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FRESNO STATE

College of Science and Mathematics

SPRING  
2018



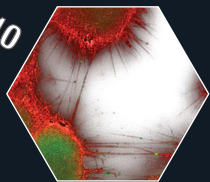
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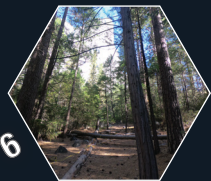
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STUDYING  
GEOPHYSICS ON  
EARTH & BEYOND



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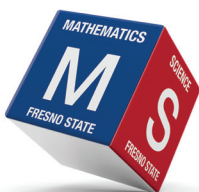


# Welcome

**CHRISTOPHER R MEYER,**  
**DEAN,**  
*COLLEGE OF SCIENCE  
AND MATHEMATICS*

*Dean's Message  
Elements Magazine  
Winter 2018*

**IT IS TRULY  
A GREAT TIME  
TO BE A BULLDOG!**



It is with great pleasure that I present the sixth issue of ELEMENTS magazine from the College of Science and Mathematics. It has been an exciting and action packed year for the college as we continue to successfully advance our teaching, research, and service mission. I began as Dean in July and it has been a wonderful experience getting the “lay of the land” here and meeting so many talented and dedicated faculty, staff, and students. It is an honor and privilege to serve as Dean and I have been continually impressed with the vibrant and diverse ecosystem of our college departments and programs. The commitment to student “learning by doing” in research and the authentic integration of teaching and research happening in our college is amazing and inspiring. This core value was highlighted by our first “Fresno State STEM Symposium for Course Based Research and Projects” this fall which featured over 60 student poster presentations, including the entire arc of student experience - from freshman to graduate students. The college also recently received a generous gift of \$500,000 from an Anonymous Donor to support Course-based Undergraduate Research Experiences (CUREs) in genetics, molecular biology, and biochemistry. In addition, we held a grand opening for our renovated biology and chemistry teaching labs, in McLane Hall and Science 1 respectively, providing enhanced spaces for active learning and collaboration. We continue to excel in research with faculty and students presenting work at regional, national, and international meetings and publishing in high quality journals. We are very proud of our faculty who secured funding from the National Institutes of Health this year, including Dr. Joe Ross, Dr. Mihai Gherase, Dr. Jason Bush, and Dr. Qiao-Hong Chen. We also just learned that a National Science Foundation Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) grant was funded in the Mathematics Department; congratulations to Dr. Oscar Vega and his outstanding team. The college also received a donation from Chevron to support the Physics Outreach Program that inspires K-12 students and trains future STEM teachers; this gift will enable the program to expand their efforts, provide new science demonstrations, as well as a demonstration trailer or “mobile unit” for underserved schools.

In this issue, we highlight our nationally accredited Fresno State School Psychology Program which has awarded over 200 degrees in school psychology, enabling our graduates to provide special education assessment, prevention programs, academic and behavioral interventions and mental health services for students in K-12 schools. The educational experience combines classroom instruction with hands on experience in schools which leaves graduates highly prepared for a career in school psychology. This highly successful program is having an extremely positive impact on schools in the Central Valley. It is also notable that the Applied Behavioral Analysis (ABA) Masters Program in the Psychology Department was recently rated as one of the top ABA programs in the nation by Applied Behavior Analysis EDU. The program at Fresno State emerged as one of the 23 best psychology programs in the US from a review of hundreds of schools, one of only five from California. We also spotlight the research program of Dr. Alain Plattner in the Department of Earth and Environmental Sciences who joined us in 2014. His research interests span from below the surface of the Earth to the far reaches of the solar system and engages many undergraduates and graduate students. His outstanding work has been funded by both NASA and the National Science Foundation. Students in his applied geophysics class conduct their own research projects on campus, and three undergraduate students are currently assisting with his planetary research. These and other stories and updates in this issue are representative of successes happening all over our college – it is truly a great time to be a Bulldog! **We look forward to an outstanding 2018.**







# PSYCHOLOGY PROGRAM

By Kathleen Schock

Some children struggle in school because of academic deficits or personal circumstances, as well as their unique social, emotional or behavioral needs. According to Dr. Marilyn Wilson, coordinator of the Fresno State School Psychology Program, school psychologists work to support children by direct interventions and counseling and indirectly through collaboration with teachers, parents, administrators and community partners.

School psychologists are on the front lines to help students cope with challenges that could otherwise have devastating academic consequences. "It can be heartbreaking to hear the stories of what kids go through and experience," says Jill Duran, school psychologist for the Clovis Unified School District who graduated from the Fresno State School Psychology Program in 2005. "Unfortunately, a lot of the situations I cannot change. But I can be there to listen, provide support and help them navigate it the best that they can," she says.

Since its founding in 1989, the nationally accredited Fresno State School Psychology Program has awarded over 200 degrees in school psychology to graduates like Duran, enabling them to provide special education assessment, prevention programs, academic and behavioral interventions and mental health services for students in K-12 schools. Housed in the College of Science and Mathematics, the school psychology program has developed a reputation for providing a rigorous and high impact educational experience that combines classroom instruction with hands on experience in schools. Students and alumni say the program leaves graduates highly prepared for a career in school psychology.

**"I'LL BE READY TO FULLY FUNCTION AS A SCHOOL PSYCHOLOGIST."**

**~ Casanova**



*Roger Casanova & Supervisors*



*The program provides a rigorous and high impact educational experience that combines classroom instruction with hands on experience in schools.*



Dr. Marilyn Wilson, Dr. Hong Ni,  
Dr. Carlos Calderon



**Advisory Board – Front Row:**  
L to R – Jason Stricker, Gina Fabrizio,  
Shant Avakian, Andrea Valadez  
**Back Row: L to R –**  
John Logan, Tim Conway, Kris Lachs,  
Trish Small, Janelle Martin



School Psychology students at  
National Association of School  
Psychologists National Conference



Tristan Kuizenga, recent graduate,  
presenting at conference.

## “I SEE VERY INTELLIGENT, MOTIVATED, ETHICAL, PROFESSIONAL AND PASSIONATE PEOPLE THAT CARE ABOUT KIDS.” ~ Vang

Dr. Wilson noted the strong community support the program enjoys. “We have an advisory board comprised of representatives from the school districts where our students complete practica and internships. These districts also employ many of our graduates,” she says. “We value their input on our curriculum and training needs. The field experiences these districts provide are a critical part of our program.”

Kong Vang, a school psychologist for the Fresno Unified School District, graduated from the program in 2010. He describes the program as highly regarded, difficult to get into, rigorous and worthwhile. “It’s as close of a guarantee you can get for a quality career,” he says, pointing to the 100% placement rate of graduates. “You’re guaranteed quality instruction, quality supervision and guidance from exceptionally knowledgeable professors.”

Each year the program admits approximately 10 graduate students as a cohort. During the first two years students take an average of 15 units per semester and spend 8-12 hours each week in supervised school-site work experience called practicum. Current student Roger Casanova says that starting practicum immediately helped him to transition more easily to the field.

“This program is difficult but rewarding,” Casanova says. “It’d say it’s one of the toughest graduate programs. It is really course heavy because there is so much to learn, but the faculty do a really good job making sure you understand the material and keep up with everything. Also, the experience you get from practicum is really meaningful.”

As a third-year student, Casanova is now in the final phase of the program, working as a full-time intern under the supervision of a school psychologist for the Fresno Unified School District. He credits the close interactions he’s had with faculty and the structure of the program for helping him be ready for the challenge. “By the time you get to the internship you feel really prepared and by the time I’m done in May I think I’ll be ready to fully function as a school psychologist.”

In addition to Dr. Wilson, the program’s faculty also includes Drs. Hong Ni and Carlos Calderón.

Their research and instruction focuses on cultural competence in working with culturally and linguistically diverse students and their families, critical knowledge for school psychologists serving diverse communities like the Central Valley. “The professors gave a lot of their time to us because they love school psychology and they wanted us to succeed,” says Duran. She also singles out the cohort experience and the support she received from her classmates as something that makes the program special.

Wilson says the connection the program maintains with alumni is critical to its success.

Many of the school psychologists that serve as field supervisors for current students are graduates of Fresno State’s program. Vang values his role as a supervisor for students completing their practicum and internships. “I see very intelligent, motivated, ethical, professional and passionate people that care about kids,” he says.

The program is proud of its ethnic and linguistic diversity in a field where over 90 percent of practitioners are Caucasian who speak only English. Wilson says approximately half of the students in the school psychology program are from underrepresented groups and bilingual. But while the students come from varied backgrounds, a passion for helping young people and deep sense of empathy with the challenges they face is what drives many to the profession. “Growing up, I didn’t always get straight As. I didn’t always behave like I was supposed to,” Casanova says. “Now when I see students struggling tremendously, or saying that school feels impossible, I understand and relate to them a lot.”

Like many graduates of the program, Casanova hopes to remain in the Central Valley after graduation. “I love the diversity of the populations of students I work with,” he says. And the feedback he has received from alumni and others in the field make Casanova confident the school psychology program at Fresno State has set him up for success. “People tell me all the time how awesome the program is and how it really prepared them for the job.”



**Dr. Alain Plattner**

# STUDYING GEOPHYSICS E EARTH AND BEYOND

*"In my teaching, my primary focus is providing students something that is going to be useful for them."*

By Kathleen Schock

**W**ith research interests that span from below the surface of the Earth to the far reaches of the solar system, Dr. Alain Plattner is developing and utilizing new methods to shape our understanding of planets both near and far.

Plattner joined Fresno State in 2014 as an assistant professor in the Department of Earth and Environmental Sciences. Since then he has explored the magnetic fields of Mars, Mercury and the Moon with undergraduate students, while also using ground penetrating radar and electrical resistivity tomography to look beneath Earth's surface with graduate students.

It is rare to find a faculty member with such divergent areas of interest, or a deeper passion for his fields of study. Plattner's eyes sparkle as he explains the odd way boulders settle after a rock avalanche. His face lights up as he describes models that map spatial relationships on distant planets. He brings contagious energy to the College of Science and Mathematics, which he describes as an ideal place in which he can explore his broad interests. "I really love the Department of Earth and Environmental Sciences. It is small and people get along so well with each other," Plattner says. "Having colleagues that really challenge me, even though they may be from a different subfield, is really valuable."

Born and raised in Basel, Switzerland, Plattner says it was mathematics, not planets, that first piqued his curiosity. He earned a bachelor's and master's degree in mathematics from the University of Basel before discovering applied geophysics and his love of planets. While working toward his Ph.D. at ETH Zurich, Plattner developed computer programs to use electrical measurements from the ground to make images of the Earth's subsurface. He planned on using his expertise to work in the private sector, "but I learned how much fun it was to do research and make discoveries, and that love just continued throughout my postdoctoral work," he says.

In 2011 Plattner joined the Department of Geosciences at Princeton University as a postdoctoral

researcher. While there, Plattner's research focus expanded out of this world, literally. He developed a new method to more accurately calculate the magnetic fields of distant planets using satellite data. NASA was so impressed with Plattner's research, they awarded him a grant to further develop the methods and use them to study the magnetic field of the southern pole of Mars.

He subsequently was awarded a prestigious National Science Foundation grant to make the method publicly available and easy to use. Undergraduate students from Fresno State are currently assisting Plattner in this aspect of his research. He says it is deeply rewarding to see others use the methods he developed to make new discoveries. "It's a great feeling when you find something that you haven't seen in other people's research articles about this place that is really far away in the night sky, and realize that I contributed to people having a better understanding than they did before," he says.

Plattner says his goal is to advance research while providing practical educational experiences for his students. He is working with two graduate students who are using electrical resistivity and ground radar methods to peer beneath the surface of Yosemite Valley and study rock avalanches that occurred thousands of years ago. The expertise the students are developing will make them highly employable after graduation. "In my teaching, my primary focus is providing students something that is going to be useful for them," Plattner says.

His undergraduate students are also deeply engaged in research. Students in his applied geophysics class conduct their own research projects on campus, and three undergraduate students are currently assisting with his planetary research. "Undergraduate research is extremely important and should be expanded as much as we can," he says. "If a student knows they are figuring out a new piece of information that no one knows, that is very motivating."

Plattner has worked with students and researchers from leading universities around the world, but says his students at Fresno State are among the best. "Some of the undergraduate students I've worked at Fresno State with are incredibly talented. They would be a match for undergraduate students at Princeton that I've worked with."

Despite developing methods to grow our understanding of distant planets, Plattner says he still feels awe as he peers into the night sky. "I look at the moon and I know a student of mine has investigated that part of it, or I look at Mars and think about the data that I've studied, but I find it really hard to connect what I do in my research with what I see in the sky," he says. "It still feels really far away." It is this sense of wonder he expects will never diminish as he continues to close the knowledge gap between us and our galactic neighbors while deepening our understanding of the planet we call home.





# 2017 Rod Coburn

## TOP DOG College of Science & Mathematics

*"Universities are an intellectual component of the community," Coburn says.*

*"Those of us that are a little more senior need to be models and support – and I don't necessarily mean financially – the University, so that the students feel really connected to the community."*



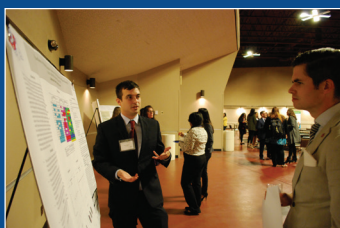
**Dr.** Rod Coburn was named the College of Science and Mathematics 2017 Outstanding Alumnus at the Top Dog Alumni Awards Gala on October 13, 2017. The gala is a signature event where alumni are honored for accomplishments in their fields and commitment to service in the community. Dr. Coburn graduated with a bachelor's degree in zoology in 1964 before earning a Doctor of Dental Surgery degree from University of California, San Francisco in 1968. Rod served as a dental surgeon in the U.S. Army. In 1971, he started his own private practice in restorative dentistry, and has since served as a dental consultant and teacher with a multitude of organizations. Rod's philosophy of putting other's needs above his own led to his involvement in a number of community service activities. Rod has been involved with the Fig Garden Rotary Club, the Fresno County Employee's Retirement Association, the Fresno Mosquito and Vector Control District Board of Directors, CASA, the Fresno County Grand Jury and more. Dr. Coburn's favorite Fresno State memory was meeting his wife Shelly in a geography class. Fifty-six years later, they are still going strong and are active supporters of Fresno State.





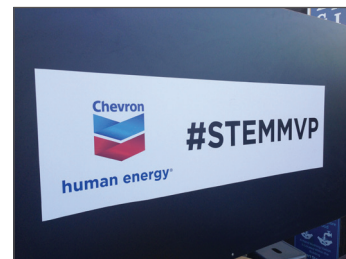
## ANNUAL APPLIED BEHAVIOR ANALYSIS CONFERENCE

The Fresno State Applied Behavior Analysis Club held their 19th Annual Applied Behavior Analysis Conference on November 3rd, 2017. The one-day event hosted experts in the field of Behavior Analysis and was attended by students, faculty, behavior analysts, and other professionals in related fields from the Central Valley community. This conference continues to grow and this year had over 200 attendees. Speakers included Dr. Claudia L. Dozier from the University of Kansas who spoke on treating escape-maintained problem behavior, Dr. Elie Kazemi from California State University Northridge who spoke on supervising professional staff, Dr. Caio F. Miguel from California State University Sacramento who spoke on complex verbal behavior, and Dr. Adel Najdowski from Pepperdine University who spoke on teaching perspective-taking skills to individuals with autism. In addition, the conference also included a research poster session where graduate students showcased their work for the community. This year there were several posters from Fresno State graduate students, as well as students from California State University Northridge and California State University Sacramento.



## COLLEGE STUDENTS VOLUNTEER FOR CHEVRON STEM ZONE OPPORTUNITIES

Several College of Science and Mathematics students offered their time this fall for a paid volunteer and networking opportunity through Chevron. Students volunteered at the Chevron STEM Zone at the Fresno Fair and the Feria de Education held on the Fresno State Campus in October. The Chevron STEM Zone is an interactive space for students, teachers, and parents to learn about science, technology, engineering and mathematics (STEM) through sports activities. The volunteers assisted with hands-on activities, helping schoolchildren and event attendees as they experienced the activities.



## COMMUNITY COLLEGE TEACHING: PREPARING FUTURE FACULTY PROGRAM



On November 30th, eight College of Science and Mathematics alumni returned to campus to share the highlights and heartbreaks of teaching science at a community college with college graduate students. Alumni discussed their path to career success, tips and best practices for graduate students and the "average day" in the life of a community college educator. Students represented the college's departments: Biology, Chemistry, EES, Computer Science, Mathematics, Physics and Psychology.



## SCHOOL PSYCHOLOGY PROGRAM DONATES OVER 1,000 BOOKS

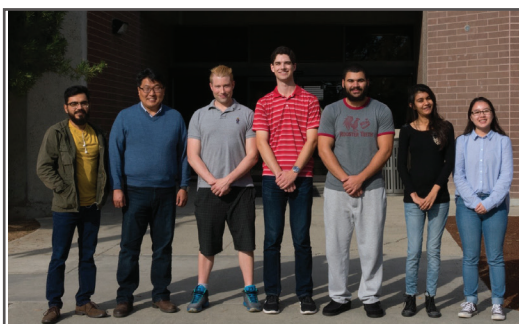
The School Psychology Program held its Second Annual Book Drive in December. All donated books were donated to students attending Susan B. Anthony Elementary School in Fresno. This year, we generously received 1,000 books to donate to the elementary school.

## STAFF MEMBERS ATTEND CCWC

On September 19, 2017, many of our staff members attended the annual Central California Women's Conference. The one-day conference educates and facilitates idea-sharing about how to succeed personally and professionally in life while juggling the increasingly complex and diverse demands of family and community. Fresno State is a major sponsor for the Central California Women's Conference.



# FACULTY RESEARCH



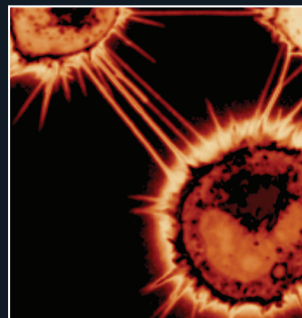
From left to right, Randy Espinoza, Dr. Choi, Logan Wood, Garrett Bader, Ahmed Mohamed, Monika Nimavat, and Der Xiong.

## Dr. Jai-Pil Choi

### DEPARTMENT OF CHEMISTRY

Dr. Choi, a faculty member in the Department of Chemistry, studies materials on the nano-meter scale, or nanomaterials. The goal of his research lab is to develop simple, accurate, and cost-effective electrochemical sensors that can be used to monitor environmentally hazardous chemical and/or biological species, such as chemical weapons (e.g., sarin), heavy metals in water (e.g., lead and mercury), and antigens. His research group is developing various metallic nanomaterials, which can be used

to make chemical and biological sensing platforms. The fundamental properties of prepared nanomaterials are characterized with various analytical instruments including a transmission electron microscope, an electrochemical analyzer, an electronic absorption spectrometer, a spectrofluorometer, a quartz crystal microbalance, and a nuclear magnetic resonance spectrometer. The Choi research lab is using this approach to develop fast, new analytical methods that consume smaller amounts of sample than traditional analysis methods.

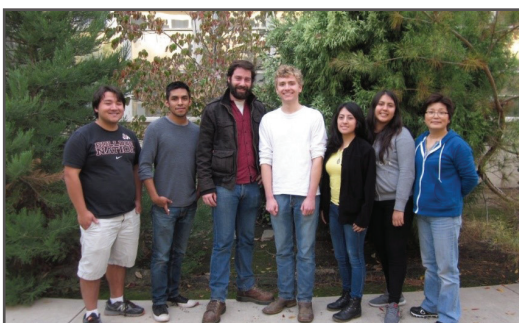
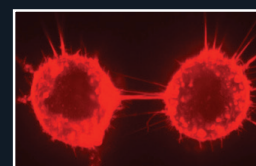
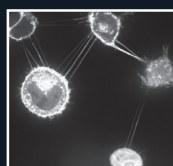


## Dr. Karine Gousset

### DEPARTMENT OF BIOLOGY

Karine Gousset, a faculty member in the Department of Biology, is focused on the study and characterization of tunneling nanotubes (TNTs), a novel mechanism for functional connectivity between cells. TNTs may also play an important physiological role in the proliferation and persistence of many diseases. Importantly, disease spreading through TNTs has proven to be a highly efficient method of transfer, since it avoids rate limited diffusive transfer and evades immune detection. For example, retroviruses, such as the human immunodeficiency virus (HIV-1), exploit these subcellular structures to facilitate infection by evading immune surveillance. Moreover, pathogenic particles and proteins, such as Amyloid  $\beta$  (A $\beta$ ), prions, and HIV-1 Nef, are found to induce, and then usurp TNT-like structures to spread between cells. Recent studies have also linked TNTs to the chemoresistance of cancer. The Gousset Lab uses a variety of techniques -from bioinformatics as well as structural, evolutionary, molecular, and cell biology- to elucidate the underlying mechanisms and structure/function relationships.

Gousset has identified the proteome of TNTs through an innovative and novel method developed under the auspices of a substantial NIH SCORE SC2 award received in the summer of 2014. The method uses a combination of a novel TNT fixation method, laser capture microdissection (to specifically isolate TNTs), and microproteomics to identify the TNT proteome.



### Current members of the Strongly Correlated Electron Laboratory.

From left to right: Shoji Hishida (undergrad), Jesus Velasquez (undergrad), Patrick Talbot (grad), Patrick Kelly (grad), Andrea Capa Salinas (undergrad), Rosa Garcia Jimenez (undergrad), and Dr. Pei-Chun Ho.

## Dr. Pei-Chun Ho

### DEPARTMENT OF PHYSICS

Pei-Chun Ho, a faculty member in the Department of Physics, focuses her research on the development of novel materials with applications in fields including green energy, spintronics, information storage, development of high-field magnets, telecommunications, and medical sensing and imaging. Ho's research group studies rare-earth related materials where the interaction between electrons becomes much larger than

simple metals' and result in a vast variety of correlated electron behaviors such as Kondo insulation, conventional and unconventional superconductivity, magnetism, and quantum critical behavior.

Because many interesting phenomena take place at low temperatures (i.e., quantum state), characterization of the physical properties of these materials as a function of temperature and magnetic field becomes a very important task. Ho's National Science Foundation (NSF) funded laboratory, the Strongly Correlated Electron Laboratory, has a low temperature facility (McLane 254) to monitor materials physical properties, such as electrical resistivity, specific heat, magnetic susceptibility, thermopower, and thermal conductivity down to 1.6K and in magnetic fields as high as 9 tesla. Recently, Ho established a materials synthesis facility (McLane 216), which will enable Ho and her students the capability of creating single crystals of intermetallic compounds at Fresno State campus.

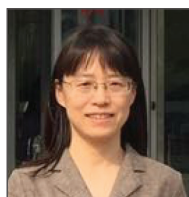
### The group of Strongly Correlated Electron Laboratory

currently is composed of four undergraduate and two graduate students. From left to right: Patrick Talbot, Rosa Garcia Jimenez, Shoji Hishida, Patrick Kelly, Andrea Capa Salinas, and Jesus Velasquez. Students are hands-on assists Dr. Ho on every aspects of research to establish the required instrumentation and facilities to advance the progress of the projects.





# FACULTY RESEARCH



**Dr. Hong Ni**

**DEPARTMENT OF PSYCHOLOGY**

Hong Ni, a faculty member in the Department of Psychology, is driven by her passion for children's and youth's mental health especially school-based prevention and interventions that promote children's social and emotional development and resilience. Ni teaches mainly graduate courses in the School Psychology Graduate Program. Ni's research is focused on resilience and mental health promotion for children and youth of all cultural backgrounds and promoting and advancing school psychological services in China. She is involved in cultural, cross-culture, and international research and collaborations. Her research examined teacher evaluations of students of different ethnicities in the US, the ideal students' image in Chinese teachers' eyes, American and Chinese elementary and middle school students' perceptions of school and class environment, school psychological services in Chinese schools, and how those cultural and cross-cultural perspectives inform the training of American school psychologists' cultural competence. Dr. Ni has recently launched a collaboration with a local community agency to provide evidence-based mental health promotion programs in an underserved and low socioeconomic school in Fresno.

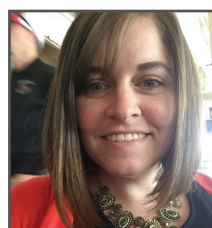


**Dr. Hubert Cecotti**

**DEPARTMENT OF COMPUTER SCIENCE**

Hubert Cecotti, a faculty member in the Department of Computer Science, explores the field of machine learning, pattern recognition, human-computer interaction and neuroscience. His research has investigated the brain computer interface for the last decade. His interests include the extraction of features from the electroencephalogram (EEG) and magnetoencephalogram (MEG) signals. He also studies the classification of brain responses related to visual processes, attention, or motor imagery. Goals of his work include the creation of applications that use the detection of these brain responses, such as virtual keyboards, for severely disabled people who are not able to communicate via conventional means. Cecotti's research approach is very holistic and interdisciplinary. To create intelligent algorithms that can perceive the world like human beings, it is necessary to have some understanding of the brain mechanisms, e.g. the human visual system and other processes related to attention. To better understand the brain, it is necessary to create efficient algorithms that can extract knowledge and classify information from brain imaging data (e.g. signals, images). For instance, the architecture of artificial neural networks that are used in computer vision are inspired from the human visual system, and these neural networks can also help in better analyzing neuroimaging data.

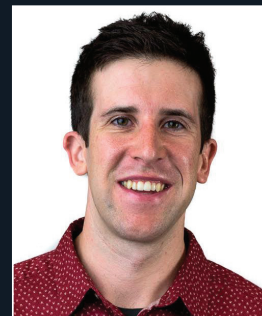
Cecotti is currently investigating consciousness monitoring using features from the EEG signal. The goal is to assess when a patient is fully unconscious. The underlying challenges are related to the classification of signals with non-stationarity and novelty detection. Cecotti is also working on projects related to the study of numerosity and virtual reality.



**Dr. Jenna Tague**

**DEPARTMENT OF MATHEMATICS**

Dr. Jenna Tague, a mathematics education faculty member in the Department of Mathematics, is one of the co-directors of the Science and Mathematics Education Center (SMEC) and collaborates with science education faculty members in developing research projects for undergraduate and graduate students. Together, with Dr. Emily Walter (Biology), Dr. Dermot Donnelly (Chemistry), and Dr. Myung Shin (Liberal Studies), they meet weekly with a group of students who are interested in Science, Technology, Engineering and Mathematics (STEM) Education. The students study research methods, collaborate on upcoming conference presentations and publications and constructively critique one another's work. The positive result is a vibrant and diverse interdisciplinary community of undergraduate, graduate, and faculty researchers.



**Dr. Aric Mine**

**DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES**

Aric Mine, faculty member in the Department of Earth and Environmental Sciences, explores the interaction between life and the environment to better understand the Earth as a system. Life has played a fundamental role over the course of earth history in establishing an oxygen-rich atmosphere and in modulating Earth's climate. Mine's research probes how microbes interact with their environment and facilitate the mobilization and transformation of the elements necessary for life, notably C, H, N, O, P, and S. Mine is working in aquatic environments to better resolve the response of microorganisms to changes in the supply of nutrients, primarily nitrogen and phosphorus, which are often applied as fertilizers. Over-application and subsequent nutrient runoff leads to algal bloom events in lakes and in coastal environments that can have devastating economic effects. Understanding how to better predict bloom formation and identifying the primary anthropogenic nutrient sources are critical to limiting the economic and environmental effects associated with toxic algal bloom formation, reduced oxygen hypoxic events, and the loss of productive fisheries. In addition, Mine is interested in extreme earth environments, like Mono Lake, as analogs for the early earth. Identifying the mechanisms by which microbes making a living in hot, saline environments today provides useful insight towards how microbes survived on early earth.





## College of Science and Mathematics CELEBRATES THE REMODEL OF

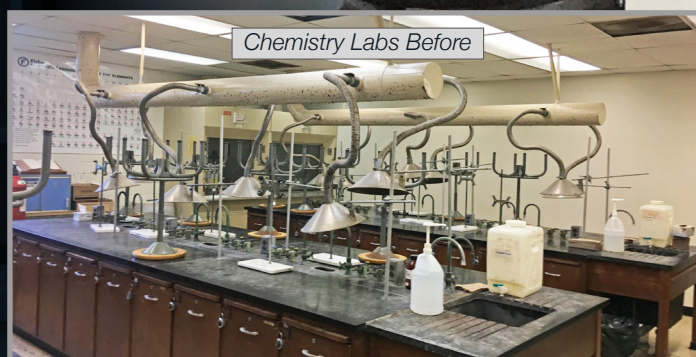
# TWO ENHANCED BIOLOGY AND CHEMISTRY LABS



### The college celebrated THE COMPLETION

of two renovated science labs this fall- an analytical chemistry lab (in Science 1 Room 238) and an introductory biology lab (in McLane Hall, Room 226). The Biology and the Chemistry lab remodel projects were the first significant renovations in the College of Science and Mathematics in over a decade. The projects were funded by the generous support of many friends of the college and the Foundation Board of Governors who believe in the value of discovery, innovation and quality real-life education experiences for our students. The vision to remodel the labs began over a decade ago, and as is the case with many like projects; we faced challenges along the pathway. The bold decision was to design and build enhanced and flexible lab spaces for students to conduct modern experimental science. The high-impact practice of “learning by doing” in lab courses in our college is vital to the growth and development of our students and prepares them for the exciting science careers of the 21st Century and was a driving factor in the design of our labs. The state-of-the-art equipment and facilities also allows students to participate in “real world” research projects that are integrated into our lab courses. These enhanced lab spaces will be utilized by hundreds of our majors every year and contribute to their success.

The college is grateful to our generous supporters for these projects and looks forward to the future as the campus invests in updating labs across the campus.



Chemistry Labs Before



Chemistry Labs After



Biology Labs After







## GILCREASE COLLECTION

**At Fresno State, we like to give back. In the Biology Department that means that students use scientific collections not just to learn, but also to teach the next generation.**



**T**he Biology Department at Fresno State houses several important collections. Its most unusual one is a collection of hunting trophies, donated by William Asberry Gilcrease, born in 1893 in Lemoore, CA. This collection is visited every year by more than 2,000 school children and other groups. Yet it was also in dire need of renovation to better protect and display the exhibits, and emphasize the conservation value of the collection. Last semester, as part of a biology undergraduate course, Comparative Vertebrate Morphology, 22 students collaborated on redesigning the exhibit. The tasks were to update the exhibit plaques, to construct a display for the skins in the collections, and to develop educational material for visitors, in particular elementary, middle, and high school student groups.

"This project showed us the amazing expertise that our students bring," says Dr. Ulrike Müller, the instructor of the course. Her students used what they learned in other courses and programs to great effect. Nancy Mohammed, a double major in biology and graphic design, took the lead on the design and brought in two external design experts, Jona Agcaoli from Bitwise Industries and Andrew Runner from Fresno Ideaworks. Shelby Moshier used software from a previous geography course to design

distribution maps for the new plaques. Building on their construction skills, the team of Marie Medina, Onya Tolmachoff and Shelby Moshier took on the most labor-intensive task – building new mounts for six large animal skins, under the tutelage of Fresno Ideaworks' Andrew Runner. Ellen Douglas, the lead designer of the name plaques stated that "Being involved in the Gilcrease Collection was a very rewarding leadership and team-building experience in which we were able to enhance an important exhibit to provide education for the community."

"We could never have done this without the help of so many people willing to lend us their expertise" says Dr. Müller. The project benefited not only from design help, but also with the assistance of educational expertise on campus. Dr. Fred Nelson and the students in his pedagogy course visited with the Vertebrate Morphology students repeatedly and offered expert advice on how to design activities that both help teachers hit important curriculum points and are fun for the visiting school children. Shelby says "It was such a great experience to be able to collaborate and work closely with my peers, instructor, and the people from Ideaworks to create a lasting display in the Gilcrease Collection that can be enjoyed by students of all levels."



*Dr. Ulrike Müller, Department of Biology*

"This was a great experience for anyone interested in being a coordinator of some sort. I learned how to delegate tasks, execute ideas, and managed my time more efficiently" said Noel Cruz. Students enjoyed the opportunity to execute a complex project from identifying tasks, building teams, and completing tasks through many rounds of redesign and troubleshooting. Mala Singh sums it all up: "It was wonderful improving my group collaboration skills and revitalizing a great educational resource for students of various levels." The redesigned exhibit was opened on graduation day with many students taking pictures of themselves in front of their favorite exhibit. The first school class visited in October. When asked what's next, Dr. Müller points out that the work is never finished "We hope to scan some bones and teeth and make 3d prints that visiting students can touch and explore. We did not get the 3d scanner in time last spring. So that will be a job for the next course."



*Onya attaching name plaques on the skin mount for the mountain lion, black bear and grizzly bear*



# NEWS

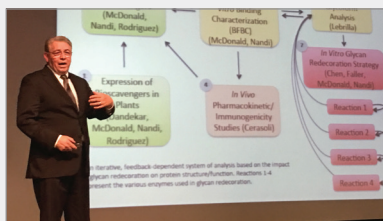


## College and Campus Welcomes Dean Christopher R Meyer

Fresno State and the College of Science and Mathematics welcomed Dean Christopher R Meyer to the campus and college family on Friday, September 1st. The event was attended by over 200 staff, faculty, alumni and friends of the college. Dean Meyer began his appointment as Dean for the College of Science and Mathematics in late July. While new to Fresno State, he is very familiar with the CSU system having been a faculty member since 1994 and Chair of the Department of Chemistry and Biochemistry at California State University, Fullerton from 2010-2015. Dean Meyer has also served at the National Science Foundation (NSF) in Arlington, Virginia as a rotating Program Director in Molecular and Cellular Biology (MCB, 2008-09) and most recently in the Division of Biological Infrastructure (DBI, 2015-17).

**We welcome DEAN MEYER to the college family!**

## Dr. Raymond Rodriguez speaks at College Fall Assembly

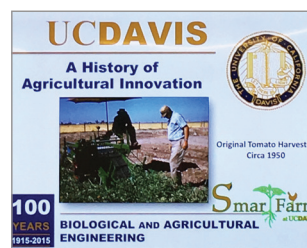


The College of Science and Mathematics had the honor of hosting Dr. Raymond Rodriguez as guest speaker at the Fall Academic Assembly on August 18, 2017. A famous pioneer in the field of biotechnology, Dr. Rodriguez is a proud alumnus of the Fresno State Biology Department and is a professor of Molecular and Cellular Biology at UC Davis. Among his many accomplishments was the development of the pBR322 plasmid in 1976 – this was the first “workhorse” gene cloning vector that was key to the modern era of molecular biology; his work on this technology and other projects served as the foundation for today’s biotech and biopharma industries. He is an inventor on 18 issued US patents and as an entrepreneur, Dr. Rodriguez founded, or helped found, over 25 high tech startup companies. As an international recognized researcher, Dr. Rodriguez has published 120 scientific papers and books and raised over \$18 million to support his research. In 2012 he was elected an AAAS Fellow and as Executive Director of the Global HealthShare Initiative, he is using his scientific and entrepreneurial skills to help the underprivileged in the developing world. He delivered his ideas around the emerging trend of transdisciplinary “team science” to faculty and staff, encouraging faculty and scientists to collaborate, leveraging the expertise of other trained in different fields. Dr. Rodriguez’s inspiring seminar gave compelling examples of the successful generation of teams of investigators with diverse skills and knowledge to solve complex social and scientific problems including climate change, food, water, and energy sufficiency, and chronic diseases. Dr. Rodriguez ended his talk with a call to action for the College of Science and Mathematics (CSM) to harness its expertise in discovery and innovation in partnering with other colleges: “Fresno State University is strategically located in time and place to help usher in the next revolution in agriculture, and to be a positive change agent for a hungry and troubled world.”

Dr. Rodriguez was recently appointed to the CSM Advisory Board and we are privileged to benefit from his career experiences, guidance and leadership.

## Conversations on Smart Farms by Dr. David Slaughter, UC Davis

OCTOBER 23, 2017



The College of Science and Mathematics hosted a special seminar on Smart Farms on October 23, 2017 with special guest speaker Dr. David Slaughter from the Department of Biological and Agricultural Engineering at UC Davis. Smart Farms take crop systems and animal agriculture to the next level of productivity, sustainability and responsible use. The Smart Farm initiative seeks to bring together research, extension, and teaching across the agricultural, biological, environmental, and engineering fields to advance California’s signature food products and create a leading model for transforming agricultural systems for lasting food security. Dr. David Slaughter’s research interests include agricultural robotics, machine learning, automation and sensors for biological materials. The interdisciplinary approaches being pursued by the College of Science and Mathematics, the Jordan College of Agricultural Sciences and Technology and the Lyles College of Engineering could lead to exciting new synergies between the colleges and UC Davis.

## 3rd Annual Department of Mathematics Day (DMD)



Since 2015, the last Friday before Thanksgiving has become a special day for the Department of Mathematics, *Department of Mathematics Day (DMD)*. The event celebrates and develops the diverse, friendly, and inclusive scholarly community within the department. DMD is an open to the public, whole-day event that has evolved to consist of various components: student research mini-conference, Ignite talks, lunch/social, and game lounge. The afternoon also includes a gala fest with everyone’s favorite, Math Jeopardy, and concludes with a talent show. The day creates a rare opportunity for students, faculty, staff, and guests to informally interact and appreciate each other’s remarkable talents.

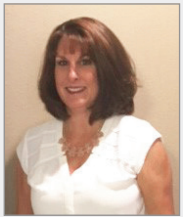
The DMD festivities extend beyond the day itself. The *Department of Mathematics Problem Solving Contest for Students* and the *Department of Mathematics Problem Solving Contest for High School Students* were held earlier in the week, with the winners of these events recognized at the DMD’s award ceremony.





# INTRODUCING

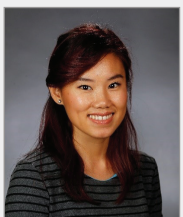
WE ARE EXCITED TO WELCOME  
**BETH GARCIA AND MAIPAHOUA XIONG**  
AS NEW ACADEMIC COUNSELORS IN THE  
ADVISING AND RESOURCE CENTER (ARC).



## BETH GARCIA

Beth was raised in Fresno and graduated from Bullard High School. Beth graduated from Fresno State with a Bachelor of Arts in Industrial Arts with an emphasis in Interior Design. She worked as an Interior Designer for a number of years prior to making a career change and becoming a Registrar for a private K-12 school. It was during her years as a Registrar,

that she became aware of the struggles of high school students entering college who are often first generation college students. Beth's new mission was to find resources available to help guide this student population. In 2004, Beth accepted an opportunity to work for Fresno Pacific University as an Academic Advisor. In the eleven years that Beth worked for Fresno Pacific, she worked in a variety of roles: from Financial Aid Advisor, to Graduate Admissions Advisor, to Academic Advisor for the traditional undergraduate students and Academic Advisor for the adult learner in the Degree Completion program at the North Fresno Campus. Beth is passionate about helping students succeed in college so they may flourish in their career. While working for Fresno Pacific University, she received her Master's Degree in Leadership and Organizational Studies. Beth is married and has five children and one grandchild. In her leisure time, Beth enjoys spending time with her family, baking, and making candies.



## MAIPAHOUA XIONG

Maipahoua was born in Thailand but grew up in Fresno. Maipahoua graduated from UC Davis with a Bachelor of Arts in Psychology and a minor in Human Development and Education. Maipahoua worked for the Fresno County Superintendent of Schools Migrant Education Department as a Counseling and Academic Tutor where she discovered her passion of supporting student education and learning development. She enjoys hearing students' success and achievements as they endure and overcome challenges along their career, personal and educational journey. She recently completed her Masters of Science in Counseling, Student Affairs and College Counseling. While in the counseling program, she was a graduate intern for the College of Science and Mathematics Advising and Resources Center, Fresno State Educational Opportunity Program, Clovis Community College Counseling Center, and Fresno State University Advising Center. She has worked with a wide range of student populations; migrant, first generation, returning, transfer, probation/disqualification, graduate, and intellectual/developmental disabilities students. Maipahoua enjoys hiking, jogging, leisure reading, music and crafting.

## Staff Retreat at the Fresno Chaffee Zoo AUGUST 16, 2017

The college held its annual staff retreat at the Fresno Chaffee Zoo on August 16, 2017. Staff members spent the morning with Dean Meyer and Katie Williamson from the Office of Organizational Excellence focusing on motivation and productivity in the workplace while enjoying the wildlife of the zoo.



## Fresno State Named Top 23 BEST MASTER'S PROGRAM IN PSYCHOLOGY WITH APPLIED BEHAVIOR ANALYSIS OPTION

Applied Behavior Analysis EDU has named Fresno State's Psychology Applied Behavior Analysis Master's Program one of the Top 23 Best Master's in Psychology programs in the country and one of only five in California. The ABA graduate program in Psychology through the College of Science and Mathematics provides students with the academic coursework, research experience, and supervised practicum experience necessary to sit for the Board Certified Behavior Analysts examination. The program prepares students to enter the field ready to provide effective therapeutic interventions for children and adults with autism and other developmental disabilities, health and fitness applications, organizational behavioral management and environmental sustainability. To date, all students secured employment in this specialty upon graduation, with approximately a third going on to pursue doctoral level studies in this area.

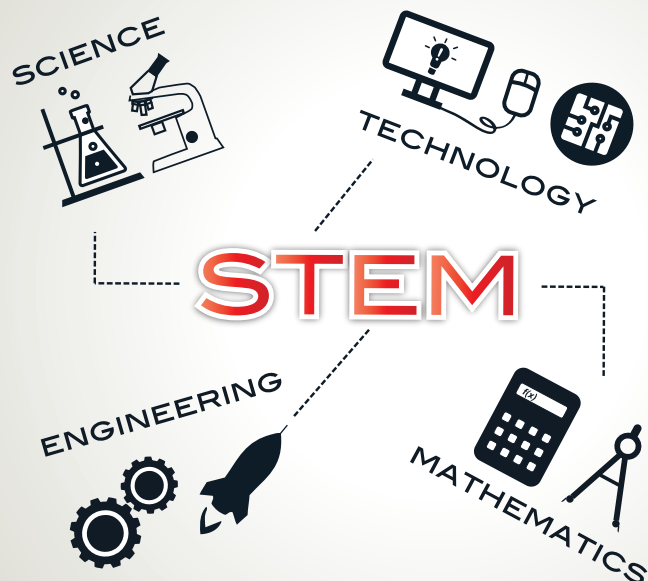
## Faculty and Staff Fresno Chaffee Zoo Night SEPTEMBER 8, 2017



Dean Meyer and the College hosted a faculty and staff Family Fresno Chaffee Zoo Night on September 8, 2017.

The annual event was attended by over 300 faculty, staff, emeriti and their minions. Families enjoyed an evening of zoo exploration, face painting, photo booths, games, and delicious barbecue at Canopy Grove in the Africa Adventure exhibit.





### STEM SYMPOSIUM DECEMBER 8, 2017

The College of Science and Mathematics hosted its first Fall 2017 Symposium for Course Based Research and Projects Symposium for CUREs on Friday, December 8th. The symposium featured students from CURE like courses presenting posters and students groups from lower-division, upper-division, and graduate courses throughout the college.

**THIS SEMESTER, THE COLLEGE HOSTED THREE SYMPOSIUMS TO RECOGNIZE THE OUTSTANDING STUDENT WORK ON THESE RESEARCH PROJECTS.**

### BOND SYMPOSIUM DECEMBER 5TH AND 6TH, 2017

The faculty of CSM10 hosted its first poster session and community forum presented by students in the College of Science and Mathematics Building Opportunities with Networks of Discovery (BOND) first-year learning community. Student research groups presented their findings from a semester-long investigation of the campus environment within the broad areas of food, water, energy, air, and biodiversity.

### PSYCHOLOGY POSTER SESSIONS DECEMBER 4TH AND 5TH, 2017

Psychology students from Psych 144 (Research Design and Experimental Methods) presented CURE posters on their research projects to the Psychology Department faculty, staff, friends, and stakeholders. This course features participation in research, data analysis, and report writing.

# CURE's

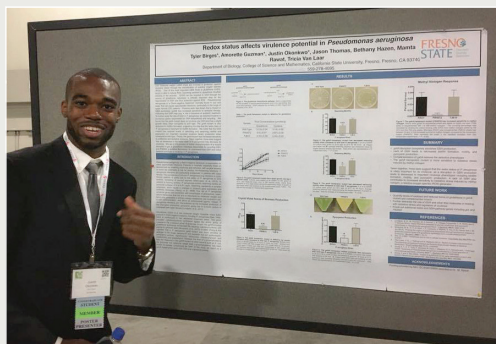
## COURSE-BASED UNDERGRADUATE RESEARCH EXPERIENCES

**When whole classes of students address a research question or problem that is of interest to the scientific community**

National calls to improve STEM education have advocated for widespread engagement of students in research. Undergraduate researchers report gains in their ability to think and work like scientists and increased interest in and enjoyment of science. They are also more likely to pursue further education and careers in science and research, which drive the nation's progress and economic prosperity. More STEM graduates are needed to find solutions to the major societal challenges in food, energy, water, and the environment; all of these challenges are significant to the Central Valley. Yet, research experiences are typically structured as independent studies in individual research labs or internships, which severely limits the number of students who can participate. In response, colleges and universities have begun to transform their laboratory courses into scalable research experiences, called Course-based Undergraduate Research Experiences (CUREs). Students who participate in CUREs achieve many of the same gains as students who participate in independent research and internships.

The College of Science and Mathematics is well poised to support this effort in a sustainable fashion given the expertise of the faculty, network connections to other national CURE experts, and the existing freshman year experience (FYE) program BOND (Building Opportunities with Networks of Discovery). A number of faculty in the College have already incorporated CURE-like elements into upper division lab courses which include use of science practices, discovery, broader relevance and importance of the research, collaboration, and iteration. Further, a number of faculty from the college are actively engaged in the NSF FLOCK (Faculty Learning for Outcomes and Knowledge; led by Dr. Ulrike Muller, Biology) Project to build a community of faculty with expertise in evidence-based teaching methods, improve student learning in introductory STEM courses, and to increase the numbers of students majoring in STEM disciplines. In addition, the cohort style BOND Program (led by Dr. Beth Weinman and Dr. Mara Brady, Earth and Environmental Sciences) features a summer research exposure for freshman as well as courses in the scientific method and evidence based decision making.

Research experiences and projects, presented at symposiums, challenge students to apply course concepts to solve problems in our disciplines and communities. A critical part of these projects and research experiences is a public forum where students share their work and conclusions with the community.

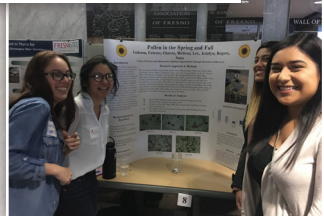
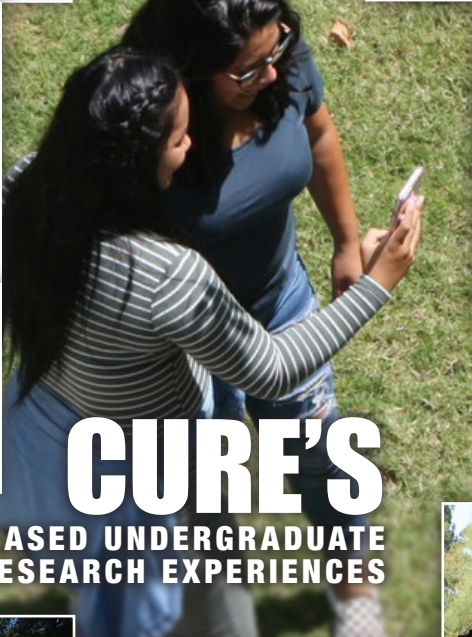
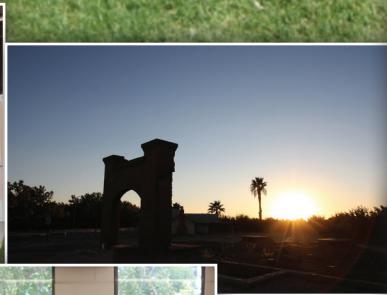


## JUSTIN OKONKWO AWARDED 2017 SACNAS NATIONAL DIVERSITY in STEM Conference Presentation Award

Justin Okonkwo, Biology Senior and research mentee of Dr. Tricia Van Laar, was one of 117 graduate and undergraduate underrepresented minority (URM) students recognized for their research and presentation skills at the 2017 The Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) National Diversity in STEM Conference in Salt Lake City, Utah in October 2017. The Presentation Awards recognize the next generation of scientists and STEM leaders for exemplary science while giving visibility to their investigations and home institutions, as well as encouraging students to continue fostering a career in science. Justin was recognized for his poster presentation "Redox Status Affects Virulence Potential in *Pseudomonas aeruginosa*".







# CURE'S

COURSE-BASED UNDERGRADUATE  
RESEARCH EXPERIENCES





## STUDENT HIGHLIGHTS

# MATHEMATICS STUDENT ABIGAYLE DIRDAK STANDS OUT

## IN THE DEPARTMENT OF MATHEMATICS

**A**bigayle Dirdak, senior mathematics major and physics minor, plays an important part in the life of the Department of Mathematics.



Abigayle volunteers as a peer mentor for mathematics majors and is the vice president of the Mathematics Club. She also works as a Mathematics Outreach Fellow, helping with the development of interesting, accessible, and hands-on math activities for students of various ages, as well as with the promotion of mathematics and Fresno State to local schools and community colleges.

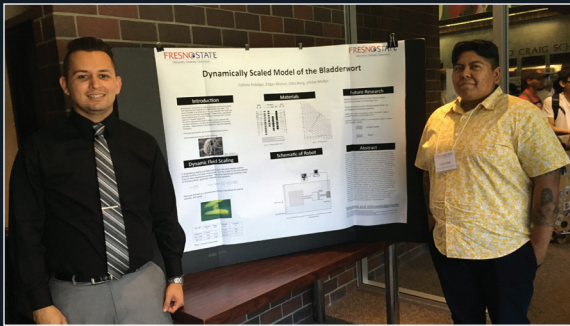
Abigayle is a Scholar of the CSU-LSAMP (Louis Stokes Alliance for Minority Participation) Program at Fresno State and a Predoctoral Scholar of the National Alliance for Doctoral Studies in the Mathematical Sciences. She was a participant in the Fresno State summer 2017 National Science Foundation Research Experience for Undergraduates (REU) Program doing research in Knot Theory in the group mentored by Dr. Carmen Caprau. Abigayle and her research group members - selected through a highly competitive nationwide search - studied virtual trivalent braids and proved conditions for such braids to yield isotopic closures.

This academic year, Abigayle is participating in another research project supported by the PUMP (Preparing Undergraduates through Mentoring toward PhDs) Undergraduate Research Groups program. Abigayle and Daniel Hooker (Fresno State mathematics and physics double major) are studying "Zeros of Polynomials Generated by Quadratic Factor Denominator" under the mentorship of Dr. Khang Tran. Abigayle presented her research at the 2nd Annual CSU Summer Symposium at UCLA in August 2017 and on campus in the Department of Mathematics. Abigayle is scheduled to present her research at the Joint Mathematics Meetings, the largest mathematics meeting in the country, in January 2018 and at the Nebraska Conference for Undergraduate Women in Mathematics.

Abigayle aspires to become a Mathematics Professor and is currently applying to graduate programs.



## Biology Student **FATIMA HIDALGO** Chosen for Prestigious Sally Casanova Scholar



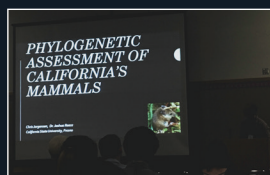
Biology senior Fatima Hidalgo has been selected as a prestigious California State University Sally Casanova Scholar. Fatima will have unique opportunities to explore, develop, and prepare for success in doctoral programs. She will have the benefit of direct one-on-one guidance from faculty members from within the CSU, and the opportunity to work with faculty from doctoral-granting institutions, as well as participate in a summer research experience program at a doctoral-granting institution to receive exposure to the world of research in her chosen field. The scholarship is named after Dr. Sally Casanova, who founded the Pre-Doctoral Scholar Program in 1989 to increase diversity within the pool of university faculty by supporting the doctoral aspirations of students in the CSU system.

## Fresno Chapter of the **SOCIETY OF PHYSICS STUDENTS** Earns Outstanding Chapter

The Fresno State, Department of Physics, Society of Physics Students Chapter, earned the designation of Outstanding Chapter during the 2016/17 Academic Year by the Society of Physics Students, a professional association explicitly designed for students and their advisers with over 800 affiliated chapters nationwide. These awards recognize contributions in areas including involvement in professional meetings, outreach, community service, and student recruitment and retention. This level of distinction is received by less than 10% of chapters annually.

## **BIOLOGY STUDENTS** Present at Evolution Conference

Biology students, Shelby Moshier, undergraduate student, and Chris Jorgensen, graduate student, both presented their research at the Evolution annual conference in Portland, Oregon in June 2017. Shelby's poster was titled "The phylogenetic distribution of climate change vulnerability in California's birds" and Chris's was titled "Phylogenetic Assessments for California's Mammals." Both Shelby and Chris are students of Dr. Joshua Reece and active in his Evolutionary Genetics and Conversation Biology Laboratory.



## STUDENT HIGHLIGHTS

## **DONUTS WITH THE DEAN**

Dean Meyer hosted his first "Donuts with the Dean" with College of Science and Mathematics students on Wednesday, September 6, 2017. Dean Meyer was greeted by over 200 CSM students from all seven departments in the college. Students were able to meet and engage with Dean Meyer as well college department chairs while enjoying refreshments. This event is held each semester.



## Earth & Environmental Undergraduate Student, **AUSTIN ROBBINS,** invited to Present at Geophysics International Conference

Austin Robbins, an undergraduate Earth and Environmental Sciences student, working under the guidance of Dr. Alain Plattner, presented at the Symposium on the Application of Geophysics to Engineering Problems (SAGEEP) 2017 in Denver in March 2017. Austin's presentation was voted as one of the "BEST OF" the presentations at SAGEEP, competing with faculty and postdoctoral researchers, and he was invited to presented his talk on "2.75-D ERT: Zigzag Electrode Acquisition Strategy to Improve 2-D Profiles" at the Near Surface Geoscience (NSG) Meeting in Malmo, Sweden in September 2017. He is a former recipient of both the Downing Science Scholarship and the Tamsen Munger Scholarship.

## **MIRIAM ANDRADE WINS** the California Association of School Psychologists Michael Goodman Memorial Research Award.

Miriam Andrade, graduate student in the Psychology Department, received The Michael Goodman Memorial Research Award. The award recognizes the most outstanding research paper or poster presented at the 2017 California Association of School Psychologists (CASP) Convention. Miriam's paper was based on her thesis research, "The Roles of Academic and Bicultural Self-Efficacy on Academic Achievement among Hispanic Students", conducted under the guidance of her research mentor, Dr. Carlos Calderon.



Dr. Carlos Calderon, Miriam Andrade,  
Dr. Rosa Toro, Dr. Constance Jones



## STUDENT HIGHLIGHTS

**T**he following College of Science and Mathematics students were awarded an Undergraduate Student Research Support Program Council on Ocean Affairs, Science & Technology (COAST) award to engage in marine, estuarine, coastal, or coastal watershed research with CSU COAST faculty members. System wide funds were distributed to the college and CSM students were provided funding for supplies and travel for their specific research project through a competitive award process. Undergraduate research awards support students interested in pursuing marine-related careers and provide them with the opportunity to obtain the skills necessary to join a highly skilled, technologically advanced workforce while promoting and supporting CSU faculty research.

### JOCELYN BOE

BIOLOGY, RESEARCH MENTOR DR. DAVID LENT

A Cross-Species Comparison of the Lateral Pallium in Muraenidae and Anguillae as an Indication of Evolution of Spatial Cognition

### CHRISTIAN CUNNINGHAM

BIOLOGY, RESEARCH MENTOR DR. TRICIA VAN LAAR

Characterization of the Internal Microbiota of Octopus bimaculoides

### DALIA DULL

BIOLOGY, RESEARCH MENTOR DR. STEVE BLUMENSHINE

Thermal Variation in Juvenile Chinook Habitats in their Pacific Range

### CLAIRE EVANGELHO

BIOLOGY, RESEARCH MENTOR DR. JOSHUA REECE

Vulnerability Assessment of Climate Change, Sea-Level Rise and Human Land-Use Change in Coastal Georgia

### SHELBY MOSHIER

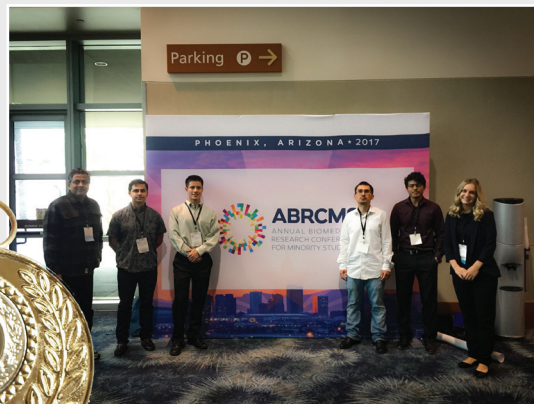
BIOLOGY, RESEARCH MENTOR, DR. JOSHUA REECE

Harbor dredging affects Morro Bay beach biodiversity and sediment chemistry

### GABRIELA VANG

BIOLOGY, RESEARCH MENTOR DR. STEVE BLUMENSHINE

15 N enrichment in Juvenile Chinook Under Controlled Conditions  
Determination of prey use by wild juvenile Chinook Salmon using nitrogen stable isotopes under controlled conditions



## CSM Students Present at ANNUAL BIOMEDICAL RESEARCH CONFERENCE FOR MINORITY STUDENTS

Several College of Science and Mathematics students presented posters at the Annual Biomedical Research Conference for Minority Students (ABRCMS) in Phoenix in November 2017. Students who attended ABRCMS were able to present their research, explore graduate schools, and network.

### Presenters:

#### MAIZIE LEE

CHEMISTRY/ LSAMP STUDENT,  
RESEARCH MENTOR DR. QIAO-HONG CHEN

Nitrogen-Containing Derivatives of  
3',4',5'-Trimethoxyflavonols: Synthesis and Biological  
Evaluation on Prostate Cancer Cell Models

#### MATTHEW MENDOZA

BIOCHEMISTRY/LSAMP STUDENT,  
RESEARCH MENTOR DR. CORY BROOKS

Characterization of the Interloop Disulfide Bond in High  
Affinity Binding of Camel VHH to *Listeria monocytogenes*

#### MICHAEL CASTRO

BIOLOGY/LSAMP STUDENT,  
RESEARCH MENTOR DR. TRICIA VAN LAAR

Characterizing the Microbiota of the Avian Nest

#### EMMANUEL FLORES

BIOLOGY/LSAMP STUDENT,  
RESEARCH MENTOR DR. TRICIA VAN LAAR

Characterizing the Microbiota of the Avian Nest



# LSAMP Research Awardees

## LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION

Several Louis Stokes Alliance for Minority Participation (LSAMP) Program students were selected to receive undergraduate research awards for the 2017-18 academic year. Each student received a total of \$3,000, for the summer and academic year, while conducting undergraduate research under the mentorship of a faculty member and participating in program activities to strengthen their research skills. Program activities included an oral research presentation during the summer and research poster presentations during the academic year. Students attended round-table sessions during the summer and academic year which included the following topics: how to prepare a research oral and poster presentation, graduate school application process, CV development, ethics in research, research elevator talk, individual chalk talks, laboratory tours, faculty research talks, and library research session with major specific librarians. The round-table sessions also provided a venue for students to network and share their progress and any concerns regarding their research. Students also completed the online Responsible Conduct of Research Training course offered via the Ethics CORE website and participate in a summer EDGE Ropes course.



Initiated in 1994, with support from the National Science Foundation, the California State University Louis Stokes Alliance for Minority Participation (CSU-LSAMP) Program is a comprehensive statewide project dedicated to increasing the number of students who face social, educational or economic barriers graduating from campuses of the California State University with baccalaureate degrees in science, technology, engineering, and mathematics (STEM) disciplines. The CSU-LSAMP Alliance, with NSF support, was initiated among 16 campuses and has gradually expanded to include all 23 full-service comprehensive universities in the CSU. The Fresno State LSAMP program is led by Lilia De La Cerda and Dr. Joy Goto.



**ABIGAYLE DIRDAK,**  
MATHEMATICS, RESEARCH MENTOR DR. CARMEN CAPRAU  
*Virtual spatial trivalent graphs and their braids*



**AMANDA OLVERA**  
BIOLOGY, RESEARCH MENTOR DR. HUBERT MUCHALSKI  
*Synthesis of Gold Complexes*



**RAVINDER KANG**  
CHEMISTRY, RESEARCH MENTOR DR. KALYANI MAITRA  
*Wastewater Quality Improvement by Algae Treatment*



**JOANNA DE LA PENA**  
BIOLOGY,  
RESEARCH MENTOR DR. ALEJANDRO CALDERON-URREA  
*Synergistic Effects of Chalcones on C. Elegans and M. Incognita*



**MELISSA SANCHEZ**  
CHEMISTRY, RESEARCH MENTOR DR. HUBERT MUCHALSKI  
*Synthesis of Quinoline Based Sulfenic Acid Precursors*



**SHYAM PATEL**  
BIOLOGY, RESEARCH MENTOR DR. JASON BUSH  
*Evaluating the Impact of E-cigarette Vapor Elements and Cytotoxicity.*



**TIMMY LEE**  
CHEMISTRY, RESEARCH MENTOR DR. QIAO-HONG CHEN  
*Synthesis of 5-O-Substituted-2,3-Dehydrosilins as Anti-Prostate Cancer Agents*



**WILLIAM DIAZ**  
BIOLOGY, RESEARCH MENTOR DR. QIAO-HONG CHEN  
*Synthesis Of 3-O- (N,N-Dibutyl) Pentyl-5,7,20-O-Trimethyl-2,3-Dehydrosilins Derivates As Anti-Prostate Cancer Agents*



**JUSTIN OKONKWO**  
BIOLOGY, RESEARCH MENTOR DR. TRICIA VAN LAAR  
*Redox Status Affects Virulence Potential In Pseudomonas Aeruginosa*



**CERVANTES YERLI**  
MECHANICAL ENGINEERING,  
RESEARCH MENTOR DR. SANKHA BANERJEE  
*Fabrication and Characterization of Barium Titanite and Epoxy Based Flexible Thin Films: Towards Developing Energy Harvesting Devices*



**ANTHONY VENEGAS**  
PLANT SCIENCE,  
RESEARCH MENTOR DR. DAVE GOORAHOO  
*Lettuce Yield Response to Four Organic Fertilizers*



*Dr. Muchalski lab tour*

*Shyam lab tour*



## STUDENT HIGHLIGHTS



### SHELBY MOSHIER selected as CSU Outstanding Student Scholar

Shelby Moshier, a Biology senior from Tollhouse, was chosen by the California State University system to receive the 2017 CSU Trustees' Award for Outstanding Achievement. Each year, one exceptional student is selected from each CSU Campus whose talent, determination and drive will help build California's future. Moshier is a member of the Smittcamp Family Honors College and the Fresno State chapter of Phi Kappa Phi. She also works as a lab manager and conducts research on Californian birds in a conservation biology research lab under the direction of Dr. Joshua Reece. Shelby will receive a scholarship for her superior academic performance, personal accomplishments, community service and financial need. The CSU Trustees' Award for Outstanding Achievement scholarship program was established in 1984 by the William Randolph Hearst Foundation, which partnered with the CSU Board of Trustees to supplement the endowment with contributions from CSU Trustees, CSU Foundation Board of Governors and private donors.



*Shelby Moshier and  
President Joseph I. Castro*



*CSU Chancellor  
Timothy P. White,  
Shelby Moshier,  
Rebecca D. Eisen, Chair,  
CSU, Board of Trustees*



*2017 CSU Outstanding  
Student Scholars*

## CSM STUDENTS PRESENT AT SACNAS

Several College of Science and Mathematics students presented posters at the Society for Advancement of Chicanos/Hispanic & Native Americans in Science (SACNAS) Conference in Salt Lake City in October 2017. SACNAS is dedicated to fostering the success of scientists, from students to professionals, in attaining advanced degrees, careers, and positions of leadership in STEM.



*L to R: Lemuel Rivera, Melissa Sanchez,  
Amanda Olvera, Rojina Nekoonam,  
Michael Castro, Christian Cunningham*

### Presenters:

**MICHAEL CASTRO**  
BIOLOGY/LSAMP STUDENT,  
RESEARCH MENTOR DR. TRICIA VAN LAAR  
*Characterizing the Microbiota of the Avian Nest*

**CHRISTIAN CUNNINGHAM**  
BIOLOGY,  
RESEARCH MENTOR DR. TRICIA VAN LAAR  
*The Role of Spy in Antibiotic Tolerance  
of Klebsiella Pneumoniae Biofilms*

**JUSTIN OKONKWO**  
BIOLOGY,  
RESEARCH MENTOR DR. TRICIA VAN LAAR  
*Redox Status Affects Virulence  
Potential in Pseudomonas Aeruginosa*

**LEMUEL RIVERA**  
BIOCHEMISTRY/LSAMP STUDENT,  
RESEARCH MENTOR DR. JOY GOTO  
*The Effect of Beta-Methylamino-L-Alanine  
and L-Serine on the Circadian Rhythm  
of Drosophila Melanogaster*



# College of Science and Mathematics

## ADVISORY BOARD

*The CSM Advisory Board consists of carefully selected community members who are passionate about the sciences and are willing to make a personal commitment to assist in the fulfillment of the college's mission to educate tomorrow's scientist, mathematicians, researchers, educators and industry professionals.*

### Tamsen Munger

Tamsen Munger earned a degree in Geology from Fresno State and was the first female graduate with a Geology Degree at Fresno State. After graduate study at the University of Colorado, she went on to own and manage Tamsen Munger Fine Gifts, a nationally recognized gallery specializing in aviation and maritime art. She retired in 2009. In 2012 she established the Tamsen Nichols Munger Scholars Fund endowed scholarship. Munger was honored as the Top Dog Outstanding Alumna for the College of Science and Mathematics in 2014.

### Dr. Joan Otomo-Corgel

Dr. Joan Otomo-Corgel graduated with a degree in zoology from Fresno State. She earned her doctorate in dental surgery from UCLA, then continued her postdoctoral studies by pursuing certificates in general practice dentistry and periodontics at the Wadsworth Veterans Hospital. Dr. Otomo-Corgel is currently a periodontal instructor at UCLA and also has a private periodontics practice in Los Angeles. She also serves on the Fresno State Foundation Board of Governors and the President's Southern California Council. Dr. Otomo-Corgel was honored as the Top Dog Outstanding Alumna for the College of Science and Mathematics in 2007.

### Dr. Thomas Downing

Dr. Thomas Downing is a Fresno native who earned a degree in Zoology from Fresno State. He earned his dental degree from New York University, College of Dentistry and had a private dental practice for over 35 years before retiring. His late father, F. Harold Downing, along with Dr. Tom Downing, provided the funding for the Downing Planetarium and the Downing Planetarium Museum. Tom, with his wife Cynthia, provide an annual scholarship to a student in each of the colleges' 7 departments. Dr. Downing was honored as the Top Dog Outstanding Alumna for the College of Science and Mathematics in 2005.

### Diane Anderson

Diane Anderson earned a degree in Chemistry from Fresno State. In 1982 Diane founded Agriculture and Priority Pollutants Laboratories (APPL), Inc. a full service analytical laboratory with a staff of over 55 employees. APPL, Inc. provides analytical chemistry data that is scientifically valid and defensible. Since 2010 APPL labs has been working in partnership with Fresno State to provide on-site education and training to Fresno State students emphasizing chemistry and other related sciences. Anderson was honored as the Top Dog Outstanding Alumna for the College of Science and Mathematics in 2011.

## MEMBERS

### Scott Barton

Scott Barton is a Fresno native who earned a degree in Zoology from Fresno State. Barton started his zoo career in 1980 as a zoo keeper at what was then the Roeding Park Zoo. He then went on to work at the Brevard Zoo and Disney's Animal Kingdom in Florida and the Reid Park Zoo in Tucson, Arizona. Barton was named the Fresno Chaffee Zoo Director in 2009. In 2015, Barton was honored as the Top Dog Outstanding Alumnus for the College of Science and Mathematics.

### Steve Bock

Steve Bock earned a degree in Philosophy and his teaching credential at Fresno State. Bock serves as the Associate Director for the Scout Island Outdoor Recreation Center of the Fresno County Office of Education. In 1997, Bock was honored as the Top Dog Outstanding Alumnus for the Kremen School of Education and Human Development.

### Dr. Katherine Flores

Dr. Katherine Flores earned her medical degree from the University of California, Davis, School of Medicine. She is the director of the Latino Center for Medical Education and Research Center, a unit of the UCSF Fresno Medical Education Program. Dr. Flores is also a family physician in private practice who also directs multiple large institutional medical education programs, including the California Border Health Education and Training Center (HETC) program, The Health Opportunities Program (HCOP) and the Hispanic Centers of Excellence (HCOE). She enjoys a statewide reputation for leadership in education of Latino health professionals.

### Dr. Mel Helm

Dr. Mel Helm is a Fresno native who earned his medical degree from Universidad Autonoma de Guadalajara and is board-certified neurologist who trained at the Albert Einstein College of Medicine in New York City. Dr. Helm owns the California Headache & Balance Center, which is the only clinic in central California that specializes in difficult headache problems as well as conditions that cause dizziness and imbalance.

### Christopher Johnson

Christopher Johnson earned a masters degree in Geology from Fresno State. Johnson is the owner and principal hydrogeologist at Aegis Groundwater Consulting, LLC. Aegis is dedicated to providing quality groundwater consulting services to government, private industries, and public agencies.

### Dr. William Silveira

Dr. William Silveira is a valley native who earned his degree in Chemistry from Fresno State then went on to earn his medical degree from Harvard University. He serves as the Medical Director for the Department of Radiation Oncology at Community Medical Centers.

### Trish Small

Trish Small earned a masters degree in School Psychology from Fresno State. Small is the Director of Pupil Personnel Services for Fresno County Superintendent of Schools overseeing contracted school psychologist services for 21 Fresno County operated programs for students with severe disabilities, 17 school districts and 2 court and community schools.

### Dr. Raymond Rodriguez

Dr. Raymond Rodriguez is a proud alumnus of the Fresno State Biology Department and is a professor of Molecular and Cellular Biology at UC Davis. He is an inventor on 18 issued US patents and as an entrepreneur, Dr. Rodriguez founded, or helped found, or 25 high tech startup companies. As an international recognized researcher, Dr. Rodriguez has published 120 scientific papers and books. In 2012 he was elected an AAAS Fellow and as Executive Director of the Global HealthShare Initiative, he is using his scientific and entrepreneurial skills to help the underprivileged in the developing world.



### THE OBJECTIVES OF THE CSM ADVISORY BOARD ARE TO:

1. Provide advice and counsel to the dean, faculty, and staff on strategy, important issues affecting the future of the College of Science and Mathematics, curricula, and programs and external affairs;
2. Provide insights to the dean, faculty, and staff on how the College of Science and Mathematics can enhance the impact of its services on various stakeholder groups;
3. Engage in, assist, and support the fundraising efforts of the College of Science and Mathematics;
4. Provide valuable contacts for the College to the scientific and professional community for research purposes, to increase the impact of their research and educational efforts on the local and statewide levels, to inform their research and teaching, and to help them further develop their research, teaching, and public service skills;
5. Provide valuable contacts and advice for students in their career, internship, job-seeking, and graduate/professional school selection decisions.





# Physics

## Outreach Program

RECEIVED  
\$125,000  
FROM CHEVRON



Fresno State received a \$450,000 donation from the Chevron Corporation on October 30, 2017 in support of science, technology, engineering and math (STEM) programs in the Lyles College of Engineering and the College of Science and Mathematics. A portion of the total gift, \$125,000, will enhance the College of Science and Mathematics' Physics Outreach – a program that provides critical training for future STEM teachers and that inspires K-12 students to further engage in STEM disciplines. The program incorporates a service-learning course that gives Fresno State students who are pursuing a career in K-12 education the opportunity to enhance their skills and build greater confidence by teaching science in an actual classroom. In return, K-12 students are exposed to STEM through creative hands-on demonstrations. Fresno State students also pass-on their knowledge of the current teaching trends in STEM education to the K-12 teachers while in the classroom, so they can then educate the next generation of students.

Each year, the Physics Outreach program visits more than 100 schools in Fresno, Madera, Mariposa, Stanislaus, Kings and Tulare counties and with 354 K-12 schools in Fresno County alone, not all schools are able to participate. Chevron's support will enable the Physics Outreach program to reach more schools and continue to provide K-12 educators "fee-free" training. The gift will also help enable the program to provide new science demonstrations, a demonstration trailer or "mobile unit" for underserved schools and visibility of program graphics.

At the October 30, 2017 gift announcement, President Castro stated "Fresno State is committed to its role as a collaborative leader in STEM education." "This gift will allow us to introduce science to more young minds and to teachers in our community who might not have the resources to develop and implement on their own. Through STEM education partnerships like Chevron's, we're able to develop leaders who will not only enhance our local and national economies, but also address global challenges."

# Biology

## Receives Generous Gift from DR. RICHARD HAAS



The Department of Biology was the beneficiary of a generous gift from the Estate of Dr. Richard Haas. Professor Emeritus Richard Haas began his Fresno State teaching career in 1969. Throughout his teaching career, he was able to teach thousands of students and make a positive and lasting impact on many of them long after their college years. The Haas scholarship will allow promising Biology graduate students with support for school expenses.



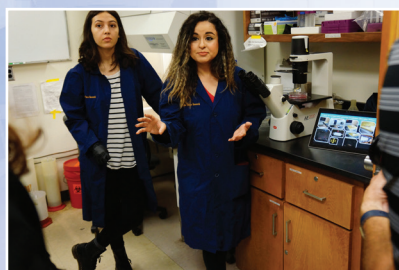




# COLLEGE RECEIVES \$500,000 GIFT

*to fund student research in*

## GENETICS & MOLECULAR BIOLOGY



**T**he University received a transformative \$1 million gift from a donor who wishes to remain anonymous that will fund two areas at Fresno State: student research in genetics and molecular biology and The President's Circle T Excellence. Half of the gift, \$500,000, will enable as many as 40% of the College of Science and Mathematics' undergraduates to participate in team-based research in biology and chemistry laboratory courses.

"By elevating academic experiences and supporting undergraduate research we are opening new opportunities for our students to grow into the next generation of medical professionals and scientists and to be more prepared for the job market after graduation and beyond," President Castro said at the October 24<sup>th</sup> gift announcement.

The science and mathematics portion of the gift will support the incorporation of authentic and cutting-edge interdisciplinary research into chemistry and biology laboratory courses, centering on modern genetics, molecular biology and biotechnology. "The 'learn by doing' approach in Course-based Undergraduate Research Experiences (CUREs) has been shown to enhance student technical, critical thinking and communication skills that are critical for the 21st century workforce," Dean Christopher R Meyer said. "This gift will allow for many more students to participate in the high-impact practice of research,

providing more opportunities for students to present their research at regional and national meetings and publish with faculty mentors." This underscores the College of Science and Mathematics' primary goal, he said: "to graduate the next generation of scientists and mathematicians, teachers, technicians, health professionals and field researchers." He said this force of scholars "will contribute solutions to real-world, complex and interdisciplinary challenges the Central Valley and our society faces with respect to food, energy, water, human health and the environment."

"The College of Science and Mathematics' rigorous and engaging curriculum and programs are designed to best prepare students for success in graduate education and health professions training as well as for a variety of career options that include industry, K-12 teaching, clinical practice, government and higher education," Meyer said.

Students will have the opportunity to contribute groundbreaking projects within the college, such as research that played a key role in developing a new approach to understanding the role of environmental toxins in ALS and Alzheimer's disease and a program that investigated the relationship between pesticides and breast cancer among Latina farm workers.



# In Memoriam



## DR. HARRISON E. MADDEN

**Professor Emeritus of Psychology**, died January 8, 2018, at the age of 93 years old. Dr. Madden was born in Hoisington, Kansas and upon graduating high school, went to work for Boeing and then joined the Army Air Corps and eventually went to India where he served at Panagarh. After returning from India, Dr. Madden attended the University of Kansas, earning four degrees, culminating with a doctorate in psychology. In 1952, he married his first wife Maxine Madden-Spencer. The Maddens moved to Fresno in 1956 where Dr. Madden began his career at Fresno State. Through his years in the Department of Psychology, he served as chair of the department three times and also served as assistant dean in two divisions. During summers and semesters off from Fresno State, he worked for the University of Maryland teaching psychology and political science at U.S. military bases around the world. He eventually spoke seven languages. He loved traveling and continued to travel with his second wife, Criss Wilhite, until 2016. Dr. Madden was a life-long learner who appreciated all the universe has to offer. He is survived by his wife Criss Wilhite, his son Kurt and his wife Katy; son Derek; son Craig and his wife Stacey; daughter Marsha; step-daughter Chelsea and her husband Wayne; step-son Carson as well as his beloved grandchildren.









**FRESNO STATE**

**College of Science and Mathematics**

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*College of Science and Mathematics*

THE COLLEGE OF SCIENCE AND MATHEMATICS (CSM) IS ONE OF THE LARGEST COLLEGES ON THE FRESNO STATE CAMPUS WITH OVER 3600 UNDERGRADUATE AND GRADUATE STUDENTS IN 21 BACHELOR'S AND MASTER'S LEVEL PROGRAMS ACROSS THE SEVEN DISCIPLINES IN THE COLLEGE. THE COLLEGE OF SCIENCE AND MATHEMATICS HAS 108 TENURED/TENURE-TRACK FACULTY, 134 PART-TIME FACULTY AND 33 STAFF.

CSM HAS SEVEN DEPARTMENTS: BIOLOGY, CHEMISTRY, COMPUTER SCIENCE, EARTH AND ENVIRONMENTAL SCIENCES, MATHEMATICS, PHYSICS AND PSYCHOLOGY WITH BOTH UNDERGRADUATE AND MASTER'S DEGREE PROGRAMS.



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