO2, and small amount of N2, H2S and water. The latest EPA data shows that municipal solid waste landfills are the third largest human-related CH4 emission source, contributing 18% of total CH4 emissions in the United States annually. CH4 is one of the potent greenhouse gases; meanwhile it is the main component in natural gas which is an alternative fuel source. Converting landfill gas to energy (high-BTU gas, >96% CH4) has great environmental and economic benefits. The goal of this research project is to reduce the cost and improve the efficiency of converting landfill gas to high-BTU gas by applying a new hybrid porous material in a "gas funnel" setup to better separate CH4 from carbon dioxide and other impurity gases. In Dr. Tian's lab, they synthesized a hybrid zeolite@ZIF-95 material and studied its properties towards gas adsorption. They calculated the selectivity of methane versus carbon dioxide on both materials based on the single-component gas isotherms, and the results show great selectivity towards carbon dioxide, indicating methane can be purified from CO2 by flowing a mixture of landfill gas even at room temperature and ambient pressure conditions. Another example is to use nanoporous MOF (Nano-MOF) for water remediation and gas sensing. Using nano-MOF as gas sensor material is still at its infancy stage, therefore many questions regarding physical chemical properties of those materials remain unanswered. One of the major uncertainties in the field of nano-MOFs is the nanocrystal formation mechanism. Understanding mechanisms of crystallization and growth of nano-MOFs is critical to obtain a well-defined structure. Ultimately, the quality of nano-MOFs determines the gas sensing selectivity and sensitivity. Dr. Tian's lab have been focusing on a type of nanoporous material: ZIF-8 nanocrystals. They employ fundamental surface science investigations to understand crystal growth mechanism and morphology control. The group have successfully synthesized ZIF-8 particles with a wide variety of sizes. Additionally, the Tian Lab have studied on the following topics: 1) Size control of ZIF-8 particles and how it will influence on gas sensing capability; 2) The driving force for nanocrystal to grow on a supportive surface; and 3) Control of morphology and growth patterns for certain nano-MOFs. Dr. Tian's lab also have research interest in two-dimensional MOFs, especially the ones with porphyrin ligands. They have studied the structure and electronic behaviors of two porphyrin-based MOF thin films for photoelectric conversion. Dr. Tian received funding from the Environmental Research and Education Foundation and the American Chemical Society Petroleum Research Funds. Based on the results that students collected, they published four peer-reviewed articles with undergraduate students as coauthors. Among all, Melissa Yang (Class of 2017), Michael Chin (Class of 2019), Jack Aldrich (Class of 2019), Mark Weber (Class of 2019), Kristi Ishihara (BS, Class of 2018; MS, Class of 2021), Benjamin Dao (Class of 2022) and Sebastian Marroquin (Class of 2022) have contributed tremendous effort into these projects.

Time went back to the day when Dr. Tian finished writing that drug-eluting stent proposal. She submitted the proposal to NIH on the due day. After that, she felt so relieved. Meanwhile, she promised to herself that she would never procrastinate a single task ever since. 11 months later, she was informed that she received the NIH SCORE Award! This grant will support the drug delivery project in her lab for another 4 years, and several more students will benefit from it.

New Faculty Profile: Dr. Julie Wahlman

NIH RUTH L. KIRSCHSTEIN POSTDOCTORAL FELLOW, UNIVERSITY OF UTAH

Dr. Julie Wahlman

The department welcomes Dr. Wahlman as its newest member! She joins us as an Organic Chemistry faculty member with a research program centered on organometallic chemistry.

Her journey as a teacher and scholar started at CSU Fullerton, where she graduated *summa cum laude* and began some of her scientific discoveries doing undergraduate research. She moved up the road to Caltech where she earned her Ph.D. with Prof. Sarah Reisman developing a variety of organic and organometallic reactions working with the persnickety metal, nickel. Her work during this period was supported by a highly competitive NSF graduate research fellowship which resulted in publications of very important discoveries in several world-leading chemistry journals. Concurrently, she began developing her teaching skills in a variety of meaningful ways, one of which was developing and teaching a course focused on the role of natural products in drug discovery. She then entered post-doctoral training at the University of Utah with Prof. Matthew Sigman, this time receiving an elite NIH Ruth L. Kirschstein Postdoctoral fellowship in support of her work. Coming from a variety of institutions on her journey, she brings expertise in the areas of organic chemistry and organometallic chemistry, but also complements the department in new ways with knowledge of computational chemistry and modern approaches to reaction development.

During her interview (online of course!) it was clear that Dr. Wahlman had a penchant for teaching and had thought about working with students in a largely undergraduate environment like at CSULB. Furthermore, being a research mentor at an institution which values student diversity was something that she was excited about as well. We think her passion for making new discoveries will likely be contagious to those joining her team!

Her research program at CSULB aims to develop new cross-coupling reactions that use earth-abundant metal catalysts. Cross-coupling reactions are commonly used in the pharmaceutical industry as they provide simple, yet robust disconnections for the preparation of complex drug molecules. Her recent publications in *J. Am. Chem Soc.* (2017) and *Angew. Chem. Int. Ed.* (2019) describe the design of new chemical transformations that use nickel catalysts to construct valuable building blocks without the need for expensive catalysts or toxic reagents.

“I’m excited to begin my research laboratory which will focus on developing new metal-catalyzed cross-coupling reactions that use inexpensive catalysts such as iron and nickel. My group will not only work on applying these methods in small molecule synthesis, but will also focus on using computational modeling and data science tools to help us understand fundamental physical principles behind reaction outcomes.”

Scientists regularly publish reactions that work, however, substrates or reaction conditions that fail are often not reported. “I think the field of organic chemistry is starting to really embrace a mindset that all data is good data,” Wahlman says. “In the past decade we have been seeing a lot of new studies that show how data science tools can make sense of why some reaction conditions work and why others do not.”

Wahlman hopes that incorporating data science tools in the laboratory can ease reaction development efforts and provide a better understanding of how to improve cross-coupling reactions in the future. “I think this is an excellent opportunity to not only train undergraduate and graduate students in experimental organic chemistry, but also tie in core fundamental chemical properties that students learn in their courses.”

Wahlman is also excited about teaching organic chemistry at CSULB and hopes to inspire her students to pursue a variety of exciting career paths. “Throughout my life I have had many teachers and professors who believed in my abilities as a scientist and an educator. Their support and encouragement have propelled me towards success. One of my goals as a professor is to be a mentor that can adapt to students’ needs and recognize how to best facilitate learning.”

In her courses, she also plans to highlight work being done by current research professors all over the globe. “The reactions we teach are often decades and even centuries old. While it is important for students to grasp that background knowledge, I think organic chemistry is most exciting when we can also see what advances are being made by scientists in our lifetime. Making those connections between the past and the present is what made me passionate about being a scientist. I hope that my students will leave my courses with an appreciation of how much organic chemistry impacts our everyday lives.”

In her free time, Wahlman enjoys finding opportunities to get outside and explore nature. She also enjoys cooking, gardening, volleyball, and playing board games with her family.

The Department of Chemistry and Biochemistry is anxiously awaiting Dr. Wahlman’s arrival in January of 2022!

By Drs. Wahlman and Schramm

ALUMNI NOTES:

Where are they now: Carolyn Kusaba Carroll, BS '12

By Margy Merryfield

Carolyn Kusaba Carroll's story illustrates the value of getting involved. As a transfer student from Long Beach City College, she came to CSULB not knowing anyone, so she decided to meet fellow students was to join SAACS. The year 2011 was the International Year of Chemistry, and in recognition, the ACS held a student chapter grant competition. Carolyn and another student were awarded a small grant to build solar-powered fuel cells and develop demonstrations to teach young children about renewable energy.

She presented her project to the Chemistry Department Advisory Council, where she was introduced to Dr. Steve Jones of Jones Environmental. Jones was impressed with the project, and connected Carolyn with his son, Chris, who, as Carolyn put it, "was really into gadgets and like to build things." Jones also donated solar cells to the project. After the project was completed, Carolyn presented the results to the Advisory Council. She reconnected with Jones, and he mentioned that he was looking for a summer intern. She jumped at the chance and worked at Jones Environmental as an intern for the summer and until she graduated with her BS in 2012, after which she was hired on full time.

When she started at Jones Environmental, it was entirely a mobile lab business. While there, she got the "extremely wonderful" opportunity to help them build and set up a fixed space lab – setting up brand new instruments straight out of the box, building methods, writing SOPs, and getting certification from the state. This experience proved especially valuable in securing her next job with the Orange County Water District.

Carolyn started working for the OC Water District in January 2018 as a Chemist and then Senior Chemist. After returning from maternity leave (she has a 1-year-old son), she was promoted to supervisor for the organic division. In that role, she spends less time than before at the lab bench, but she still takes on special projects. When we spoke, she was working on a multi-lab project spearheaded by Eurofins Eaton in Monrovia to develop and validate a new method for measuring nitrosamines in water. Her lab, along with others, was invited to participate in tests to establish how robust the new method was. The proposed method detects certain analytes that are not detected by the standard method and does not use ion traps. She explained that she was waiting to see results from the latest trials to "see who's right and how right I was."

Reflecting on her experience at CSULB, Carolyn has found her upper division lab classes to be especially valuable. Her favorite professor was "Dr. Shahab". Her engagement with the department and with SAACS also allowed her to get to know and appreciate the department staff. Even as she found time to be involved (for which she received the Toni Horalek Award), she also worked throughout college and learned to prioritize her time. That experience leads to the advice she has for current students – to learn how to "study smart" and use time effectively. She also recommends having fun, making connections with other students, staff, and faculty, and being present – not just showing up and leaving. Carolyn continues that philosophy in her own life, making time for family, a complex job, and weekly rehearsals with the Long Beach Community College Orchestra,

Where are they now: David Maynard, MS Chemistry '88

By Margy Merryfield

Dr. David (Dave) Maynard graduated from CSULB with an MS in Chemistry in 1988. Jim Jensen was his thesis advisor, and Dr. Maynard notes, "[Dr. Jensen] is someone I have always tried to model myself after. He was an intelligent, caring and knowledgeable life mentor." After graduating from CSULB, Dr. Maynard completed a PhD at UC Riverside in organic chemistry. He completed a teaching postdoc at Occidental College before joining the faculty at CSU San Bernardino as an assistant professor of chemistry. This was a return home for Dr. Maynard, as his BS degree was also from CSUSB.

At CSUSB, his research was in natural products, including a class of natural pesticides isolated from avocados. In 1995, he and a colleague from the Anthropology Department set up the Laboratory for Ancient Materials Analysis. The lab analyzed several meso-American artifacts, including the Pakal Funeral Mask, a Mexican national treasure that can be seen in the National Anthropology Museum in Mexico City. He also served as co-director of the Inland Area Science Project, providing professional development for middle school science and math teachers.

Over the years, Dr. Maynard has served in a variety of roles at CSUSB, including 12 years as chemistry department chair, interim dean of both the College of Natural Sciences and the Palm Desert Campus, Special Assistant to the Provost, Assistant Dean, Interim Chair of Geology (4 years) and Math (1 year), and Director of the School Computer Science and Engineering (1 year). While chair, he was involved in the planning, design, construction, and occupation of a new Chemical Science Building, which was completed in 2005.

Continuing his long record of service, Dr. Maynard is now a CNS Dean's Fellow working on improving pathways for community college students to transfer to CSUSB, which allows him to work with students, staff, faculty and administration on both the CSUSB and community college campuses.

During his time at CSULB, Dr. Maynard recalls using the first Mac computer with ChemDraw installed in Roger Acey's lab. Dr. Acey would allow him to use the computer late at night when he was working on his thesis. Besides Dr. Jensen, he cites Drs. Po, Acey, and Nakayama as major influences on his education.

When asked what he found particularly rewarding about his career, he described the opportunity as an educator to help students not only transform their lives, but their families, community and future generations.

His recommendation to students just starting out on a career in chemistry would be to stay interested in all aspects of life. "Although life as an undergraduate and/or graduate student is very challenging, it is also one of the best times of your life," he concluded.

AWARDS, HONORS & SCHOLARSHIPS

Chemistry and Biochemistry Students, 2021


Kayla Landers


Andrew Alvarez


Benjamin Dao


Harry Doan


Danna De Boer


Justin Duong


John Burdick

Undergraduate Awards and Honors

Richard D. Green Dean's Award	Kayla Landers
Department Honors	Sargis Srapyan, Andrew Alvarez, Jubilee Munozvilla
AIC Chemistry	Aaron Chavarria
AIC Biochemistry	Robert Mejia
Scoggins Award	Joe Yamauchi
Biochemistry Award	Annamarie Vu
Toni Horalek Award	Jubilee Munozvilla
Inorganic Chemistry Award	Natalie Tran
John H. Stern Award in Physical Chemistry	Kayla Landers
ACS Award in Physical Chemistry	Danna De Boer
Freshman Chemistry Award	Bhavik Bajania
Spyros Pathos IV Award	Brianna Broderick
ACS Organic Chemistry Award	Kayla Landers, Saba Dalaub
ACS Polymer Chemistry Award	Darlene Gonzalez
Organic Chemistry Award	Hutson Taylor
ACS Analytical Chemistry Award	Benjamin Dao
Analytical Chemistry Award	Harry Doan

Graduate Awards and Honors

Graduate Dean's List	Justin Duong
Richard D. Green Dean's Award	Justin Duong
Outstanding Thesis	John Burdick
Department Honors	Aaron Miller
Department Honors	Josh Mercado
Department Honors	Blair Russel
AIC Chemistry	Nick Pavlakovich
AIC Biochemistry	Kyle Meyer
Outstanding Teaching Assistant	Cecilia Cisneros

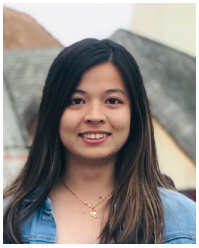
AWARDS, HONORS & SCHOLARSHIPS

Chemistry and Biochemistry Students, 2021


Steve Guillen


Jocelyn Dominguez


Danna De Boer


Kim Hong Keu


Andrew Beshay

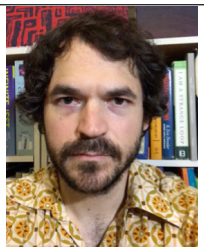
Scholarships

Aida Husain	**Graduate Research Fellowship**	**Kim Hong Keu**	**Leslie K. Wynston Scholarship**
Vidya Metkar	**Richard D. Green GRF**	**Nishi Rauth**	**Kenneth L. Marsi Award**
Steve Guillen	**Richard D. Green GRF**	**Kenny Calderon**	**Monahan Memorial Research Fellowship**
Miguel Palma	**Richard D. Green GRF**	**Cullen Lewis**	**Monahan Memorial Research Fellowship**
Jocelyn Dominguez	**Whitaker Memorial Fellowship**	**Andrew Beshay**	**Robert B. Henderson Memorial Scholarship**
Miguel Palma	**Whitaker Memorial Fellowship**	**Aaqil Khan**	**Robert B. Henderson Memorial Scholarship**
Danna De Boer	**Phi Beta Kappa**	**Karel Aceituno**	**John H. Stern Summer Research Fellowship**
Minh Dinh (Jackson)	**Beckman Coulter Foundation Scholarship**	**David Feliz**	**John H. Stern Summer Research Fellowship**
Alexia Morales	**Beckman Coulter Foundation Scholarship**	**Douglas Fowler**	**John H. Stern Summer Research Fellowship**
Ivan Villavicencio	**Beckman Coulter Foundation Scholarship**	**Danna De Boer**	**ORSP Summer Student Research Award**
Vanessa Plascencia	**Beckman Coulter Foundation Scholarship**	**Jia Mao**	**ORSP Summer Student Research Award**
Aida Hussain	**McAbee-Overstreet Award**	**Cullen Lewis**	**ORSP Summer Student Research Award**

AWARDS, HONORS & SCHOLARSHIPS

Chemistry and Biochemistry Students, 2020


Stephanie Leal


William Wellman


Jude Khatib


Darian Gamble

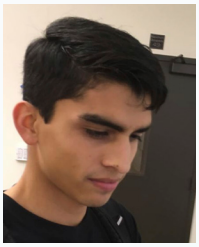

Angela Bui


Anh Nguyen


Daniel Nguyen


Harry Doan


Denise Torres`


Daniel Figueroa


Kareem Asham


Abbas Abdulhasan


Jalyssa Felix


Benjamin Dao


Jocelyn Dominguez

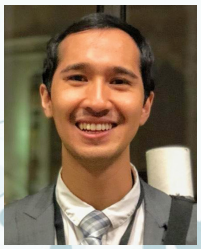
Undergraduate Awards and Honors

Richard D. Green Dean's Award	Stephanie Leal
Department Honors	William Wellman, Jude Khatib, Darian Gamble
AIC Chemistry	Angela Bui
AIC Biochemistry	Anh Nguyen
Scoggins Award	Daniel Nguyen
Biochemistry Award	Harry Doan
Toni Horalek Award	Angela Bui
Inorganic Chemistry Award	Denise Torres
John H. Stern Award in Physical Chemistry	Daniel Figueroa
ACS Award in Physical Chemistry	Kareem Asham
Freshman Chemistry Award	Alex Yuan
Spyros Pathos IV Award	Abbas Abdulhasan
ACS Organic Chemistry Award	Lawrence Thai
ACS Polymer Chemistry Award	Piunik Babakhanins, Jalyssa Felix, Ethan Lim
Organic Chemistry Award	Benjamin Dao
ACS Analytical Chemistry Award	Emily Shu
Analytical Chemistry Award	Jocelyn Dominguez

Graduate Awards and Honor

Graduate Dean's List	Lee Macklin
Outstanding Thesis	Phil Ly
Department Honors	Jonathan Godinez
Department Honors	Bingli Wang
Department Honors	Kristi Ishihara
AIC Chemistry	Jiam Vuong
AIC Biochemistry	John Burdick
Outstanding Teaching Assistant	Phil Ly, Heather Hershberger

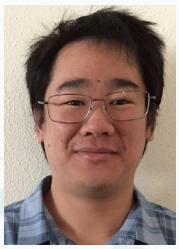

Lee Macklin


Phil Ly


Jonathan Godinez


Bingli Wang


Kristi Ishihara

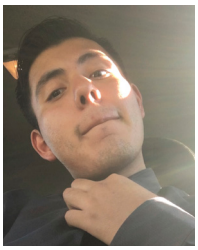

Jiam Vuong

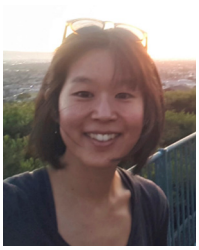

John Burdick


Heather Hershberger

AWARDS, HONORS & SCHOLARSHIPS

Chemistry and Biochemistry Students, 2020


Jose Luis Martin


Jessica Shin


Justin Duong


Kim Hong Keuv


Danna De Boer


John Anthony Orlina Arcillas


Kayla Landersv


Daanish Kulkarni


Andrew Beshay


Noemi Castro


Lynn Nguyen


Andrew Alvarez


Steven Guillen

Scholarships

Jose Luis Martin	**Graduate Research Fellowship**	**John Anthony Orlina Arcillas**	**Kenneth L. Marsi Award**
Jessica Shin	**Richard D. Green GRF**	**Kayla Landers**	**Monahan Memorial Research Fellowship**
Jessica Shin	**Whitaker Memorial Fellowship**	**Daanish Kulkarni**	**Monahan Memorial Research Fellowship**
Justin Duong	**Whitaker Memorial Fellowship**	**Andrew Beshay**	**Robert B. Henderson Memorial Scholarship**
Jose Luis Martin	**McAbee-Overstreet Award**	**Noemi Castro**	**Robert B. Henderson Memorial Scholarship**
Jessica Shin	**McAbee-Overstreet Award**	**Lynn Nguyen**	**John H. Stern Summer Research Fellowship**
Kim Hong Ku	**Leslie K. Wynston Scholarship**	**Andrew Alvarez**	**California pre-doctoral Fellowship**
Danna De Boer	**Kenneth L. Marsi Award**	**Steven Guillen**	**ORSP summer research Fellowship**

ALUMNI NOTES:

Where are they now: Katherine (Kathy) Kurjan, BS Chemistry 1986

By Margy Merryfield

Kathy Kurjan graduated from CSULB with a BS in Chemistry in 1986. A springboard diver in college, she noted that participating in athletics and working a job while going to school meant that it took her five years to graduate. Her first venture into industry was a summer internship before her senior year with American Hospital Supply (now Baxter), where she performed polymer synthesis and characterization.

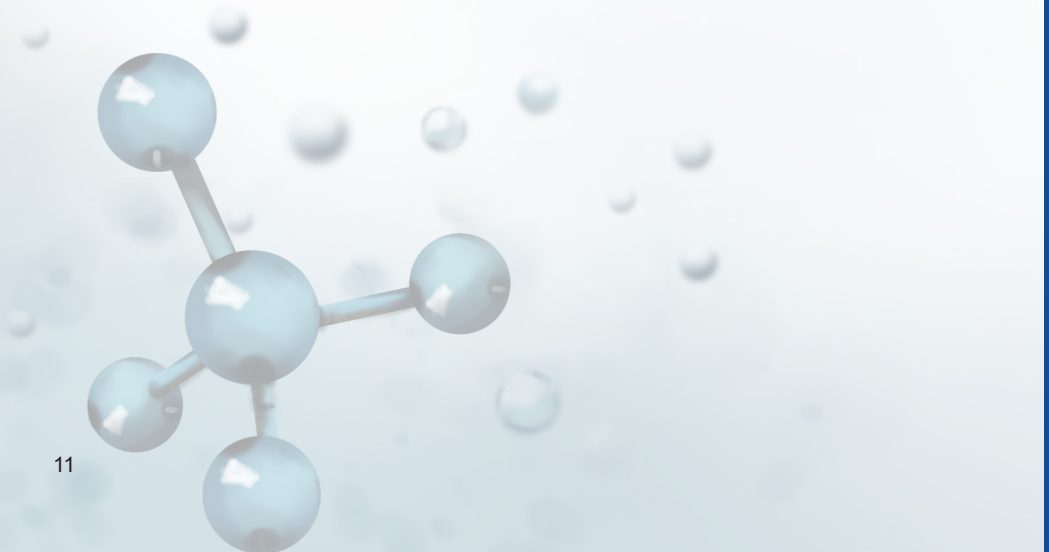
From her internship work, she learned of an opening at Allergan; she applied and was hired as a formulator in July of 1986. There, she held many titles, beginning as an Associate Professional, followed by Professional and Senior Professional, Specialist, Scientist, Manager, Senior Manager, and finally retiring in 2016 as Director of Chemical Development.

She did bench work for the first nine years and then moved toward management, a choice motivated by the opportunities for advancement it provided; to advance on the scientific track would have required an advanced degree. As a manager, in addition to doing science, she had responsibility for managing projects and people – an extra layer of complexity that she discovered she enjoyed. She and members of her team contributed to developing many different pharmaceutical products that came to market. She also had the opportunity to travel to and work with labs all over the world, interacting with scientists and business people around the globe. Since retiring, she has been consulting on a part-time basis with a variety of companies, helping them bring drugs into clinical trials or to commercialization. While this work is also global, in the COVID era, it means meetings on Zoom or Teams instead of extensive travel.

While her career has taken her far, she also notes, “Chemistry is really is a small world and most people I meet have friends in common. The people connection is very important. I even met my spouse at work, who is also a scientist, which was an added bonus.”

Faculty members who were particularly influential for Kurjan included Dr. Peter Baine, who met her when she was an undeclared major in introductory chemistry and encouraged her, telling her she could do well in chemistry, and Dr. John Stern, with whom she did undergraduate research measuring heats of dissolution of amino acids (accompanied by classical music). She still keeps in touch with Anette Guerrero, a fellow research student. She also got to know Dr. Nail Senozan, whose lab was across the hall, and who always invited her over to visit. She recalls sharing many a piece of carrot cake with him.

One of the things she found most valuable about her CSULB education was its emphasis on hands-on experience, not just theory. As she puts it, “It gave me that first step in the door to start my career in science. I have loved it and never looked back.” When asked to offer advice to new students starting out, she responded, “Your first science job may be the trajectory to your career, so if you absolutely hate it, move on quickly to something else that seems more interesting so you don’t rack up a ton of experience and then feel stuck. Just remember that any work experience can help you with your science career in some way or another.” She also pointed out that having a PhD can provide the greatest level of career opportunity.



ALUMNI UPDATES:

Dmitri Pervitsky (MS 2001, advisor Lijuan Li):

“I have been working with the 773rd weapon of mass destruction civil support team located in Germany since winter 2018. I am acting Nuclear Medicine Science Officer, primarily responsible for the mobile Analytical Laboratory. Our mission is to support the US Army installations in Europe by providing analytical services. The unit has Survey, Decontamination, Medical/Analytical, and Logistic teams. Between April and June 2020, we screened over 2200 just arrived or ready to leave US military and civilian personnel. We identified and quarantined all Covid-19 infected people preventing epidemic among US Army troops who participated in the Defender 2020 exercise in Poland. In addition to our efforts, Public Health Command Europe screened every US military and civilian personnel, confirming that my team had 100% analytical success.”

Pervitsky completed a Ph.D. in 2008 at UC Irvine. He rose through the ranks in the US Army Reserve, attaining the rank of major in 2018, and has worked as a US Army civilian chemist since 2016, including as a Senior Chemist (Organic Chemistry Division) for the Public Health Command Europe from 2016 to 2020 and as a Senior Chemist (Method development Team) with the US Army Public Health Center since 2020.

Henry U. Valle (BS Biochemistry 2008, research advisor Dr. Xianhui Bu):

I completed my Ph.D. at Mississippi State and am now a Senior Scientist, MicroED | Small Molecule X-Ray Crystallography, with NanoImaging Services, Inc. in San Diego.

Dear Alumni:

We’d love to hear from you and where you’ve gone since your time with our department. Your research advisor, or any of your former faculty would always appreciate a note and a quick “hello.” Please feel free to contact us anytime, or you can reach out to the department chair as well. We’d be honored to write up an “alumni notes” intervor an “alumni update” note with your help.

FACULTY REPORTS

Douglas McAbee

My wife Cristy and I retired at the end of the spring 2020 semester and relocated to Eagle, Idaho (a suburb of Boise). We enjoy the area very much, and being close to our adult kids who live in Boise is a big plus (at least for us… the kids may have a different opinion). Experiencing four full seasons has been a welcome adjustment after 23 years in southern California with its two seasons—the pleasant it-should-be-raining-but-isn't winter season and the exciting evacuate-now-ahead-of-the-flames summer season.

Professionally, I've continued developing clinical or research-focused case studies as supplements for my biochemistry colleagues to use as they deem appropriate in CHEM 441A/B instruction. These have included guided inquiries on hemolytic anemia caused by pyruvate kinase mutations, the biochemical effects of acetaminophen toxicity, an analysis on the effects of cytochrome c redox status on apoptosis avoidance, and more recently a clinical and research analysis of the function of the mitochondrial form of phosphoenolpyruvate carboxykinase. I also served my second year on the accreditation review study section for the American Society for Biochemistry and Molecular Biology. This service has helped me better appreciate the strength and vigor of our biochemistry program in our department particularly given the large number of students in our major.

Arguably my most impactful professional activity this past year was to design t-shirts for the CHEM 4443 lab for the fall 2020 and spring 2021 semesters! Biochemistry lab t-shirts have been a tradition since 2010, and the theme for both shirt designs was, of course, COVID. These designs proved very popular with students and faculty, and putting them together was a lot of fun for me. (We sent Dr. Anthony Fauci at NIAID one of The Vaccinator t-shirts, which I'm sure he wears proudly to briefing sessions at the White House.) Special thanks goes to our graphic artist Lilit Grigoryants (Lilit.Grigoryants@gmail.com) who creative skills helped make our ideas a cool reality. I also wish to thank Mr. Pedro Ramirez and the good folks at Quality-ScreenPrint (Santa Ana) for their expertise in printing our shirts over the last 10 years. They do great work!

Dr. Douglas McAbee

My first year of retirement confirmed a prediction I had for many years, which is that I would not miss grading exams. This is certainly the case. I also imagine students are relieved at not having to take them either! I do miss my department colleagues and interacting with students, particularly those in our biochemistry group. It's just a void that cannot be filled in any way, and I value those times this last year when we've gotten together on Zoom to laugh and commiserate. I look forward to seeing them again, hopefully sometime in this coming year.

Deepali Bhandari

This was a year of unexpected challenges on many fronts. Apart from the health concerns, the pandemic brought on the sudden switch to virtual instruction, restrictions on research labs, and the merger of the personal and professional space. It took extensive scheduling and planning to make sure that instruction remained effective, that research continuity was maintained, and that work-life boundaries stayed manageable. On a broader scale, the pandemic spotlighted the vast extent of racial inequities so prevalent in our society for centuries. It also elevated the dire need for civic scientific literacy. That "the mask" became the center of a political debate and a partisan issue is both appalling and concerning!

While it all seemed overwhelming initially, looking back on it, last year did teach us some valuable life lessons. It taught us how to adapt to rapidly changing circumstances and how to stay socially cohesive while staying physically distanced. It forced us to think outside the box and use the technology to innovate instruction and expand research collaborations. Not least, it affirmed the value of science for the betterment and well-being of society, and the need for clearly communicating science to our elected officials and public. It was also heartening to see the scientific community at the forefront of acknowledging the systemic racial bias and engaging in discussions to address these disparities and to take measures to remedy the injustice.

Amidst the chaos and reckoning, what shone brightly was my students' resilience and grit. They stayed focused on their goals and worked efficiently to ensure timely progress towards their graduation. Undergraduates Stephanie Leal, Anh Nguyen and Jude Khatib graduated with the 2020 Richard D. Green Outstanding Graduate Award, American Institutes of Chemists Biochemistry Baccalaureate Award and Departmental Honors, respectively. Stephanie has joined the Ph.D. program at UC San Diego and Jude at Penn State in Hershey. Anh has now entered the second year of the joint MS-MD program at the California Northstate University. Yotham Ghaly completed his University Undergraduate Honors thesis last semester and Reyalyn Villegas will be starting the Ph.D. program at the University of Illinois, Chicago this Fall. Graduate student Rosanna Calderon successfully defended her thesis in Spring 2021. She is pursuing her Ph.D. at University of Southern California. Five others (Kelly Araujo, Iris Marquez, Noemi Castro, Koyinsola Oloja and Jamie Solorsa) completed their experimental work and are now writing with the aim to defend their master's theses in AY2021-22. Kelly Araujo has already started her Ph.D. program at Loyola University Chicago (my Alma Mater!) and Noemi Castro will be joining the Ph.D. program at the UC Davis this Fall.

While we bid a fond farewell to graduating students, we also welcomed new students to our group. Two undergraduate students - Anma Arora and Prerana Reddy and two graduate students - Miguel Meza and Michelle Castillo started in the lab this summer.

Dr. Bhandari's lab group

My students also brought recognition to the lab by winning prestigious fellowships and scholarships. Graduate student Aida Husain was awarded the 2021-22 CSULB Graduate Research Fellowship and the McAbee-Overstreet Scholarship. Graduate student Miguel Palma received the 2020-21 Whitaker Recruitment Scholarship and the 2021-22 Richard D. Green Graduate Research Fellowship. Undergraduate Nishi Rauth (NIH-RISE fellow) was awarded the 2021 Kenneth L. Marsi Endowed Scholarship. Nishi was also one of the 2021 Glenn Nagel Undergraduate Research Award finalists at the CSUPERB annual symposium. Undergraduate Anma Arora received the 2021 President's Commission Scholarship. Together, my students also presented 9 posters (virtually) at various meetings and symposia.

One highlight of this year was that I successfully applied for the NIH SCORE SC3 grant (funded April 2021). In addition, I received two grants from CSUPERB – the Research Development Grant and the COVID-19 Micro Recovery Grant. Another highlight was that I had the honor to be one of the recipients of the 2020-21 University Distinguished Faculty Advising and Mentoring Award. Receiving this award is very special to me as mentoring students has been one of the most rewarding aspects of my job. It has been a very humbling experience to witness our students overcome their struggles to get their education. As I have grown into the role of a mentor, I view mentoring as a journey on which I help students chalk out a path to reach their destination, overcoming any obstacles along the way. Keeping in touch with them even after they graduate and lending them support when they need it has brought me job satisfaction way beyond what I had expected when I started my position seven years ago. In the years to come, I will continue to provide students with an inclusive and welcoming environment in my classroom and my lab.

STEPHEN MEZYK

To say that 2020 – 2021 was difficult for me/group would be an understatement, but now that we are approaching the end of this year – things are definitely looking brighter! Moving to on-line teaching in March 2020, for my newly developed Physical Chemistry one-semester lecture course (CHEM379) was very hard, but ultimately successful as I learned how to teach in this format. Fall 2020 was a little more difficult for me, as I had three completely on-line courses; CHEM379 again, plus our majors Physical Chemistry Laboratory class (CHEM373) and my graduate course (CHEM574). Most of my students seemed to struggle with the on-line format in these upper-division classes, especially with COVID impacts hovering over all of them all the time. Teaching the lab course was the hardest of these three, even with provided data students struggled to understand the concepts we were trying to cover. But everything improved in Spring 2021, when CHEM373 was my only course, and now is back to normal in Fall 2021 where we are back in person. During this time I have learned a lot about different teaching practices and technology, and I'm continuing to incorporate that learning in my classes now.

The shut-down we experienced in Spring 2020 also mean that my own research basically stopped: both CSULB and the national laboratories I visit for data collection were not available to me for over a year. However, I still managed to graduate one MS student, Justin Duong in 2020, who was able to write his thesis on data obtained in a single (January) Notre Dame visit! He received the Richard D. Green Award for being the top Graduate Student in Chemistry and Biochemistry, so his research was still pretty good. Justin is now back working at his old laboratory, and moving upwards in his industry position. In addition, journal publications kept on coming (9 in total in 2020-2021 to date) mainly thanks to being able to write up outstanding data obtained with my postdoctoral fellow Greg Horne, who is now full-time at Idaho National Laboratory. We continue to collaborate on various nuclear-related projects, which are still giving us excellent publications and conference presentations. With all the restrictions in place, I did not get involved much with conferences, but we did have one presentation in 2020, and the group will have 7 in 2021. So life is slowly getting back to normal.

The halt in my active research coincided with my grant funding running out in 2020, and so it was also a year of writing new grants. Of the 14 grants I submitted, two NSF grants have been (so far) successful. The first is on microplastics chemistry in natural waters, investigating weathering of these species and how it impacts their environmental chemistry. The second is on looking at reductive technologies to remove perfluorinated chemicals from waters. Two new areas for me, new collaborators as well, and now that I'm able to get kinetic data at the national labs again, we have made a great start on both. It will be exciting working on these two projects for the next few years.

Another major positive for my research was that I had 6 MS students join my group in 2020, mostly working on kinetics projects at CSULB using our stopped-flow spectrophotometer. Initially it was difficult to get the research going, especially as most of these students weren't actually allowed on campus until Summer 2021, but I am still planning on graduate them in Spring/Summer 2022 and along with theses will come more publications. My undergraduate group shrank to only a few students, but now that I am teaching General Chemistry, I am hoping to get a few more eager students to work with me in the future. This will also be aided by my Sabbatical semester in Spring 2022 – where I will have time to do research both at CSULB and at the national laboratories.

So as 2021 comes to an end, it is very

gratifying to be able to say that both myself and the RadKEMTM group has been able to survive the past 16 months, and continue to be healthy, have fun, and be busy and productive in research. We are all looking forward to a much more successful year in 2022.

JASON SCHWANS

Our lab continues to ask the question, "How do enzymes work?". Research directions in the lab are focused on several major enzymology projects including: 1) Synthesis and biochemical evaluation of cholinesterase inhibitors as potential therapeutics for neurodegenerative diseases; 2) experimentally and computationally investigating the catalytic role of 'near active-site residues' in triosephosphate isomerase to aid in the design of new enzymes with new functions; 3) using tyrosine phenol lyase to enzymatically generate unnatural amino acids; 4) identifying potential cellulases for biofuel production; and 5) developing synthetic approaches for modified amino acids.

Despite the major challenges over the past year, progress was made in the lab. Phillippe Ly, Lee Macklin and Julie Heejin Park defended their MS Biochemistry theses. We had a large number of undergraduate students graduating from the lab: Aaron Chavarria, Michael Lam, Jubilee Munozvilla, Nicole Paz-Bracamonte, Hannah Ramirez, Merin Rixen, and Izzy Yardumian. They are off to PhD programs, MS programs, professional schools, and careers.

Experimental projects were slowed or stopped by the lab shutdowns, but progress was made during this time in computational modeling and predictions. With access to the lab restored, we are now following on the computational work and experimentally testing the predictions. We are also continuing on the experimental work that was halted last year. The lab continues with a dedicated and motivated group of graduate and undergraduate students. I look forward to seeing their continued success.

YOUNG SHON

Our research on the synthesis and catalysis applications of colloidal metal nanoparticles and their hybrids has continued during the past year and a half despite the lab closure and limited opening brought by the spread of COVID-19. First, a research proposal on liposome bilayer-embedded palladium nanoparticle catalysts is funded by the National Science Foundation for the period of three years (7/2020 – 6/2023). Second, we were able to publish two papers during this period despite the unusual situation we all had to face. Peter Tieu, a former graduate student, and Vincent Nguyen, a former undergraduate student, are the co-authors of the paper published in Frontiers in Chemistry. Dr. Al-Mahmnur Alam, a post-doc, is the first author of the second paper published in ACS Applied Nano Materials. Third, I have continuously served as a PI for SCORE-funded research project - colloidal nanoparticle catalysis for enzyme site mimics – which ended at the end of April this year.

Two graduate students completed their degree program during this period. Christos Nixaridis successfully completed his MS thesis in May 2020 and joined the Department of Chemistry at Syracuse University for his Ph.D. studies. Bingli Wang successfully defended her thesis in March 2020 before she went back to China to find a position in industry. A continuing graduate student, Edwin Avila, presented his research in the national meetings (ACS National Meetings in March 2021, virtual). Edwin will join the Department of Chemistry at the University of Houston for his Ph.D. studies when he completes his thesis this summer.

Three other graduate students, Dominick Ortega, Faraz Hussain, and Nicholas Pavlakovich are also getting close to finishing their thesis work. Two new graduate students, Jan Farag and Joshua Garcia, joined our lab this past year. Jan is working on the water-soluble nanoparticle catalysis project with a focus on investigating the influence of carbon quantum dots as co-catalyst. Joshua who is co-advised by Dr. Narayanaswami is studying the formation and catalysis of Apo E lipid nanoparticle – Pd nanoparticle hybrids. Due to the limited lab opening, only two undergraduate students, Saba Dalaub and Christian Powell, were able to spend their time in the lab during this period. Saba is continuing her training in our Chemistry Program as a M.S. graduate student starting this fall semester. I am looking forward to having in-person interactions with my research students during the post COVID era.

MARGY MERRYFIELD

As I write this, it's the beginning of my third year in the Faculty Early Retirement Program (FERP). It doesn't feel like that much time has passed, perhaps because pandemic time passes at a different rate. I didn't face many of the challenges my colleagues did – since I wasn't teaching, I didn't have to learn how to run an effective class online; with no children at home, I didn't have to juggle my own responsibilities with "Zoom School". However, I did go about 17 months without setting foot on campus, and it's nice to once again be in the regular physical presence of other people.

I have continued to work as the Equity Advocate for CNSM. In this role, I've been embedded on faculty search committees in the college, helping them focus on equity and inclusion from start to finish. I've also been offering training on different aspects of the search process. Last year, in response to the national conversation around anti-racism and racial justice, a small group of us within the college organized programming to stimulate conversations. These included a college-wide kick-off meeting where participants were asked to view a recent documentary about James Baldwin (I Am Not Your Negro) and read a blog post from Scientific America by 500 Women Scientists titled, "Silence is Never Neutral; Neither is Science".

Dr. Margy Merryfield

In the spring, Dr. Nicole Joseph led a workshop for the college. Dr. Joseph is a researcher focused on the math identity development of black women and girls as well as their intersectional experiences in mathematics, as well as structures that promote a white supremacy culture in STEM fields and in the academy. Her presentation was titled, "Moving Beyond 'Access' and 'Equity': Calling on STEM Faculty to Have Courageous Conversations About Whiteness in STEM." Following her presentation, three of us each led a small reading group that met biweekly for three months, diving deeper into these topics and how we each could contribute to a just and equitable community personally and professionally.

My other major project last year was developing a new course for upper-division General Education credit. Current rules for GE require that all incoming students complete an upper-division GE course in science or math, but the college actually has very few offerings. In response to this. I created “Chemistry in the Kitchen”, which will be offered for the first time this spring. It reflects my lifelong enjoyment of cooking and baking (yes, I did bake a few loaves of sourdough during the lockdown) coupled to a science nerd’s love of experimentation and fascination with what’s behind the recipe. Here’s the description: “From the first discovery of the positive impacts of cooking on food safety, taste, and digestibility, to molecular gastronomy, where chefs use scientific techniques to play with their food, chemistry is at the core. This course explores the chemical and biochemical processes that make food edible and delicious. In addition to gaining an understanding of the science of cooking, students will be encouraged to develop their own skills as science-driven cooks.”

FANGYUAN TIAN

Despite the pandemic, our lab still achieved great student success. Six lab members graduated: Angela Bui and Trenton Nguyen graduated in Spring 2020; Kristi Ishihara (MS), Tiffany Nguyen, George Alfarhat and Leonardo Barajas graduated this spring all with excellent academic records. Among all, Angela joined the PhD Program of Biochemistry, Molecular and Structural Biology (BMSB) at UC Los Angeles; Trenton joined the PhD Program in Biomedical Engineering; Kristi started as a Research Scientist in AMVAC since January 21; Tiffany was admitted to the PhD Program of Electrical Engineering at UC Santa Cruz; George was admitted to the PharmD Program at UC San Francisco; Leo received several job offers from different companies. We wish them continued success in their future careers!

We continue to work on adsorptive phenomenon and chemical reactions at the surface and interface of porous solid materials. Our research progress was hindered by the pandemic, we had two peer-reviewed publications with our own students last year. Several lab members attended national meetings to present our research. Among all, Tiffany Nguyen and Trenton Nguyen presented two posters in ABRCMS last November; and MS student Steven Guillen gave an oral presentation in ACS national meeting this spring. Additionally, Dr. Tian received the NIH SCORE (SC3) grant last year. With the financial support, we will work on using metal-organic frameworks for drug delivery.

Dr. Tian’s lab group

Lastly, we welcome several new lab members: Ricky Rodriguez (MS student), Raymond Yu (MS student), Jacquelin Chen (MARC Scholar). We look forward to another exciting year!

PAUL WEERS

The Weers research group aims to understand the structure-function relationship of a group of lipid-transporting proteins named apolipoproteins. Or research is funded by an NIH SCORE SC3 grant, supporting the research carried out by of our students. The main focus of the grant is to elucidate the contribution of the N-and C-terminal helices of human apolipoprotein A-I to lipid binding interactions and self-association. This to better understand how apolipoprotein A-I forms high density lipoproteins, which play a crucial role in cholesterol transport in the vascular system. High cholesterol levels in the blood lead to formation of plaques in our artery walls, block blood flow and restrict supply of sufficient oxygen to the heart, eventually resulting in a heart attack. We are also very interested in an insect apolipoprotein, apolipophorin III, which is used as a model system to better understand the structure-function relationship of apolipoproteins. All our proteins are produced in a bacterial expression system, which also allows us to generate many mutant forms of the protein by site-directed mutagenesis.

Most of the undergraduate students of the Weers research group graduated since the last newsletter: Diego Alcala, Rohin Basi, Dylan Blaauw, Kaitlyn Burns, Amy Chan, Andrew Fowler, Lindsey Ondieki, and Joe Yamauchi. Further, John Burdick (now perusing a PhD at UCI), Heather Hershberger, Nauruti Patel (technical position at Bio-Rad), and Blair Russell graduated with a MS degree in Biochemistry. John Burdick was received the best thesis award from our department, and we published two papers, one in Chemistry and Physics of Lipids with former student Tilini Wijeratne, who is currently a PhD student at UC Santa Cruz. The second paper was recently accepted for publication in Biochimica et Biophysica Acta - Biomembranes with James Horn and Blair Russell.

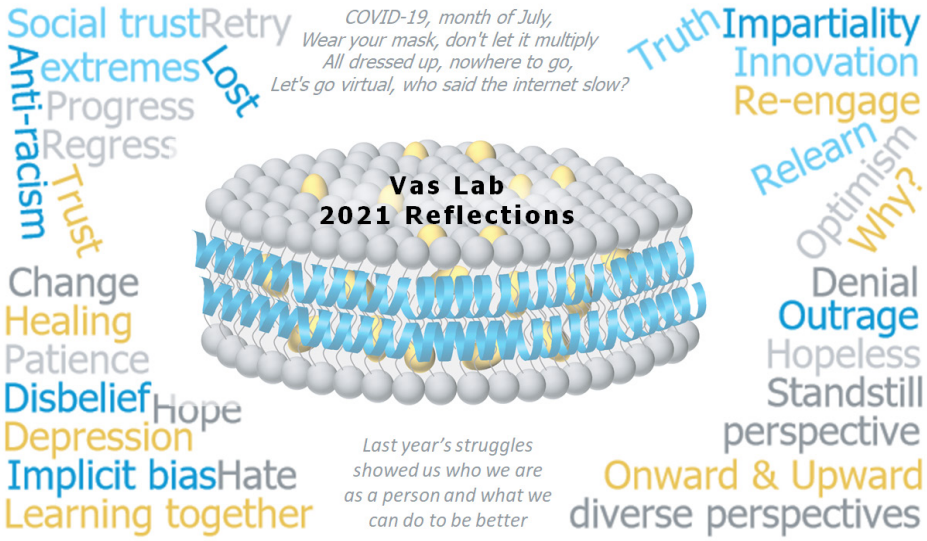
Many students were severely affected by the lock-down and unfortunately their research projects were cut short. However, we have recovered and are back in force with a new team of enthusiastic students: Alli Adams, Trevor Chapman, Judy Jauregui, Ramiro Monteon, and Juliette Rodriguez.

VAS NARAYANASWAMI

Zoom, Zoom, Zoom- that pretty much describes the last 15 months of the pandemic for all of us- both in terms of our interaction format and the speed with which time went by. My lab members and I derived strength from each other by meeting online routinely in small and big groups and directing our attention on research articles.

It is highly commendable that students were able to reach the finish line successfully given the limited access to the lab and the lock-downs. We waved goodbye to undergrads Kyla Anderson (University Honors), Kristina Dela Cruz (Women & Philanthropy Scholarship and University Honors) , and Robert Meija

(NIH MARC T34 trainee; Department Honors and American Institute of Chemists (AIC) Undergraduate Biochemistry Award) moving on to PhD program at University of Wisconsin, Madison, Joseph Pedregon (University Honors), and Kevin Seo (DOE HSI-STEM trainee) moving on to Pharmacy school, University of California, Irvine.



Dr. Narayanaswami's lab reflections

Equally commendable is the number of new students who courageously joined my research group amidst the chaos. We welcomed new undergrads: Zahraa Abdulhasan (NSF LSAMP Summer Research Fellow), Kasandra Khiev and Christy Nguyen (NIH MARC T34 trainee), and graduate students Joshua Garcia, Jose Lemon, Vidya Metkar and Dhaval Patel.

We celebrated Vidya Metkar's 2021 Richard D Green Dean's Graduate Research Fellowship award, Kyle Meyer's 2021 AIC Graduate Biochemistry Award, John Aracillas' 2020 Marsi Award, Abbas Abdulhasan's Edison 2021 STEM-NET Student Research award, NSF LSAMP Fellowship award and being named 2020 CSULB NSF LSAMP PROUD Scholar. And lastly we have Muhammad Abeer (who moved on to start PhD program Delaware State University), Vernon Benedicto, Daanish Kulkarni (moving on to start PhD program at University of California, Irvine), Kyle Meyer and Jessica Shin persevering with their MS theses work.

All these achievements are fabulous! But how did we get through the last 15 months, shrouded with the pandemic, layered with social unrest and generously peppered with socially unjust incidents?

Reflecting on these events, we threw our collective thoughts into a Word Cloud or expressed them as couplets. What emerged is an image woven with extreme thoughts of truth and despair, healing and depression, and trust and disbelief. But amidst all this, the message of hope and optimism rang out loud and clear, raising their heads defiantly, with a determination to retry, re-engage and relearn …..Thank you, team!

MICHAEL P. SCHRAMM

"4/19/43 16:20: diethylamide tartrate, 0.25 mg, diluted in 10 cc water, tasteless.

17:00 Beginning dizziness, feeling of anxiety, visual distortions, symptoms of paralysis, desire to laugh. I asked my laboratory assistant, who was informed of the self-experiment, to escort me home. We went by bicycle... On the way home, everything in my field of vision wavered and was distorted as if seen in a curved mirror. Nevertheless, my assistant later told me that we had traveled very rapidly" – Albert Hofmann

As part of my new course, "Naturally Dangerous" (first taught online!) this was one of many explorations my class and I went on together, via the Socratic method *mind you!* discussing the ability for molecules to cross through skin, to have pronounced biological activity and to face how the USA has treated such powerful substances, even in the face of evidence that they can do more good - than harm. Sometimes there are mind-altering substances do more harm than good with little restriction.... Nuances of the FDA's approval process for drugs, but not supplements, of when organic might be less safe than non, of what constitutes if something is safe? why natural has almost no bearing in the discussion? These and other issues we wrestled with as the pandemic began.

Not unlike the first LSD-25 trip described above, the past 24 months have felt like time has been viewed through a curved mirror. In October 2019 I helped celebrate my post-doctoral advisor's 75th birthday in Shanghai - presenting work to a daunting audience of scholars from the world's powerhouse institutions. Little did any of us know what was looming just months away after that auspicious gathering.

Returning to lab in the new year ('20) several senior students were on the cusp of making their finest discoveries in lab - only to be sent home. Lisa, Tia, Grant, Vy, Alex went on to pursue a variety of dreams and brave new members joined - under the worst of circumstance and performed remarkably well, Ryan, Anna, Zach, Jack, Hannah, Sahana, Colby and a 2nd crop of crystals precipitated, my "gang of 7" Darlene, Susan, Simran, Jackson, Balleria, Kassady and Estella. Together we continue our work on doing metal mediated catalysis in confined pockets of space - currently we are exploring asymmetric catalysis as well as diastereoselective transformations.

2020 & 2021 M.S. THESES

Master of Science Chemistry

Christos Nixarlidis

"Palladium Nanoparticles and Titanium Oxide-Supported Palladium Nanoparticles for Catalytic Alkene Transformations in Water"
Advisor: Young-Seok Shon

Bingli Wang

"Influence of Semiconducting Nanodiscs on Colloidal Catalysis of Palladium Nanoparticles in Water"
Advisor: Young-Seok Shon

Justin Duong

"Nitrate Radical Reactions as a means of Remediating Antibiotic-Contaminated Wastewaters"
Advisor: Steve Mezyk

Kristi Ishihara

"Optical and Electrical Properties of Porphyrin-Containing Metal-Organic Framework Thin Films"
Advisor: Fangyuan Tian

William Ryan Sueme

"Synthesis and Characterization of Dinitrosyl Iron Compounds with Tris-Phosphine Based Ligands"
Advisor: Lijuan Li

Dominick Ortega

"Lipid Bilayer-Embedded Hydrophobic Palladium Nanoparticles for Catalysis of Olefins in Water: Effects of Lipid Membrane and Phase Transition"
Advisor: Young-Seok Shon

Edwin Avila

"Water-Soluble Palladium Nanoparticles for the Oxidation of Terminal Alkenes"
Advisor: Young-Seok Shon

Master of Science Biochemistry

Phillippe Ly

"Organophosphate Triester Inhibitors of Butyrylcholinesterase: Part I – Effect of the Cholinyl Substituent; Part II-Effect of the Substitution of Oxygen by Sulfur Atoms"
Advisors: Jason Schwans, Kensaku Nakayama

Lee Macklin

"Synthesis of 7-Alkyl-3-Benzylcoumarins and Organophosphate Coumarin Hybrids: Potential Implications in Cancer and Alzheimer's Disease"
Advisor: Jason Schwans

Julie Heejin Park

"Investigating the Structural Role of the Conserved Glu97 in Triosephosphate Isomerase from Saccharomyces cerevisiae"
Advisor: Jason Schwans

Aaron Miller

"Regulation of actin dynamics by SelR"
Advisor: Elena Grintsevich

Muhammad Abeer

"Modification of Apolipoprotein E, a Cholesterol Transport Protein, by 4-Hydroxynonenal, a Lipid Peroxidation Product"
Advisor: Vas Narayanaswami

Blair Russell
"Insight into the structure and function of fragments of apolipophorin III from Locusta migratoria and the role of the individual helices in lipid binding"
Advisor: Paul Weers

Heather Hershberger

"Probing the antimicrobial activity of apolipoprotein A-I"
Advisor: Paul Weers

Rosanna Calderon

"Investigating the Role of The PI3K-Akt Pathway in Adaptation to Endoplasmic Reticulum Stress in MDA-MB231 Cells"
Advisor: Deepali Bhandari

Koyinsola Bolutife Oloja

"Impact of Phosphorylation of CDK5 at Residues Serine 46 and Serine 47 on its Activity and Function"
Advisor: Deepali Bhandari

Jamie Solorsa

"Effect of Akt Inhibition on Endoplasmic Reticulum Stress Signaling"
Advisor: Deepali Bhandari

Kelly Araujo

"The Effect of Phosphoinositide 3-Kinase Inhibition on the Unfolded Protein Response"
Advisor: Deepali Bhandari

FACULTY PUBLICATIONS 2020-2021

Dr. Xianhui Bu

Yang, H.; Peng, F.; Hong, A. N.; Wang, Y.; Bu, X.; Feng, P., Ultrastable High-Connected Chromium Metal-Organic Frameworks. J. Am. Chem. Soc. 2021, 143, 14470–14474

Hong, A. N.; Yang, H.; Li, T.; Wang, Y.; Wang, Y. X.; Jia, X.; Zhou, A.; Kusumoputro, E.; Li, J.; Bu, X.; Feng, P., Pore-Space Partition and Optimization for Propane-Selective High-Performance Propane/Propylene Separation. ACS Appl Mater Interfaces. 2021, doi.org/10.1021/acsami.1c10391

Zhang, J.; Feng, P.; Bu, X.; Wu, T., Atomically Precise Metal Chalcogenide Supertetrahedral Clusters: Frameworks to Molecules, and Structure to Function. Nat. Sci. Rev. 2021, doi.org/10.1093/nsr/nwab076

Li, Y-P.; Zhao, Y-N; Li, S-N; Yuan, D-Q; Jiang, Y-C; Bu, X.; Hu, M-C; Zhai, Q-G, Ultrahigh-Uptake Capacity-Enabled Gas Separation and Fruit Preservation by a New Single-Walled Nickel-Organic Framework. Adv. Sci. 2021, 8, 2003141.

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Dinh, A.; Yang, H.; Nguyen, T. C.; Hong, A.; Feng, P.; Bu, X., Isoreticular Three-Dimensional Kagome Metal-Organic Frameworks with Open-Nitrogen-Donor Pillars for Selective Gas Adsorption. Cryst. Growth Des. 2020, 20, 3523

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Xiao, Y.; Hong, A. N.; Hu, D.; Wang, Y.; Bu, X.; Feng, P., Solvent-free Synthesis of Zeolitic Imidazolate Frameworks and the Catalytic Properties of Their Carbon Materials. Chem. Eur. J. 2019, 25, 16358-16365

Dr. Elena Grintsevich

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Dr. Lijuan Li

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Dr. Stephen Mezyk

Horne, G.P.; Mezyk, S.P.; Mincher, B.J.; Zarzana, C.A.; Rae, C.; Tillotson, R.D.; Schmidt, N.C.; Ball, R.D., Ceder, J.; Charbonnel, M.-C, Guilbaud, P., Saint-Louis, G.; Berthon, L., DEHBA (di-2-ethylhexylbutyramide) gamma radiolysis under spent nuclear fuel solvent extraction process conditions, Radiat. Phys. Chem. 170, 108608, (2020).

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Dr. Vansanthy Narayanaswami

Kothari, S., Bala, N., Patel, A., Donovan, A. & Narayanaswami, V. (2021) The LDL Receptor Binding Domain of Apolipoprotein E Directs the Relative Orientation of its C-terminal Segment in Reconstituted Nascent HDL. Biochimica Biophysica Acta (Biomembranes) 1863, 183618

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Dr. Michael Schramm

"Au-Cavitands: Size Governed Ring Closing Reactions of Alkyne-aromatics" Lisa E. Rusali and Michael P. Schramm, Tetrahedron Letters, 2020 https://doi.org/10.1016/j.tetlet.2020.152333

Dr. Jason Schwans

Macklin L.J; Schwans, J.P. Synthesis, Biochemical Evaluation, and Molecular Modeling of Organophosphate-Coumarin Hybrids as Potent and Selective Butyrylcholinesterase Inhibitors. Bioorg. Med. Chem. Lett. 2020, 30, 13.

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Dr. Young Shon

Tieu, P.; Nguyen, V.; Shon, Y.-S. Proximity Effects of Methyl Group on Ligand Steric Interactions and Colloidal Stability of Palladium Nanoparticles. Front. Chem. 2020, 8, 599.

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Dr. Fangyuan Tian

Pham, H., Ramos, K., Sua, A., Acuna, J., Slowinska, K., Nguyen, T., Bui, A., Weber, M. D. R., Tian, F., "Tuning crystal structures of iron-based metal-organic frameworks for drug delivery applications," ACS Omega, 2020, 5, 3418-3427.

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Dr. Paul Weers

Russell, B.A., Horn, J.V.C, and. Weers, P.M.M., 2021, Fragments of Locusta migratoria apoLp-III provide insight into lipid binding. BBA Advances 1 (2021) 100020

Maravilla, E., Lee, D.P., Tran, J.J., Chiu, M.H., Prenner, E.J., Weers, P.M.M., 2020, Apolipophorin III interaction with phosphatidylglycerol and lipopolysaccharide: a potential mechanism for antimicrobial activity. Chem. Phys. Lipids 229, 104909.

FACULTY AWARDS 2020-2021

Dr. Deepali Bhandari

CSULB University Distinguished Faculty Advisor and Mentoring Award 2020-21

Dr. Michael Schramm

CNSM Faculty Award for Excellence in Teaching, Service and Research, 2020.

Dr. Jason Schwans

CSULB Distinguished Faculty Teaching Award, 2020.

Dr. Fangyuan Tian

CSULB Early Academic Career Excellence Award, 2020.

Dr. Paul Weers

CSULB Outstanding Professor Award, 2020-2021

Distinguished Faculty Advising Award, 2020

The President's Award for Outstanding Faculty Achievement 2019-2020

FACULTY GRANTS 2020-2021

NSF-MRI-CHEM 2117040 MRI: Acquisition of a Single Crystal X-ray Diffractometer 8/1/21-7/31/24 $354,871
PI: Xianhui Bu
CoPIs: Michael Schramm, Young Shon, Fangyuan Tian

NSF-DMR-Solid State and Materials Chemistry 2105961 RUI: New Ultrastable Crystalline Porous Materials 09/01/21-8/31/24 $392,017
PI: Xianhui Bu

ORSP Multidisciplinary Research Grant
PI: Elena Grintsevich

NIH SCORE (SC3) the grant will support our research project on "porous inorganic framework thin film as drug-eluting stent coating" for four years.
PI: Fangyuan Tian

EAGER: Laboratory radiation chemistry methods to induce rapid aging of microplastics in water to assess fundamental chemical reactivity changes. 09/20. NSF-EAGER $300,000
PI: Steve Mezyk

ERASE-PFAS: Collaborative Research: Development of Quantitative Tools to Assess the Mechanisms and Full Potential of UV-ARPs for the Treatment of PFASs in Water NSF-EAGER $499,011 08/21.
PI: Steve Mezyk

NIH SCORE SC3 (Grant # GM121246) "Molecular Mechanisms Underlying Cell Survival During Endoplasmic Reticulum Stress" 04/25/21-03/31/24
PI: Deepali Bhandari

CSUPERB Research Development Grant "Role of Akt pathway in regulation of the unfolded protein response" 06/01/21-11/30/22
PI: Deepali Bhandari

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