In This Issue:
Dean’s Message
New Faculty Profiles
MESA News
Awards
Tinker Academy
Summer Bridge
Summer Research
Grants & Funding
Post-Fire Research
Conferences & Publications
Student Spotlight
Alumni News

Sonoma State University
School of Science & Technology
Fall 2018 Newsletter
October 30, 2018 | Volume 8, Issue 1
www.sonoma.edu/scitech
Welcome to Fall 2018,

This year marks a major milestone for me ... this is my 25\textsuperscript{th} year at Sonoma State University! As I reminisce about the past quarter century, I have so many wonderful memories. It seems like yesterday I was packing up my young family and newly minted Ph.D. to leave UC Irvine for a new job in a new CS department on a campus I knew little about. I had little idea then that weeks before when George Ledin, Chair of the SSU Computer Science Department Search Committee, said to me “We want you to come to SSU” in the early summer of 1994 that his invitation would lead to my life’s work.

Over the years I have admired our students and their commitment to their dreams and aspirations. My fellow faculty and staff colleagues inspire me day-in and day-out with their drive to be effective contributors, teachers, mentors, and scholars. And, after 24 years, my SSU friends enrich everything I do, every day. I am forever grateful for my many students, colleagues and friends and the meaning and purpose you all bring to my life.

Last year our university engaged in a comprehensive process to SHARE, SHAPE and UNITE around a strategic plan. The result—\textit{Building Our Future @ SSU – Strategic Plan 2025}—will guide us toward our goal of becoming a national model for public higher education. The plan prioritizes student success, academic excellence and innovation, leadership cultivation, and transformative impact. It is based on and enhances our core values of diversity, sustainability, community engagement and adaptability. The work for this year is to begin widely implementing these priorities.

In this issue of our newsletter, several stories demonstrate how these priorities and core values are currently being implemented in Science & Technology. Examples include faculty and student research collaborations, discovery-driven curriculum, student support initiatives, and community partnerships. Profiles of our newest faculty members in Biology, Geology, Mathematics & Statistics, and Computer Science are also in what follows.

If you want to learn more about the work we are doing in the School of Science & Technology, please be in touch.

Best wishes for a wonderful fall – and here’s to my 25 phenomenal years at SSU!

\[\text{Lynn Stauffer, Ph.D.}\]
\[\text{Dean}\]
New Faculty in the School of Science & Technology

Dr. Rodrigo Gaitan – Assistant Professor Rodrigo Gaitan returns to our Department of Mathematics and Statistics after serving as a lecturer in the 2017-18 academic year. He earned his Ph.D. in statistics from UC Riverside. His research is in probability and statistics with a focus on point processes—powerful tools for modeling and analyzing spatial data (applications in forestry, plant ecology, economics, and epidemiology, among others). Outside of teaching and research, Gaitan enjoys martial arts and exploring new cuisines.

Dr. Robin Glas – Assistant Professor Robin Glas joins our Department of Geology. Dr. Glas is a former middle and high school science teacher; she taught in Maine and for six years in Buenos Aires, Argentina. She received her Ph.D. in earth sciences from Syracuse University and spent time working in the Andes Mountains of Peru. Her research specialties include groundwater and surface water interactions; climate change and streamflow trends; aquifer structures and groundwater storage capacity; and using geophysics (electrical, radar, and seismic energy) to image groundwater.

Dr. Brent Hughes – Assistant Professor Brent Hughes joins our Department of Biology. After earning his Ph.D. from UC Santa Cruz in ecology and evolutionary biology, Dr. Hughes was a Smith Conservation Research Fellow at Duke University and UC Santa Cruz. He is a marine ecologist, conservation biologist, marine botanist, and accidental sea otter biologist. Additionally, he is passionate about diversity in STEM. He loves Northern California, is a father of two, husband of one, who mountain bikes, hikes, SCUBA dives, and plays the banjo.

Dr. Omayra Ortega – Assistant Professor Omayra Ortega also joins our Department of Mathematics and Statistics. She obtained her Ph.D. in applied math and computational sciences at the University of Iowa. Her research applies mathematics and statistics to model emerging problems in public health such as the spread of infectious disease and efficacy of prevention strategies. She was a visiting professor at Pomona College, a Fulbright-Hays Fellow in Ghana, and worked in the healthcare field as a healthcare and data analyst before returning to education as a visiting professor at Arizona State University. In her free time, Dr. Ortega trains capoeira, does yoga, knits, crochets, and enjoys travelling and camping.

Dr. Shubbhi Taneja – Assistant Professor Shubbhi Taneja joins our Department of Computer Science. She received her Ph.D. in computer science from Auburn University. Her research interests include thermal management, energy efficient, and performance evaluation of parallel and distributed computer systems. Additionally, she is passionate about computer science education and STEM outreach and programming for K-12. Dr. Taneja speaks three languages (English, Hindi, and Punjabi) and enjoys dancing, yoga, and gardening.
There is extraordinary expansion and support of student success this fall in the Mathematics, Engineering Science Achievement (MESA) program this semester. We are excited to announce that forty-two new students joined MESA this fall. Additionally, this semester we launched STEMbytes led by MESA tutors and the MESA mentors program. A STEMbyte is a “byte” sized (meaning 30-minute) introduction to a new study tip, tool, or concept that is applicable to STEM majors. We have covered topics such as planning out the semester, email etiquette with professors, using whiteboards to code, and understanding learning styles. Tutors provide unique insight into the courses they tutor and start great discussions between students across different disciplines. STEMbytes are held Thursdays at 3 pm and Fridays at noon in the MESA Corner of the Darwin Lobby. Come learn how to study STEM smarter!

A new initiative this year in MESA is the peer mentorship program, which is designed to increase the persistence among entering first-year, second-year, and transfer STEM students. A MESA mentor is an academic and social role model who helps the mentee navigate their major while taking time to build a relationship, maintain trust, share expertise, and have fun. We planned multiple mentor and mentee group activities this semester such as goal setting, a photo scavenger hunt on campus, how to talk to professors during office hours, time management and grit (growth mindset).

MESA still meets weekly for workshops and for group study sessions, where we learn study skills and encourage each other to foster a sense of community to reach both academic and personal goals. This semester, MESA has workshops in the Library and Makerspace on applying to scholarships, searching for undergraduate research opportunities, applying to graduate school, and a registration workshop for spring semester classes. We are also excited to host a “meet the professors” night where faculty from across Science and Technology share their educational pathways and overcoming obstacles.

SSU MESA students Ana Tongilava, Christina Lynch, Ester Hernandez Martinez, and Alexis Mercado and MESA Director Dr. Megan D’Errico attended the 15th Annual MESA Student Leadership Conference at the Millennium Biltmore Hotel in Los Angeles on October 5 and 6, 2018. The conference brings together STEM students from all across California to network, attend workshops, and practice interviewing skills. Students also met and interacted with representatives from companies such as Applied Materials, PG&E, Lyft, and Cisco.

— Dr. Megan D’Errico
CSU Trustees’ Award for Outstanding Achievement

The CSU Trustees’ Award for Outstanding Achievement is given each year to students who demonstrate superior academic performance, personal accomplishments, community service, and financial need. Twenty-three students—one from each campus of the California State University—are selected to receive the award. It is the CSU’s highest recognition of student achievement. A donor-funded scholarship ranging from $6,000 to $12,000 accompanies the award. Each scholarship bears the name of a donor.

This year, SSU student Mariah Chastain was selected as the Sycuan Band of the Kumeyaay Nation Scholar. Mariah, an active leader in MESA, is currently a junior majoring in environmental studies and planning and minoring in biology.

Mariah’s feature on the CSU’s website reads:

Mariah Chastain has overcome numerous challenges in life, including a birth mother who battled mental illness and addiction. Mariah was removed from her home and placed in foster care at age nine. She never again saw her family, did not know her father, and was separated from her brothers, one of whom was taken away in a custody battle, while the other died tragically when Mariah was in middle school.

Disconnected from family, Mariah struggled to find a sense of belonging and identity. In spite of these difficulties, she became the first in her family to go to college. Now a junior at Sonoma State University, she is majoring in environmental studies with an emphasis in conservation and restoration and minoring in biology. Mariah has three on-campus jobs and is a leader in the Mathematical Engineering Science Achievement Club.

This fall, Mariah is studying abroad at Swansea University, in Wales, to expand her environmental and biological education. She intends to pursue a doctorate in environmental conservation with an emphasis in indigenous studies.

“My Native American heritage has helped me create a profound connection to the environment and an interest in environmental issues.”

Dr. Luke Receives North Bay Leadership Award

Dr. Claudia Luke, Director of SSU’s Center for Environmental Inquiry, received the 2018 North Bay Leadership Award in environmental stewardship. Dr. Luke and four other honorees in community building, innovation, and leadership are described as, “beacons of hope for those who seek stronger, more resilient communities.” An awards luncheon and ceremony will be held November 2 at the Embassy Suites Hotel in San Rafael.
Tinker Academy: Middle School Girls Explore STEM Possibilities

This summer, the School of Science and Technology hosted the Girls Tinker Academy, a two-week summer program for middle school girls interested in STEM. The program was sponsored by the Career Technical Education (CTE) Foundation of Sonoma County and took place in the SSU Makerspace. An aim of the program was to engage and inspire middle school students in Maker activities that encourage the exploration and development of technical, mathematical, and design abilities. Each day offered a combination of guided maker activities and time for students to “tinker” on self-designed projects that foster creative thinking and problem-solving skills. Class time also includes presentations designed to educate, inspire and motivate girls to pursue their interests in STEM education and careers.

The girls also had the opportunity to tour various SST departments. Kandis Gilmore in the biology Department hosted the girls for an exploration of the biology collection. Girls had the opportunity to look at insects, plants, and other specimens under microscopes and take the front seat as a scientific explorer. Phil Mooney hosted the girls for a tour of the Geology Department and demonstrated Geology’s new interactive sandbox. In the Nursing department, Mary Ellen Wilkosz led the girls in a tour of the Nursing Department, demonstrating the various opportunities available.

The girls also had a final showcase where they showed off a final project of their own creation. Parents, and university and community leaders attended this showcase of the girls’ culmination of hard work. Final projects had to combine at least two or more lessons from the academy.

“I gained a lot of confidence after seeing so many other girls who have similar interests.”

Many faculty and students in SST were involved in the program. Math Professor Natalie Hobson and Computer Science Professor Anamary Leal were the core instructional team and organized much of the camp activities, schedule, and curriculum. The making activities included weaving, electronics, and wearable computing. SSU students Kathy Funke-Spicher and Lucero Alvarez-Vieyra assisted the girls as makerspace techs, leading projects and demonstrating makerspace equipment for the girls. Dana Conard, an SSU student in computer science, along with the support of Dr. Sara Kassis, helped the girls through interactive VR stations. Professor Lynn Cominsky organized a session on soldering robots.

In addition to these STEM-focused activities, twelve SSU Science and Technology undergraduates served as mentors to the middle school students in the academy. These mentors were led by SSU biochemistry student Natalie Asemi. The SSU student mentors interacted with the girls in team building and bonding activities. They will continue to engage with the girls throughout the year and act as role models for them in STEM.

You can view a slideshow of the Academy here.

—Dr. Natalie Hobson
SSU Math Takes on Summer Bridge

In June, the Department of Mathematics and Statistics joined forces with EOP and PUERTA staff to revamp the SSU Summer Bridge program. This was the first Summer Bridge program in many years that included an academic component in addition to the extensive advising and transitional support that students experience through their participation in the program. Over the course of one week, seven math faculty (Jeong-Lim Chae, Nick Dowdall, Natalie Hobson, Elaine Newman, Martha Shott, Jeff Silverman, and Sunil Tiwari) led nearly 200 Summer Bridge students in interactive explorations that showcased the power of data analysis.

The week began with students out of the classroom and collecting data across the SSU campus, which increased their familiarity with their new university home. The students collected environmental measurements such as soil moisture, tree canopy coverage, and ground cover classification. For soil moisture, students learned how to use a digital sensor to obtain readings in multiple areas of campus. They downloaded a smart phone app that overlaid a grid on a photo of the overhead sky, which the students used to estimate percentage of that area that was covered with tree canopy. In addition to these environmental data, the students also recorded personal data; they recorded a baseline measurement for heart rate and several different moods (anxious, happy, lively, etc.). Then, the students completed ten minutes of either brisk walking or meditative yoga and recorded their heart rates and mood immediately after activity.

The data collected on the first day would eventually be the basis of student analysis, but not before learning the fundamentals of summary statistics and data visualization. This task was accomplished with the help of America’s favorite candy—M&M’s! Students used samples of candies from individual packs of M&M’s to explore central tendency and variability in the distribution of candy colors.

The following day, the Summer Bridge students were ready to return to the environmental and personal data they had obtained at the start of the week. With this large dataset, the students created box plots, histograms, and scatterplots using online statistical software. These graphs helped them to see relationships between different variables, and led them to develop research questions that they would analyze more deeply. In groups of three, the students created a poster display that presented their chosen question, motivated the importance of its study, described their methods, and interpreted the graphs that they created.

The Summer Bridge students proudly displayed their finalized poster for a program-wide gallery walk on the final day, which included special guest invitees from SSU’s administration. The students left feedback on sticky notes for each of their peers’ posters that they visited during the gallery walk. Upon returning to their original classroom, the Summer Bridge students had an opportunity to synthesize and reflect on the remarks left for their own posters.

“What I realized was college math can be doable. I can do it”

The Summer Bridge students provided positive evaluations of their experiences with the mathematical component of their program. Many remarked that the activities showed them that “math can be fun and interactive,” and they appreciated that data analysis could be used to better understand their surrounding world. One student wrote simply yet cogently, “What I realized [from Summer Bridge] was that college math can be doable. I can do it.”

—Dr. Martha Shott
Uzbekistan: the Birthplace of Algebra

From June 1, 2018 through June 12, 2018, SSU Math Professor Sam Brannen conducted a site visit to the International Research Experience for Students (IRES) program in Uzbekistan. The program is hosted by CSU Fullerton in partnership with the Institute of Mathematics of the Uzbekistan Academy of Sciences, and gives U.S. students a 10-week summer research experience in Uzbekistan, the birthplace of algebra, under the mentorship of world-renowned mathematicians Shavkat Alimov, Shavkat Ayupov and Utkir Rozikov. This summer, the U.S. students conducted cutting-edge research in Leibniz Algebras, Harmonic Analysis, and Mathematical Biology.

In addition to six IRES students chosen nationally, CSU-LSAMP (California State University Louis Stokes Alliance for Minority Participation) funded 4 CSU-LSAMP students to attend the program this summer. One of those four students was SSU math major Drew Horton:

This summer, I was lucky enough to participate in the experience of a lifetime. I was one of ten students chosen to participate in an international research experience for undergraduate students in Uzbekistan. We spent the first ten days traveling as a cohort along the Silk Road. After returning to Tashkent from our travel, we began research at the Institute of Mathematics of the Uzbekistan Academy of Sciences. I was chosen to work with two graduate students from Uzbekistan, Uktamjon Mamadaliyev and Qobiljon Abdirasulov. Uktam and Qobil spoke very little English, just as I spoke very little Russian or Uzbek, and I learned just how universal of a language math is. Together we spent eight weeks researching an open problem in the area of Leibniz Algebra, and by the end of that time, we had written a paper. We submitted our paper to the Uzbek Mathematical Journal.

Research wasn’t the only thing I spent my summer doing in Uzbekistan. On the weekends, the family we lived with would take us out to see different places in Tashkent. We visited museums, bazaars, restaurants, amusement parks, and more. Additionally, at home, most of us picked up some of the Uzbek language. We also learned how to cook many of the national dishes such as manti, tukhum barak, and borscht. I will never forget the summer I spent in Uzbekistan, nor will I forget all the people I met there. I have since kept in touch with not just the students who came with me to Uzbekistan, but also all the other people I reluctantly had to say goodbye to at the end of the summer.
During the week before Fall 2018 classes, I took 17 of my majors to Canada for a week of hiking, glaciology, paleontology, and geologic self-discovery. This was my 13th iteration of the trip I started in 2003 to the UNESCO World Heritage Site of the Burgess Shale fossil deposits. But it is actually so much more. Field work allows the geology faculty to construct a plinth upon which our students will build. Field work sets in place a lodestar to guide our students for future success in graduate school and in working careers.

Among the possibilities of blood, sweat, and tears, Phil Mooney and I only plan predictably on perspiration. As surprised as we are if the others occur, we react equally quickly and support our students from the all-important angles of body, mind, and soul. We always raise the issue of blisters and take proactive and prophylactic steps, but mostly it is reaction. And moleskin. And sometimes duct tape. Our preparation in coastal California for hiking in the Canadian Rockies can never quite duplicate the distance, steepness, and elevation of our hikes, but the beauty of the mountains always exceeds our expectations.

As geoscientists, as well as in the other SST departments, I think we are all fans of data, and what better data than that which we collect ourselves? Here’s my data from the Burgess Shale trip, collected on my Fitbit watch, which is kind of like a deep space probe, just passively collecting data and periodically reporting back to the mother ship. Considering I accidentally left my phone in my car at SFO, my Fitbit was just doing its thing for seven days. And then when I was reunited with my iPhone, and after we kissed and hugged and I apologized profusely for leaving it all alone in the dark, cold drink holder in my Prius, and after I fed it some much-needed nutritional electrons, the Fitbit did its duty as a wrist robot and downloaded the daily data (see chart on the left). The distance numbers show everything I did on a particular day, which is parallel for everyone in the trip. Note how there is very little elevation gain on the travel days, which makes sense, because we were mostly walking around the airport. With the Fall semester fully underway, my future planning continues.

—Matthew James, Department of Geology
Three members of the Department of Geology at Sonoma State University, students Ian Ocampo, Kate Thomson, and faculty member, Dr. Laura Waters (Fig. 1), traveled to South Sister Volcano, Oregon (located amongst the Three Sisters Volcanoes within the Cascade Range) along with two other students from Union College and Union College Geology Department Chair, Dr. Holli Frey.

South Sister Volcano (Fig. 2), Oregon’s third highest peak, has experienced uplift and inflation that some scientists believe could be attributed to the intrusion of 20 million cubic meters of magma at about a depth of three miles beneath the edifice. The inflation of the volcano, visible by satellite measurement and ground monitoring, suggest that it may be the next site of volcanic unrest in the central Cascades. To understand what may happen in South Sister’s future, geologists seek to understand the conditions (temperature, pressure and water content) of the magmas prior to eruption. Where were these magmas stored? How long were they beneath the volcano prior to eruption? Each of these questions can be answered through investigation of crystals within the craggy summit peaks and steep sided domes on the volcano’s flanks. Natural hazards aside, the minimal research that has been conducted on South Sister Volcano suggests that its erupted rocks may be an excellent analogue for the average composition of continents; South Sister Volcano may hold the key to understanding the volcanic processes that lead to the formation of Earth’s landmasses.

Over a five-day period, the group collected about 150 pounds of volcanic rocks spanning from high silica, pumaceous (containing abundant air pockets) rhyolites (volcanics with high concentrations of SiO$_2$) to crystal rich basalts (volcanics with low concentrations of SiO$_2$). Thanks to all the effort of the participants, the Sonoma State Geology Collection now includes the entire sample suite erupted from South Sister Volcano over the past 100,000 years. The glassy, crystal-poor dacites that have a composition analogous with the continental crust were heavily targeted during this round of sampling, as they will be used in an experimental series conducted in Dr. Waters’ newly built experimental petrology lab and an experimental lab at UC Davis.

Sample location sites were positioned around and atop South Sister volcano where the only access points were via hiking trails. With limited accessibility, rock samples were collected by hand (using sledgehammers; Fig 3), under permit issued by the Deschutes and McKenzie Forest Service Districts, and were carried out of the field in backpacks. The trip was capped with a rigorous hike to the summit of South Sister where basalts

(Continued on page 11)
were collected amongst beautiful glaciers (Fig. 2), glacial lakes, and views of Middle and North Sister. The smoke from the Carr and Mendocino Fires in early August (seen in Fig. 4) notably obscured the view and reduced the air quality.

Going forward, crystals within these rock samples (the white faceted shapes in Fig. 5) will be analyzed using electro-microbeam techniques to obtain compositional data that will be used in two senior theses at Sonoma State and two theses at Union College. The objective of the studies at Sonoma State will be to determine the water contents and eruptive temperatures, as recorded by minerals, of the magmas prior to their eruption. In a complementary study, colleagues from Union College will focus on the crystal dissolution rates of zircon crystals, which are a function of the magmatic temperatures. The goal of the Union College studies will be to quantify the amount of time the magma spent within the chamber prior to eruption by measuring dissolution of mineral rims. Funding from this work came from the Dean of the School of Science and Technology as well as discretionary funds from Union College. The results of the theses derived from this expedition will be presented at the annual Sonoma State Science Symposium and during an oral defense in the Geology Department. —Dr. Laura Waters

Figure 1: Kate Thomson, Dr. Laura Waters, and Ian O’Campo in front of a lava dome, with South Sister Volcano in the far background

Figure 2: View of South Sister Volcano on the way to the summit. In the foreground is a glacial lake and Lewis Glacier.

Figure 3: Students from SSU and Union College collecting obsidian from a dome on the flank of South Sister Volcano.

Figure 4: View from the summit of South Sister looking at Middle Sister (near peak) and North Sister (far peak).

Figure 5: Photomicrograph of a thin section (slice of rock thin enough to transmit light) of one of the samples collected during field work. Crystals are white and will be analyzed in several senior theses.

Dean’s Summer Research Awards

This summer, Dean Stauffer and the School of Science & Technology awarded eight tenure-track and lecturer faculty funds to advance research, proposal writing, curriculum development, and other work supporting student success. The faculty funded were: Tammy Brunk (Nursing); Gurman Gill (Computer Science); Sara Kassis (Engineering Science); Monica Lares (Chemistry); Matty Mookerjee (Geology); Mohamed Salem (Engineering Science); Sudhir Shrestha (Engineering Science); and Kurt Sollanek (Kinesiology). Dr. Kurt Sollanek used his award to successfully draft a research manuscript, which he submitted to Journal of Clinical Laboratory Analysis for review, and to establish his “Exercise Biochemistry Laboratory.” In his report, Dr. Sollanek writes:

My colleagues from the US Army Research Institute of Environmental Medicine (USARIEM; Natick, MA) had made some interesting observations over the years regarding the measurement of osmolality. They noticed that when measuring the osmolality of biological fluids (namely whole blood and blood plasma) the values obtained were significantly higher than those reported in the literature. This is an important observation because in the sports medicine field, plasma osmolality is used as an indicator of hydration assessment. For example, if a patient has a plasma osmolality value of under 290 mmol/kg, we say they are “adequately hydrated” (i.e., euhydrated). If a patient has a value higher than 290 mmol/kg, we state that the individual is not adequately hydrated (i.e., dehydrated or hypohydrated). Thus, different values have different clinical interpretations. My colleagues went on to publish a paper with some preliminary data demonstrating that when plasma osmolality was assessed using a 20 μL sample vs. a 250 μL sample, there was a trend for higher values with the smaller sample volume (1); however, this was a very limited dataset. After that publication, they collected a more

(Continued on page 12)
Project ADOPT Grant Awarded to Nursing Faculty

This past summer, Karen Werder, PhD, PMHNP-BC, of the Department of Nursing worked with Jason Satterfield, PhD, a psychologist and faculty at UCSF, and Alexa Curtis, PhD, director of USF Nurse Practitioner Program to write a grant to obtain funds from the Substance Abuse and Mental Health Services Administration (SAMHSA), a branch of the US Department of Health and Human Services (DHHS). Their project, “Addressing Drug and Opiate Prevention Treatment (ADOPT),” addresses the current opioid addiction crisis in California. They were awarded $447,553 for the three year project that began September 30, 2018.

Project ADOPT addresses the current opioid addiction crisis by training MD and NP students about the scope of the problem, the use of Opioid Use Disorder screeners, risk assessments, and foundational skills in prescribing and making effective referrals for treatment after they begin practice. All three programs, UCSF Medical School, San Francisco University, and Sonoma State University’s Nurse Practitioner Programs, will be trained with a series of videos and webinars sponsored and produced by Providers Clinical Support System (PCSS) on Medication Assisted Treatment (MAT). Students will also be placed with MAT providers for their clinical experiences. There will also be biannual outreach to clinic preceptors and administrators to enroll and train clinical champions in active training clinics in our area using the PCSS/APNA online materials. They will utilize focus groups and surveys for both students, preceptors, and graduates to evaluate and assess their outcomes. Graduates of these programs will be eligible for a prescribing waiver when they apply for their Drug Enforcement Agency (DEA) license to prescribe the necessary medications. —Dr. Karen Werder
Sonoma State University is part of a consortium of 15 California State University and 9 University of California campuses collectively awarded a five-year, $5 million grant from the National Science Foundation to dramatically increase diversity in physics and astronomy through the Cal-Bridge program.

“I am very proud that I helped write the successful grant that will be able to support our Physics and Astronomy students prepare for success in graduate school,” said Professor Lynn Cominsky, Physics and Astronomy Department Chair and SSU E/PO Director, who is a member of the Cal-Bridge Steering Committee.

Currently, students from underrepresented minority groups represent 30 percent of the U.S. population but less than 4 percent of physics and astronomy Ph.D.s awarded nationwide.

Launched four years ago, the Cal-Bridge program creates a pathway for students from multiple CSU campuses to Ph.D. programs in physics and astronomy at UCs across California. The program has already had a national impact on the number of students from underrepresented groups graduating with a physics degree and matriculating to Ph.D. programs in physics or astronomy. The new grant allows Cal-Bridge to expand from about a dozen scholars per year to as many as 50 statewide. The national average of underrepresented minorities, or URM students, earning a Ph.D. in these fields is about 80 per year. Cal-Bridge is led by PI and Director, Alexander Rudolph, a Cal Poly Pomona professor of physics and astronomy.

Cal-Bridge scholars are recruited from the 15 CSU campuses and more than 30 community colleges in the Cal-Bridge network, with the help of local faculty and staff liaisons at each campus.

The program has been highly successful in its first five years in developing a pipeline of highly diverse, qualified scholars, many of whom have already successfully matriculated to a Ph.D. program in physics or astronomy. The program just selected its fifth cohort of 27 scholars from 10 different CSU campuses across the state, bringing the total number of scholars to 61 in five cohorts, including 35 Latinos, 7 African-Americans and 27 women (16 of the 27 women are from underrepresented minority groups). In the last three years, 19 of 21 Cal-Bridge Scholars who have earned their bachelor’s degree in physics have begun or will attend Ph.D. programs in physics or astronomy at top programs nationally, including UC Irvine, UC Santa Barbara, Harvard University, Northwestern University, the University of Maryland, Michigan State University and Penn State University. —Dr. Lynn Cominsky

Rohnert Park Small Grants

The City of Rohnert Park has a newly founded Small Grants Program. This year, the Program awarded twenty-eight projects, including two proposals from members of the School of Science and Technology:

The Department of Nursing was awarded $1,400 to purchase a patient medical model that will be used for elementary, middle, and high school presentations. Rohnert Park schools, as well as other Sonoma County schools, will host the presentations.

SSU’s Virtual Reality Club was also awarded $1,400 to purchase equipment in support of the Club’s “360 Degree Tour” project, which will include campus highlights as well as popular places and landmarks in Rohnert Park. The project, which will allow internet users to experience the tour, will be shared with Rohnert Park to be posted on the City’s website.

XSEDE

Dr. Mark Perri, Department of Chemistry, was awarded a renewal of XSEDE supercomputer access for his website, the Chem Compute Undergraduate Computational Chemistry Science Gateway, which allows undergraduate students to perform computational chemistry calculations for free. The award is for 268,000 CPU-hours (SUs) and the estimated value is $32,300 for July 1, 2018 through June 30, 2019.
GORT Reborn after Sonoma County Wildfires

GORT (GLAST Optical Robotic Telescope), the SSU E/PO group’s robotic telescope, is located off campus at the Pepperwood Preserve in northern Santa Rosa, an area that burned during the October 2017 Sonoma County wildfires. Amazingly enough, GORT survived the fire with the dome and telescope intact, and very little ash inside the dome. The external weather station, the power lines and internet were not so fortunate, and have now been replaced. The panoramic photograph above was taken about a month after the fires, when a crew of E/PO staff and Emeritus faculty Gordon Spear went up to look around. The burned building is GORT’s former neighbor, the Hume Observatory. Also lost inside Hume was at least one rare Clark 18 inch refractor, which seems to have vaporized. The Dwight Education Center at Pepperwood also survived, but the barn and home of the caretaker were additional losses at the site. We are grateful to the AstroHaven company who made our dome! Although it was not intended to be fireproof, the white high-tech material seems to have encouraged the fire to flash over GORT so quickly that no damage occurred. With a lot of hard work, and support from SSU’s insurance, GORT’s power and internet were finally restored on September 12, 2018. —Dr. Lynn Cominsky

AlertNorthBay

This August and September, a pilot project of eight telecommunication towers were installed near Lake Sonoma, Pepperwood Preserve, and SSU’s Fairfield Osborn Preserve (FOP) as part of the AlertNorthBay (AlertNB) project.

AlertNB is a proposed network of towers throughout Sonoma County that will assist emergency response personnel with wildfire and earthquake response. Data from cameras and seismic weather sensors on the towers will be sent via the internet to a server that allows visual access and predictive models of fire behavior in real-time. Similar networks in eastern and southern California were used by emergency services to respond to over 200 fires last year. The AlertNB network also supports research and educational use during non-emergency conditions.

The tower at FOP will relay signals to a radio receiver

Southern end of AlertNB pilot project showing connection to CENIC internet service.

(Continued on page 15)
Dr. Lisa Bentley in Biology is currently collaborating on a research project with the California Native Plant Society, the SSU Center for Environmental Inquiry, and local non-profit organizations to better understand phenotypic or genotypic differences in oak tree species of Sonoma County. This “Re-Oaking Sonoma County” project is focused on evaluating the growth success of various local oak species for restoration efforts after the devastating fires in October 2017. In collaboration with students in her Biology 350: Plant Physiological Ecology class, the group is growing acorns from fire and non-fire affected areas in the greenhouse at SSU to evaluate if physical differences among plants exist across populations. Students will be proposing a design for a common garden experiment to evaluate differences. Once a research design is agreed upon and established, they will plant the seedlings at Fairfield-Osborn Preserve for further observations and measurements. In addition, Dr. Bentley’s group is collaborating with students from GEP 389: Advanced GIS class to use remote sensing to examine if local populations of oaks can be distinguished using their unique climate and fire histories. Finally, results from the phenotypic and climate-based studies are to be linked to genetic diversity via an undergraduate student research project focused on extracting DNA from the seedlings and assessing genetic variability. Dr. Bentley looks forward to this research having strong deliverable outcomes directly related to restoration efforts across the county.

Photos courtesy of Kandis Gilmore.
VITaL Collaboration Wins Gold Award

This summer, Dr. Sara Kassis, Department of Engineering, presented alongside Drs. James Frazee and Sean Hauze, both from SDSU, on the Virtual Immersive Teaching and Learning (VITaL) initiative at the Cal State Tech Conference in Sacramento. The Initiative provides a variety of virtual reality, augmented reality, mixed reality, and other immersive tools for use across the pedagogical spectrum. Work is being done in partnership with campuses across the CSU. The group took home the Gold Award in the category of “Technology Supporting Innovation in Teaching and Research” for their highly innovative work. You can learn more about SSU’s VITaL Lab by contacting Dr. Kassis or visiting VITaL Lab website.

SST Students Present at ISAM 2018 Conference

A team of multidisciplinary students presented a poster this summer at the International Symposium on Academic Makerspaces (ISAM) at Stanford University titled, “Using the Makerspace to Create Educational Open-Source Software for Electrical Circuits: A Learning Experience.” The students worked on creating an electrical circuit application to be used in the engineering classroom for the mixed reality platform, HoloLens, made by Microsoft, while utilizing the Virtual Immersive Teaching and Learning (VITaL) Laboratory at the SSU Makerspace.

The team members consisted of SST students Dana Conard and Blake Vollmer from the Computer Science Department, Corbin Shatto from the Electrical Engineering Department, along with Hannah Bowman from the Anthropology Department. Each student contributed his or her expertise in creating the software, which included 3D modeling and coding, subject matter content, and user experience and design with a focus on accessibility.

The students’ work has drawn attention from the virtual reality (VR) community. The group is currently being mentored by local software company, Lighthaus. The team will continue to work on expanding their current tutorial over this academic year.

For additional information, please contact Dr. Sara Kassis.

Fluorescent Nanodiamonds to be Published

Dr. Meng-Chih Su’s new book, Fluorescent Nanodiamonds, co-written by Drs. Huan-Cheng Chang and Wesley Wei-Wen Hsiao, will be published by Wiley this November. The text is the most comprehensive reference on fluorescent nanodiamond physical and chemical properties and contemporary applications. Nanodiamonds are a rapidly increasing interest among academic and industrial researchers. Please visit the publisher’s page for more information.

An original experiment developed by Assistant Professor Bogdan Negru has been chosen for the June cover of *J. Chem. Ed.*, the American Chemical Society journal for innovative curricular developments. The experiment developed by SSU undergraduates and Professor Negru teaches students about nanotechnology by using organic solvents to change the color of blue *Morpho* butterflies. The experiment also uses chemistry and material science concepts to functionalize the normally superhydrophobic wings so that they become hydrophilic. Water beads up and rolls off of untreated wings, while detergent functionalized wings can be wet by water. You can read the full article here. —Dr. Lynn Cominsky

Student Spotlight: Ian Ocampo

Ian Ocampo is a rising senior in the Geology Department. He was accepted into the NSF-Smithsonian sponsored Natural History Research Experience Program for undergraduates and spent the summer of 2018 in the Department of Mineral Sciences, in the National Museum of Natural History, Washington, D.C. working on determining nitrogen solubility in magmas to better understand the origin of life on our planet. Ian writes of his experience this summer:

*When I received my acceptance letter, I was incredibly proud and excited for what was to come, but little did I know that I would make best friends, build strong ties to an institution and my mentors, and solidify what I wanted to pursue in graduate school and as a career. My project focused on the understanding of the interaction between Earth’s earliest atmosphere and the large scale magma oceans that dominated our young planet during planetary accretion. To accomplish this, I developed a new experimental method to conduct high temperature experiments equilibrating silicate melts (a magma ocean analog) with C-O-N gas (an atmosphere analog). Through the experimentation process, I learned that failure is unavoidable, yet with each failed experiment, I gained valuable information on how to improve. I not only learned the technical and analytical skills associated with the use of the apparatuses and instruments available to me, but I learned how to truly critically think and tackle problems like I never had in the classroom. Beyond the project, my mentors welcomed me into their academic family and helped me to build a network of advisers to contact for graduate school, a huge step up in the graduate school application process.*

*In short, this was one of the best summers of my life. I went from having a topical interest in a subject and having low expectations of being able to get into graduate school to feeling passionate about experimental petrology with a new found confidence of my ability to succeed in Ph.D. program.*

Ian demonstrates his interest in the field by participating in a variety of research projects, including one self-led project with the Chemistry Department that evaluates spectra collected by the Mars Rover using laser-induced breakdown spectroscopy (LIBS) (Advisor: Dr. Bogdan Negru). For his second research project in the Geology Department, Ian is developing a model that will predict pre-eruptive water contents in equilibrium with a magma prior to eruption by integrating...
Alumni Spotlight: Erica Kallestad

Erica Kallestad, a recent Biology graduate, is now working as a science instructor at the Ocean Institute in Dana Point, CA. The Ocean Institute is a non-profit organization that uses the ocean as a classroom to inspire students to learn. Of her exciting new position and how SSU and her biology coursework prepared her for working as a scientist, Erica writes:

“As an instructor, I facilitate hands-on learning by allowing students to explore science in the laboratory, at tide pools in the Dana Point marine protected areas, and on board our research vessel.

What stands out most to me is the utilization of certain concepts I have learned in my marine science classes at Sonoma. Getting to immerse myself in the field and work alongside other biologists to analyze data, identify species, or collect oceanic samples really puts what I have learned into perspective.

The most exciting part of my job thus far has been getting the chance to see countless whales and dolphins while on board our research vessel. Just a few weeks ago, I was fortunate enough to see a pod of orcas a few miles off of our coast. This pod of 6 killer whales was from the Eastern Tropical Pacific and is an incredibly rare sighting in the coastal Southern California area. We were also able to watch the alpha male take a meal of a common dolphin.

These experiences help to remind me of the importance of working hard and going after your passions.”

(Continued from page 17)

thermodynamics and coding with mineralogy and geochemistry (Advisor: Dr. Laura Waters).

Ian’s interest in integrating the field of chemistry, geology and computer coding to create models to better understand the formation of our planet and others in our solar system make him a standout amongst our students. —Dr. Laura Waters & Ian Ocampo
Alumni and Women In Tech Spotlight: Miah Crockett

Miah Crockett is an alumna who graduated in May 2017 and was the first female African-American student to graduate with an undergraduate degree in engineering from SSU. She gave the audience a compelling speech at Commencement about her academic journey and compared her experience to a “roller coaster ride”—especially since she was the only female student in 90% of her classes.

Nationally, only 18% of degrees in computer science, engineering, and physics are awarded to women. At SSU, those numbers are unfortunately below the national average and are around 12 to 15%. As a response, the School of Science and Technology created the Women In Tech initiative to help support, retain, and graduate women obtaining degrees in the technology-based disciplines.

Miah is now an engineer at Intel and is employed in the semiconductor fabrication unit, working on the “recipes” that create the silicon wafers used in many electronic devices we use today. She finds it rewarding to see Intel products on store shelves and knowing it was her contribution as an engineer that made it a reality. “It’s cool to see your work in person,” she said.

When asked to reflect on her time at SSU, she states, “Being able to look back on the experience, I had so many people who supported me and wanted me to succeed. My professors helped me and worked with me to be versed in my engineering coursework. I had so much support from other SSU faculty, with the staff at my work. It was all around me. I am definitely happy with the experience.”

When asked about the Women In Tech initiative and a few of the events she attended as a student, she said, “It was so fun!” Women In Tech helps to empower students by offering leadership opportunities, professional development workshops, travel to conferences, networking opportunities, along with teamwork and confidence building.

“I didn’t take the time to obtain all the support that was offered to me. If only I had taken the time to attend more events that would have been a huge support system for me,” she reflects of the opportunities she was offered with the Women In Tech initiative.

“I had so many people who supported me and wanted me to succeed... I am definitely happy with the experience.”

Miah is happy to contribute back to others and help empower women by leading skill-based workshops at Home Depot with hands-on classes called “Do-It-Herself.” When she was asked to give advice to our current students, she states, “Tell all students, specifically women, that you are not alone. You have a support system, you have to be the one to reach out and say you want the support. It is all set in place you just need to go and grab it.” —Dr. Sarah Kassis

Nursing Alumni News

Elizabeth Woods, FNP, was reappointed to the California Board of Registered Nursing on July 18, 2018 by California Governor Gerry Brown. Woods is a 1976 SSU graduate of the Master of Science in Nursing Program. She volunteers at the Jewish Community Free Clinic, which she has been doing weekly since 2002.

Leslie Evertson, FNP, was a graduate of the Pre-Licensure BSN program in 2001. She was recently awarded Edge Runner recognition by the American Academy of Nursing for her innovative models of care and interventions with the geriatric population at Ronald Reagan UCLA Medical Center, which have improved patient health with practical, evidence-based solutions.
Fairfield Osborn Events

Natural History Hikes
Every Saturday through December 1
10 am—2 pm
(excluding November 24)
Leader: SSU Student Naturalists

Mushroom Blitz
Sunday, November 4 | 10 am—2 pm
Leader: Dr. Melina Kozanitas, SSU Biology

Poetry for a Changing Landscape
Sunday, November 11 | 2—6 pm
Leader: Maya Khosla, Sonoma County Poet Laureate

Galbreath Wildlands Events

World of Mushrooms
Every Saturday through December 1
(excluding November 24)
Leader: Lisa Bauer, Local Mycology Expert

Recording Bird Songs
Sunday, November 4 | 10 am—12 pm
Leader: Dr. Chris Halle, SSU CEI

Mushroom Blitz
Sunday, December 1 | 10 am—3 pm
Leaders: Dr. Melina Kozanitas, SSU Biology & Lisa Bauer, Local Mycology Expert

To register www.sonoma.edu/cei

@SSUCEI

Give to SST

You can support academic success with a gift to the School of Science and Technology!

Visit Sonoma.edu/give

For more information, contact:
Kirsten Tellez
Director of Development
tellezk@sonoma.edu
707.664.4151