
SONOMA STATE UNIVERSITY
School of Science and Technology

**In This Issue:**



# Sonoma State University
# School of Science & Technology
# **Fall 2019 Newsletter**


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# Fall 2019 — Dean's Message

Hello Friends,

Fall semester is underway at Sonoma State University. The halls of Darwin, Nichols, P.E., and Salazar are bustling with students and faculty including many new arrivals on campus. We are excited about our new tenure-track faculty: Dr. Lisa Hua (Biology), Dr. James Lee (Physics & Astronomy), Dr. Nansong Wu (Engineering) and Dr. Alexandra Miller (Physics & Astronomy). They join our outstanding team of teacher-scholars.

We also saw transition amongst the senior faculty with Dr. Matt James (Geology) and Dr. Jon Fukuto (Chemistry) retiring (both continue to serve in the Faculty Early Retirement Program). Dr. Lynn Cominksy has moved to full-time in the Education and Public Outreach Group. Another exciting transition is the appointment of Dr. Susan Herring as our School's first Faculty Associate Dean. For me, this year marks multiple milestones – twenty-five years at SSU and my tenth year as Dean.

Dean Emeritus, Dr. Anne Swanson, is featured in these pages sharing the origin of the Anne Swanson Student Opportunities Fund, which supports students in their research pursuits. She started the fund with School colleagues and she continues to contribute generously. The impact of our donors is evident throughout this issue.

Our School's 2025 Strategic Plan is completed after casting a large net and gathering input from our broad group of stakeholders. The SST purpose, vision and values and strategic implementation plan are, in the words of a stakeholder, "concise, crisp, and actionable statements that can become a 'touchstone' for all." Our plan will promote communication, help guide strategy and unify our efforts across the School. We are proud to share our new purpose, vision and values and 2019-20 Strategic Priorities on our new School website.

We are undertaking some exciting initiatives sparked in part by our Strategic Planning work last Spring, including:

•**Find Me in Darwin** Campaign celebrating the MESA Community in Science and Tech.

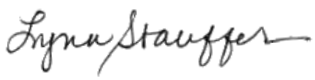
•**SSU Sit With Me** Campaign supporting women's participation in computing and technology.

•**SST Student Success & MESA Terrace** project for our SST student community working and collaborating on their courses and research endeavors.

See the related articles elsewhere in this issue.

Science and Tech students and faculty are doing big things: gathering data in the field and laboratory, presenting research findings, and tackling some of the North Bay's biggest challenges. We feature work of SST members in this newsletter along with news of faculty awards, publications, and honors.

Wishing you a wonderful fall,



Lynn Stauffer, Ph.D.

Dean

## Welcome to Our New Faculty!

**Dr. Lisa Hua** – Assistant Professor Lisa Hua joins our Department of Biology. Her Ph.D. is in cell and molecular biology from Tulane University. Prior to joining SSU, she was a postdoctoral fellow at UC San Francisco and lectured at both San Francisco State and Dominican University. Her area of study is the mechanism of higher-order chromosome organization during the cell cycle and its function in development and cancer.

**Dr. Alexandra (Alex) Miller** – Assistant Professor Alex Miller joins the Physics and Astronomy Department. Her Ph.D. is in physics and astronomy from UC Santa Barbara. Prior to joining SSU, she was a lecturer at Wellesley College. She works in the field of theoretical quantum gravity seeking to answer one of the biggest open questions in physics today: how can one consistently unite Einstein's theory of general relativity with quantum mechanics?

**Dr. James Lee** – Assistant Professor James Lee joins our Department of Physics and Astronomy. He received his Ph.D. in physics from University of Illinois, Urbana-Champaign. He was a postdoctoral fellow at Lawrence Berkeley National Lab and University of Oregon. He also held a postdoctoral staff position at University of Illinois, Urbana-Champaign. His research focuses on light scattering methods to reveal how electrons and atoms are arranged in materials, which has broad implications from semiconductors to DNA.

**Dr. Nansong Wu** – Associate Professor Nansong Wu joins the Department of Engineering Science. He received his Ph.D. in electrical engineering from Florida International University. Prior to coming to SSU, he was an assistant professor at Arkansas Tech University. His research interests are in wireless sensor networks, low-power wide-area networks, and low-cost and low-energy systems-on-a-chip.

## New Faculty Associate Dean

We are pleased to announce the appointment of Dr. Susan Herring as the Faculty Associate Dean in the School of Science and Technology. Dr. Herring has more than 30 years of experience in higher education and joined the SSU faculty in 1992. She is an experienced chair and is returning to this role in the Mathematics and Statistics Department this year. Recently, she served on the SST Strategic Planning Taskforce, contributed to the developmental math redesign, and is part of the SSU ASPIRE (Assisting Schools and Programs in Inquiry, Review and Evaluation) team. She is praised as a collaborative and thoughtful leader. The Faculty Associate Dean is a new leadership position offered through the academic schools at Sonoma State University. The position aims to support the strategic priorities of: student success; academic excellence and innovation; and leadership cultivation.

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*Cover photos courtesy of SSU Creative Services and Dr. Natalie Hobson*

*Edited by Cory Oates*

# CS Club and WiCS Recognized for Collaboration and Club Programming

The Computer Science Club and Women in Computer Science (WiCS) had their extraordinary accomplishments recognized at SSU's Student Involvement Awards this past spring. With over 100 clubs participating, and 100+ nominations, they claimed three of the ten prizes awarded. Adding that to the VR Club's "Outstanding New Organization" award last year, we have so much to be proud of! Thanks to these students for their remarkable contributions to the CS community:

**Outstanding student club or organization: Jointly awarded to CS Club and WiCS**

From the nomination: *In 2018-2019, WiCS and CS Club have become phenomenally collaborative, supportive of each other, responsive to the student community and department-serving. We are nominating these clubs jointly due to their incredible programming and their collaborative, supportive relationship. Simply, the two clubs have done more events than ever this year, and done more than ever *together* this year.*

*The clubs have worked hand-in-hand on events and activities supporting their members' interests in the field, developing their members professionally, and building a shared community. […] The clubs have been incredible boosters for other groups such as Society of Women Engineers, MESA, and Women in Tech.*

**Outstanding program: NomaHacks, CS Club**

From the nomination: *NomaHacks was the first major 24-hour intercollegiate hackathon in Sonoma County. It offered aspiring developers a place to gather and showcase their passions and skills. Teams gathered in the ballrooms of SSU to develop and present their projects. The event offered over $1,500 of prizes to teams […]. The CS Club raised over $6,200 in order to provide the event for free to participants.*

*One of the secondary outcomes of the hackathon was student professional development. For many students, this was their first significant out-of-class programming project, and now appears on their resume. Student projects have a public identity on devpost (the website used for project submission, judging and dissemination); many employers in the technology sector prefer to hire students with a history of working on publicly available projects. The event had parallel resume-building workshops, skill-building workshops and technical mentoring. Students interacted with sponsors in a familiar and less formal environment. The goal was for students of all backgrounds and levels of experience to grow confidence talking to potential employers about technology and feel les intimidated to join future hackathons (i.e., across the Bay Area).*

**Outstanding officer: Catherine Meyer, WiCS**

From the nomination: *Catherine's organization, Women in Computer Science (WiCS), has the mission of supporting female CS students, who comprise only 15-20% of the CS student population both at SSU and nationwide. Catherine faced the double challenge of 100% officer turnover coming into the 2018-19 year, and needing to recruit a new officer team in Spring 2019 after her fellow officers all graduated in Fall 2018. Despite both of these hurdles, and because of Catherine's leadership, WiCS has had a year of consistent, frequent, diverse programming meant to include the broadest possible base of students. WiCS has also worked very effectively to cross-promote and collaborate with the CS Club and Women in Tech […] WiCS' success this year relied on a keen sense of what members needed from the organization. Catherine's willingness to truly listen to her fellow officers and members was crucial in this effort.*

—Dr. Suzanne Rivoire


Club officers Ian Davidson, Keegan Donley, David Tauraso, Catherine Meyer and Maurice Becnel.

# Science & Tech Students Shine at Academic Year-End Events

On April 25, 2019, cross-disciplinary SSU student teams presented their product pitches at the inaugural Seawolf Pitch Competition. The competition consisted of 1-minute pitches followed by a venture expo. Student groups were evaluated by a panel of local entrepreneurs and business leaders, and competed in one of four tracks: entrepreneurship, engineering, prototype and social entrepreneurship. A total of $5,000 in cash prizes were awarded to winning teams, which included multiple projects from SST engineering students:

| Award | Team Members | Project Title |
|---|---|---|
| Entrepreneurship Track, 4th Place | Nicholas Vanni, Jirah Alberto, Brandon Barron | *TroutLab* |
| Social Entrepreneurship Track, 1st Place | Alyssa Wright, Priya Khera, McKenzie Maher | *EMOTE* |
| Social Entrepreneurship Track, 3rd Place | Richard Mitts, Edwin Tran, Taylor Plorin | *Smart Animal Trap* |
| Prototype Track, 1st Place | Jonah Baumgartner, Ryan Quiambao, James Normantas | *PocketSight* |
| Prototype Track, 2nd Place | John Gonsalves, Sean Kavanaugh, Hao Wu | *Bucky::Liner – Soccer field lining solution* |
| Prototype Track, 3rd Place | Austin Salois, Blake Zuniga, Daniel Gil | *Vital Signs Monitoring with Radar* |
| Engineering Track, 1st Place | Kenneth Kleinsmith, Ian Furniss | *PLAD: Power Line Arc Detector* |
| Engineering Track, 2nd Place | Gavin Hayden Town | *Motion Controlled Robotic Arm* |
| Engineering Track, 4th Place | Manthan Gajjar | *Visionalyze* |

The annual Science Symposium was held for the seventh year on April 30, 2019. The Science Symposium is part of SSU's Week of Research and Creativity, which showcases the scholarship and research accomplishments of faculty, graduate and undergraduate students at three symposia held over the first week of May. This year, 400 undergraduate science student researchers presented nearly 200 posters. As is tradition, students were evaluated and selected by a group of twenty-five volunteer judges for awards in various categories. This year, the winners were:

| Award | Presenters | Title | Advisor |
|---|---|---|---|
| Best Poster | Jonah Baumgartner, Ryan Quiambao, James Normantas | *Project PocketSight* | Dr. Don Estreich, Department of Engineering Science |
| Big Picture | Ian Furniss and Kenneth Kleinsmith | *PLAD: power Line Arc Detector* | Dr. Mohamed Salem, Department of Engineering Science |
| Bright Idea | Jennifer Juarez-Yoc, Kayla Hontz, Alejandra Perez, Jessica Torres | *eDNA sampling of the California Tiger Salamander (Ambystoma californiense) in Vernal Pools of the Santa Rosa Plain* | Dr. Derek Girman, Department of Biology |
| SCI 120 Best Poster | Sophia Demetriou, Carly Spencer, Ruby Wagner | *How do Different Riparian Factors Affect the Stream Temperature in Copeland Creek?* | Dr. Robin Glas, Department of Geology |
| WATERS | Lindsey Wachsman and Laura Enzor | *Interactive effects of ocean acidification and elevated temperature differentially impact acid-base balance Antarctic fish* | Dr. Mackenzie Zippay, Department of Biology |

*(Continued on page 6)*


The School of Science and Technology would like to send a hearty "Congratulations!" out to our 2018-2019 graduates! We are so proud of you and can't wait to see all that you go on to accomplish! We hope that you stay connected with SSU and SST by attending alumni events in your area, attending one of our many public lecture series and our annual Science Symposium, signing up for our newsletter, or just stopping by to say hello when you're in the area. We love to hear from our alumni, so be sure to add yourself to our Alumni Map!

In addition to our graduates, we would like to recognize the students who were part of our platform party: Ian Ocampo, Geology, B.S., who served as our Student Banner Carrier; Delilah Milner, Chemistry, B.A., who was our Student Speaker; and Brennan Chin, Biology, B.S., M.S., who represented our SST alumni.

This was SSU's largest groups of graduates to date in the campus's 58-year history. In total, more than 2,900 students graduated. SST also marked a few milestones, specifically in the Nursing Department's CNECM program. Of the 2019 CNECM class:

- 44% are first generation college graduates
- 53% speak a language other than English
- 26% are Spanish speakers, the highest percentage to date

Six CNECM students were inducted into Sigma Theta Tau, the Honor Society of Nursing: Tina Alcazar, Lizdey Garcia Chavez, Chelsea Diehl, Evelynn Oui, Mandy Smith and Brittany Thiede. The following students received Distinction honors from the Department of Nursing: Tina Alcazar, David Alvarez and Dora Valenzula.

Again, CONGRATULATIONS to all of our 2018-2019 graduates!

*(Continued from page 5)*

The Computer Science Department held its Spring 2019 Tech Showcase on May 9, 2019, with eight project teams and three senior research posters. For the first time, the event featured industry judges from Visual Concepts, as well as the audience award from the 100+ attendees who made their way across campus to the Cooperage. The winners were:

| Award | Project Title | Course | Team Members |
|---|---|---|---|
| Audience Favorite | *Spice Boys* | CS 470 | Caleb Yost, Adam May, Greg Thomas, Matt Mulkeen |
| Judges' Award | *Game Development: Octane* | CS 385 | Brandon Adamson-Rakidzich, Marc Baello, Warren Goodson, Jeff Olson |
| Judges' Award | *Butterfl.io* | CS 470 | Alissa Greaney, Dylan Marcus, William McLaughlin |
| Best Demo | *Hawt Dawg* | CS 470 | Kristen Avila, Ryan Boyle, Joseph Criseno, Alexander Elkins |

# Gondree Chairs 2019 IEEE Symposium on Security and Privacy

Dr. Mark Gondree, Department of Computer Science, was the General Chair for the 2019 IEEE Symposium on Security and Privacy, held in San Francisco on May 20-22, 2019. This was the 40th anniversary of IEEE's flagship security conference. The conference and its workshops were host to over 750 attendees from over 30 countries, representing universities, research labs, industry and government, and presented cutting-edge research in security and privacy. This was a special year in many ways: they broke attendance records, received record-setting sponsorship, and supported a record number of students with travel awards. While the conference's paper acceptance rate continued to be highly competitive (~12%), a record number of paper submissions resulted in the largest program in history: 80+ papers, representing ~30% program growth.

The conference celebrated its anniversary with a special panel and reception, inviting back luminary members of their community—Dorothy Denning (Naval Postgraduate School), Deborah Frincke (NSA/CSS Director of Research), Richard Kemmerer (UC Santa Barbara), Peter Neumann (SRI)—to reflect on their time organizing and serving with Security and Privacy. They had an anniversary treasure hunt, which took the form of an online Capture-the-Flag contest, with trivia and challenges representing each decade of the conference's history. They also started a new tradition with the inaugural "Test of Time Awards", celebrating conference papers shown to have had a tremendous impact on the community.

Also significant, but less showy, Gondree moved the traditionally single-track conference to dual-track, and advanced the conference's commitment to inclusivity through its recently adopted Code of Conduct by instituting volunteer Code Stewards, a hotline, and community transparency reports. *—Dr. Mark Gondree*

## Microsoft Donates Headsets


Microsoft has donated 22 Mixed Reality Headsets to Sonoma State University's Immersive Learning @SSU Program for the purposes of faculty and students to develop mixed reality applications. Accepting the donation on behalf of the University is Dr. Sara Kassis, Faculty Fellow of Immersive Learning and faculty member in the Department of Engineering, who is pictured with Jo Ryall, Head of Marketing for the *SF Academy* at *Microsoft* Reactor. Some of the headsets will be used by the Computer Science Department in class related coursework, while a limited number of head sets are to be available on short-term loan at the SSU Library. *—Dr. Sara Kassis*

## Hughes Lab Hosts Doris Duke Scholar

This summer, Dr. Brent Hughes, Department of Biology, hosted Doris Duke Conservation Scholar, Daniella Smith, from Boston College. Daniella's visit was funded by the prestigious conservation scholarship in 2018 from her sponsoring institution at the University of California Santa Cruz. Part of the goal of the Doris Duke Conservation Scholars program is to pair promising undergraduate scholars with research mentors in their area of interest. Dr. Hughes and his lab provided the perfect overlap with Daniella's interests in wildlife ecology and conservation. Over the summer, Daniella worked with graduate and undergraduate students in the lab with colleagues at the National Park Service and San Francisco State University to investigate the habitat and prey availability for recovering sea otters in coastal areas outside of their current range, like San Francisco Bay and Pt. Reyes National Seashore. Daniella will use data collected from this summer to write her thesis at Boston College. It's been a great pleasure having Daniella at Sonoma Sate for the summer, and we wish her good luck in her future adventures! *–Dr. Brent Hughes*

# Local High School Students Explore Engineering at SSU

This summer, the Engineering Department at Sonoma State University launched its first Summer Engineering Camp. A total of 28 students, ranging from sophomores to seniors, from local schools in Sonoma County participated in the camp. The purpose of this hands-on program was to introduce the students to engineering design, innovation, analysis, planning, teamwork and communication skills in a fun and creative environment.

Throughout each one-week long session, the students created exciting projects, including a Bluetooth enabled robotic car, a light tracking system, electronic games and much more. They also created their first working smartphone application using AppInventor. For the majority of students, this was their first experience with electrical circuits and Arduino programming. During the camp, the students also had the opportunity to visit SSU's Makerspace and create a personal logo using 3D printers.

Some of the students were amazed at what they had accomplished! In the final class survey, one student wrote, "The camp has been an amazing experience. Building and programming the car on my own with clear precise instructions was awesome."

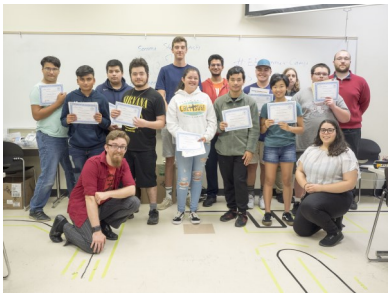
The funding for this program was provided by Keysight Technologies, Inc., a long-time supporter of the engineering program at Sonoma State University.

"It was great to see students' enthusiasm in playing with hardware, sensors, and coding, and to hear how that experience is reinforcing their interests in pursuing STEM careers," said Dr. Sudhir Shrestha, Assistant Professor in the Engineering Department at SSU.

"This year's Summer Engineering Camp enabled us to promote engineering education and reach out to our rising local students. We want to keep these students local beyond their high school years and to do this we present Sonoma State University as a distinctive academic alternative," emphasized Dr. Farid Farahmand, Chair of the Engineering Department.

Engineering education has always been an important driver of technological innovation and critical to successful industrial innovation. As the industry leaders in Sonoma County explore the creation of more manufacturing opportunities and the need to bring more high-tech jobs to the community, the role of engineering education becomes more imperative.

Sonoma State University is committed to expanding its outreach programs to attract more local students to its engineering program. By encouraging more students to consider studying different fields of engineering and computer science, we expand the pool of locally trained high-tech professionals that tend to stay in the community and contribute to its economy.



"The current partnership between Keysight Technologies and Sonoma State University is a prime example of how the local high-tech industry and universities can work together to create stronger career pathways for a diverse group of students to high-demand local employment. In return, these new professionals can contribute their skills, knowledge and talents to the local community and its economy," acknowledged Hamish Gray, Senior Vice President at Keysight Technologies, Inc.

*—Dr. Farid Farahmand*

# Middle School Students Tinker with STEM and Making

For the second year, the School of Science and Technology hosted the Tinker Academy in the SSU Makerspace. Funded by the Sonoma County Career Technical Education Foundation, this two-week summer program engaged 24 middle school students in *Maker* activities that inspired them to explore their interests in making and develop technical, mathematical, and design abilities.

Math professor Dr. Natalie Hobson was the faculty lead of the program, organizing and running the camp activities, schedule, and curriculum. Four SSU students, Kathy Funke-Spicher, Lucero Alvarez Vieyra, Melissa Chan, and Liz Marshal assisted the students as makerspace techs, leading projects and demonstrating makerspace equipment for the students. Two other SSU students, Tabitha Miles and Rosie Lehnhard, acted as mentors for the students in the academy, engaging with the students on making and team building activities.

Some of the making activities included sewing, weaving, electronics, and design challenges. Students also learned through a series of "equipment tutorials" in which they became expert users of the Makerspace machines. The camp culminated in a showcase open to participants' families and the campus community in which students presented their unique capstone projects. These projects varied from LED backpacks to 3D printed miniature neighbors and from quilts to board games.

Students also had a chance to explore other opportunities in SST and STEM through the program. Gabby Luna, an SSU student in computer science, helped the students through interactive VR (virtual reality) stations. Professor Anamary Leal organized a session on soldering robots. Kandis Gilmore, in the Biology Department, hosted the students for an exploration of the biology collection. Professor Robin Glass and Denise Burgett hosted the students for a hydrology lab in the Geology Department.

Though the program was only two weeks, students formed close bonds with each other and the staff and faculty involved. At the end of the program, many shared that they were more inspired to explore STEM and felt more confident in doing so after the program. One participant wrote on her end-of-program survey, "I always thought of myself as being bad at building things, so to not only have the chance to improve my skills but to show that I can design things was awesome!" —*Dr. Natalie Hobson*

# Summer High School Internship Program Celebrates Eleventh Year


This September marks the completion of the eleventh cohort of Summer High School Internship Program interns! This year, the SSU and SCOE partnership supported fifteen interns, selected from over seventy applicants from Sonoma County public high schools, and nine faculty mentors. Interns worked on research in the Departments of Biology, Chemistry, Computer Science, Engineering Science, Nursing, Physics and Astronomy, and SSU E/PO. Interns presented their research at the SHIP Symposium on September 11, 2019. This year, they were joined by undergraduate SSU students presenting their MESA-funded summer research.

# SST Plans for the Student Success and MESA Center

In Sonoma State's strategic plan, *Building Our Future @ SSU: Strategic Plan 2025*, the university has identified Student Success as a leading priority, striving to become a national model in all aspects of the student experience, from academics to campus life to graduation. As such, provision of the student support services needed to succeed becomes ever more important. In our school, student success means an emphasis on advising and peer support through programs such as MESA. The time has come to focus on the facilities necessary to engage and advise our students by creating a student-centered environment dedicated specifically to these efforts.

In an ambitious project, inspired by the vision of Cathy and Chuck Williamson, generous donors to the School of Science and Technology, and lifted by their pledge of support, the school has embarked on a vision to create the Student Success and MESA Center.

***The School of Science and Technology makes plans to expand the Darwin Lobby and create the Student Success and MESA Center!***

The plan is to convert the existing planter area outside of the Darwin Lobby into a paved and furnished patio enclosed with fencing. The patio will be accessible from the lobby through a pair of sliding power-activated glass doors. In addition, the plan is to remove the existing computer work station and replace it with a half-wall counter increasing much-needed access to electrical outlets and charging!

The result will be an inviting and open space for students to gather, collaborate or just hang out. It will be a space for MESA students to support one another and hold events and gatherings. It will be a place where all students can invite their friends to "Find me in Darwin!".

We are still seeking additional financial support to complete this project. For more information, contact Kirsten Tellez, Director of Development, at 707-664-4151 or tellezk@sonoma.edu. —*Kirsten Tellez*

# Find Me in Darwin!

"Find me in Darwin!" is the Science and Tech STEM student's frequent refrain, because Darwin is where they spend most of their time. Darwin is where their classes are, where they study, where they can find free drop-in tutoring and advising, where they spend endless hours in labs—in fact, many students probably feel like they never leave Darwin while at SSU!

With the addition of the Student Success and MESA Center and the Math Deck, the Find Me in Darwin campaign aims to create even more of a hub for Science and Tech students to study, gather and engage by identifying Darwin as the place where they can find community and belonging. Darwin is not only where Science and Tech students can be found, but where Science and Tech students can find their people.

## Sit With Me

As part of their Innovation and Strategic Priorities Proposal to strengthen and formalize student-student and student-alumni connections for tech majors, Drs. Mark Gondree, Sara Kassis, and Suzanne Rivoire pledged to participate in the NCWIT Sit With Me Campaign. Sit With Me is a national campaign to increase awareness and support of women in computing and technology. The campaign is simple but impactful: it invites you to sit in a red chair and tell your story. From the Sit With Me website:

> *The red chair is symbolic. When women and men sit to take a stand, they validate women in computing and IT and recognize them for the important role they play in creating future technology. The Red Chair gives all of us a constructive way to show our solidarity and invite others to participate. The bold red color grabs attention and encourages action. By sitting together we hold space for an honest conversation and create a platform for online and offline discussions about our challenges and hopes for the future.*

The goal of having the Red Chair at SSU is to create space for our campus community to hold these important conversations, either as part of a larger event or at an event specifically organized around the Red Chair. So far, the Red Chair has been part of events for SST, IT, the Tinker Academy, and made an appearance at BigNite 2019. Additionally, members of campus leadership were featured in a soon to be released Sit With Me video sharing their stories and words of encouragement and support—watch for it on our website!

If you would like to host a Red Chair event for your department, student club, or other campus constituency, please contact Dr. Mark Gondree.

Follow the Red Chair's journey around campus on Instagram @redchairssu.

**The Red Chair is made of 111 recycled plastic Coke bottles and is designed to last 150 years.*

## Community Math Deck Opens

If you have walked in the west end of Darwin lately, you probably noticed the newly installed chalkboards, currently adorned with chalk art by SST's very own Kate Lapp, Department of Engineering Science, and Sarah Tucker, Department of Math and Stats. These boards, along with the tables and chairs set up on the surrounding patio, constitute the Community Math Deck, which opened this summer.

While primarily an outdoor extension of the frequently crowded Math Study Lab in Darwin 108, the Math Community Deck is a way to provide a great outdoor space for both faculty and students from across campus to gather and collaborate. Moreover, the Math Community Deck will make mathematics and the mathematics community more visible to the entire campus. As stated in Dr. Brigitte Lahme's initial proposal, people will see that mathematics is a collaborative effort rather than a solitary pursuit, and they will gain a broader perspective and more positive view of math.

The Math Community Deck was made possible by Innovation and Strategic Priorities funding provided by the School of Science and Technology.

*Photo courtesy of Sarah Tucker.*

## Drs. Works and Lillig Awarded $1.3 Million to Improve Performance of Underrepresented Minorities in STEM Courses

*This article, written by Nate Galvan, was originally published on SSU News.*

Sonoma State University is in line to receive $1.3 million in conjunction with three other colleges as part of a project to close equity and achievement gaps in science, technology, engineering and mathematics fields.

Sonoma State chemistry professors Carmen Works and Jennifer Lillig-Whiles will work alongside professors at UC Berkeley, College of Marin and Diablo Valley College, creating online transferable modules for gateway STEM courses that will be accessible to college faculty across California. The project will look to create more equitable and inclusive classrooms and combat evidence that shows underrepresented students, such as female students and students of color, leave science in greater numbers than majority students.

"Jenn and I are both very excited to do this meaningful work with great collaborators, especially Paul Daubenmire from College of Marin, for coordinating a dynamic team," said Works. "We have both spent almost two decades at SSU developing these types of learning and teaching approaches and feel grateful that our efforts have been recognized."

The online modules will focus on introductory-level STEM courses, specifically in chemistry. Works, Lillig-Whiles and the six other co-principal investigators will develop modules and classroom strategies for engaging underrepresented students and helping increase their access to support networks. In addition, they will create faculty development modules to educate chemistry faculty so that they support student learning and a student's sense of belonging.

The award is part of the California Education Learning Lab initiative that awarded a total of $7.5 million to six CSU campuses: Fullerton State, Humboldt State, Cal State Los Angeles, Cal Poly San Luis Obispo, Cal State San Marcos and Sonoma State. The Learning Lab has an annual budget of $10 million to increase learning outcomes and close equity and achievement gaps across California's public higher education segments. This year, the focus is on curricular innovations that combine educational technologies with the science of learning to reduce equity and achievement gaps in online and hybrid STEM gateway courses.

The research phase of the project will begin over the summer, with the grant extending through June 2022. For more information on the other projects the Learning Lab has funded, visit the CSU's News page.

## Chancellor's Office Funds Awarded to Address Bottleneck Courses

Drs. Monica Lares, Department of Chemistry, and Scott Severson, Department of Physics and Astronomy, have been awarded CSU Lab Innovations with Technology (LIT) awards. CSU LIT is part of a system-wide Academic Technology initiative aimed to reduce bottleneck courses for students using innovative online, remote web-based, and lab kit technologies.

Dr. Lares will use Sama Learning, a Bay Area education technology start-up, which creates high-quality VR (virtual reality) simulations and courseware for hard-to-learn STEM subjects, to address the bottleneck in general chemistry courses. The bottleneck in general chemistry is created by the course's high failure and withdraw rate, which in part can be attributed to chemistry's abstract concepts that limit student engagement with the discipline. General chemistry is a highly impacted course, so students who wish to repeat the course to replace a D, F, or W grade are

*(Continued on page 13)*

deprioritized, often waiting multiple semesters to retake the course. This holds them back in progressing through other courses for which general chemistry is a pre-requisite.

Sama Learning's interactive VR courseware will help students conceptualize abstract theories and support them towards mastery of the subject. From Dr. Lares' proposal, "VR enables a radical departure from traditional STEM education in many useful ways. For students, the ability to visualize and manipulate 3D visualizations of otherwise abstract STEM concepts is significant and illuminating. Conceptually, the approach is well founded in the educational psychology literature indicating that multiple means and modalities for conceptual representation expose different facets and aspects underlying a core concept." The Sama Virtual Learning Platform has shown a full grade improvement in first-year chemistry courses, and, in some cases, the failure rate has been reduced to zero.

This project, a partnership with the Director of the Faculty Center and Educational Technology, Dr. Justin Lipp, will roll out as a pilot course in Spring 2020.

Dr. Severson will also partner with Dr. Lipp as well as Dr. Sara Kassis, Faculty Fellow of Immersive Learning, to develop VR experiences addressing key conceptual hurdles for ASTR 100 students. One exercise, addressing the spatial origins of the phases of the moon, has already been designed and implemented in the course. The LIT award will support the development of two more exercises that will address the fundamental difficulty students have with relative size scales in astronomy and the revolution in observing and characterizing planetary systems outside our solar system through the use of planetary transits.

The hope is that these interactive VR activities will both improve student engagement with the course and break through students' misconceptions by making explicit the conceptual leaps of modern astronomical discovery. From Dr. Severson's proposal, "The increased engagement and support on difficult topics are important components of supporting student success and improving D, F, and W rates. Our initial work in-progress with the existing activity shows 90% of students either agree or strongly agree that the immersive experience stimulated their curiosity, and that student assessment shows a near 10% increase in correct responses over non-VR instructed students."

The additional VR exercises will be implemented in one section of ASTR 100 in Spring 2020. With the expected addition of more VR stations at a later date, these exercises can roll out to the other sections of the course, benefitting the entire ASTR 100 course population. Moreover, with added experience in designing and conducting VR experiences, the department can leverage this into adding a lab component to the course, which will address EO1100 and campus-based GE changes underway.

## STEM-NET Supports Math Faculty NSF HSI Program Proposal

Drs. Brigitte Lahme, Ben Ford and Omayra Ortega, Department of Mathematics and Statistics, were awarded a $50,000 STEM-NET Faculty Seed Grant in May 2019.

STEM-NET*, a CSU affinity group, put out a call for nominations from each CSU Campus Provost for Faculty Seed Grants. The goal of these Seed Grants is to support STEM research and education across the CSU. Further, these grants enable the pursuit of foundational work leading to external funding possibilities (e.g. NSF, NIH, Department of Education).

From SSU, Provost Lisa Vollendorf selected the proposal submitted by Drs. Lahme, Ford and Ortega for submission. The STEM-NET Seed award led to submission of a $2.5 million grant proposal to the NSF program in Improving STEM Education: Hispanic-Serving Institutions (HSI Program), titled "Transformative In-

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clusion in Postsecondary STEM: Towards Justice" (NSF 19-540).

The STEM-NET Seed funding allowed Lahme, Ford and Ortega to organize a workshop bringing together a variety of SSU faculty and staff to discuss what a STEM department that truly embraced the *serving* in a Hispanic Serving Institution would look like. From their proposal:

> *What would it mean for a University STEM Department embody the "Serving" in its* Hispanic Serving Institution *(HSI) designation? While the HSI label is based on enrollment data, we follow (Garcia 2017) and propose a definition of* Hispanic-Serving *in terms of* culture *and* outcomes*. With partners from other STEM disciplines and with funding from NSF's HSI program, we will develop, pilot, and test a two-year pathway (the* TIPS Pathway*) for academic departments to move towards a truly Hispanic-serving vision of a radically inclusive STEM culture, leading to demonstrably equitable outcomes (including graduation and persistence rates).*

The group spent the summer reviewing literature and successful previously funded projects and developed their vision for the project. With the help of the STEM -NET funding, they worked with a grant writer to put together their proposal for $2.5 million over five years, which they submitted September 18, 2019.

* The California State University currently has ten multi-campus collaborations, also known as affinity groups, that conduct collaborative activities in research and education on a breadth of topics from agriculture and biotechnology to desert, ocean life and STEM. STEM-NET is a new affinity group formed with the vision of making the CSU a worldwide leader in increasing the pipeline, preparation, graduation and employment of outstanding, diverse STEM students. The mission is to enable STEM leaders from across the CSU to share expertise and leverage system-wide opportunities to foster the implementation of global best practices for our students and faculty in pedagogy, learning and research related to STEM fields within the CSU system. STEM-NET is overseen by a Governing Board of four CSU campus presidents. Dean Lynn Stauffer serves on the founding STEM-NET Steering Committee led by committee chair, CSU Long Beach Provost and former Sonoma State Professor, Brian Jersky.

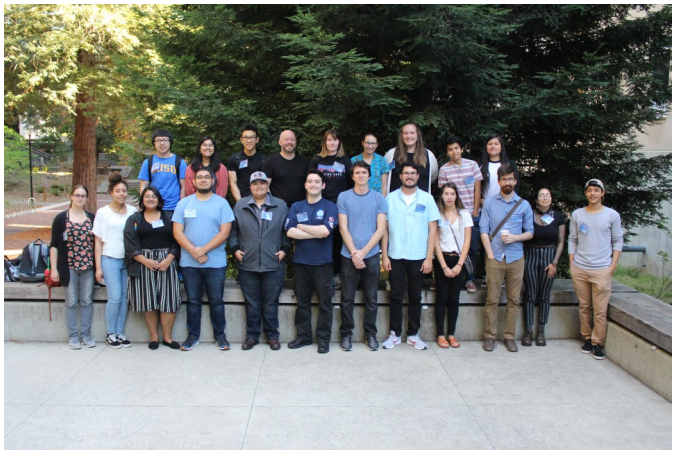
*REFERENCES*

*Garcia, Gina A. 2017. "Defined by Outcomes or Culture? Constructing an Organizational Identity for Hispanic-Serving Institutions." American Educational Research Journal 54 (1_suppl): 111S – 134S.*

## SSU's First Cal-Bridge Scholar Named

Cal-Bridge is an NSF-funded program that aims to increase the number of CSU students completing their bachelor's degree and successfully entering a PhD program to study physics, astronomy, or a closely related field. Originally offered only to southern California CSU students, Cal-Bridge has now expanded to include northern CSU campuses, including SSU.

Alex Vasquez began working with SSU's EPO group when he was still a high school student. While attending SRJC, Alex began working on the EdgeCube satellite mission, mentored by Dr. J. Garrett Jernigan. He also



Northern Californian cohort of 2019 Cal-Bridge Scholars.

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attended SSU courses including SCI 220, taught by Prof. Lynn Cominsky last semester, before transferring to SSU this fall. She recommended that he apply for CAMPARE, a summer internship program that places rising juniors in research groups at research-intensive universities. Through CAMPARE, Alex spent last summer at UC Berkeley, working on the HERA (Hydrogen Epoch of Reionization Array) project. This fall, it was announced that Alex will be SSU's first Cal-Bridge scholar! The program offers financial support, as well as grad school preparation workshops and help with the grad school application process.

Applications to CAMPARE are due in February 2020, and next year's Cal-Bridge applications will be due in August 2020. If you are interested in applying and have any questions, please don't hesitate to contact Prof. Alexandra Miller. *–Drs. Lynn Cominsky and Alexandra Miller*

## Biology Graduate Students Named Recipients of Prestigious Awards

Two Sonoma State biology graduate students have been named recipients of prestigious awards for the 2019-20 year.

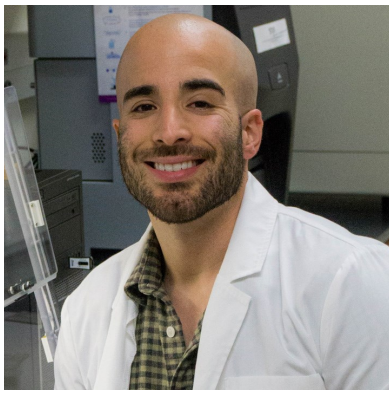
**AAUW Career Development Grant**

Jazmyne Gill, a graduate student in Dr. Mackenzie Zippay's lab, has been awarded a 2019-20 American Association of University Women Career Development Grant.

The AAUW Career Development Grant is a highly competitive, national award that provides funding to women who hold bachelor's degrees and are pursing a master's degree, a second bachelor's degree, certification or training in order to change careers or reenter the workforce.

Gill's research focuses on climate change as it is expressed through heat-shock proteins in purple sea urchin larvae. Gill plans to pursue her Ph.D. and become a biology professor where she will "share her passion through teaching, mentoring and providing students with the appropriate tools to become educated citizens who can make informed decisions about the environment."

**CSU Trustees' Award**



The CSU Trustees' Award is given each year to one student from each CSU campus who demonstrates superior academic performance, personal accomplishment, community service and financial need. It is the CSU's highest recognition of student achievement. A donor-funded scholarship ranging from $6,000 to $12,000 accompanies the award, and each scholarship bears the name of the donor.

This year, Anthony Tercero, a biology graduate student in Dr. Sean Place's lab, was selected as the Wells Fargo Veteran Scholar.

Anthony's feature on the CSU's website reads:

> *Anthony Daniel Tercero has overcome numerous challenges in his life, including growing up in a family where the pursuit of higher education never seemed like a possibility. After joining the Army at 17, he deployed to the Middle East, where he and his fellow soldiers were barraged daily with mortar and rocket attacks. The week he returned home, Anthony's house and all his possessions were destroyed in the San*

*(Continued on page 16)*

*Bruno gas pipeline explosion.*

*While deployed to Korea as an intelligence analyst, he developed a passion for learning and helping others. Following eight years of military service, Anthony enrolled at Sonoma State University, where he earned a bachelor's degree in molecular cellular biology and served as an undergraduate and graduate researcher for a National Science Foundation-funded project investigating the genetic and physiological adaptations of Antarctic fish.*

*Anthony is now working on a Master of Science degree in biology and plans to pursue a doctorate at the University of California, Davis, to one day work as a university tenure-track professor.*

## Dr. Waters Selected as MSA Distinguished Lecturer

Dr. Laura Waters, Department of Geology, has been selected as a Mineralogical Society of America Distinguished Lecturer for the 2019-20 academic year. The MSA sponsors three Distinguished Lecturers each year. Distinguished Lecturers go on three, one-week tours across North America and Europe, visiting three institutions during each tour. Distinguished Lecturers are asked to develop and deliver two lectures designed for institutions that normally do no have the opportunity to hear talks about recent advances in mineralogy. Dr. Waters' talks are titled, "Why doesn't continental crust evolve to its fullest potential?" and "An evaluation of the effects of differential and degassing on magmatic oxidation states across tectonic settings." View Dr. Waters' tour schedule for dates and institutions.

## Dr. Gondree Receives National Engagement Excellence Award

Dr. Mark Gondree, Department of Computer Science, was selected for the 2019 National Center for Women and Information Technology EngageCSEdu Engagement Excellence Award. Sponsored by NCWIT and funded by Google, this award recognizes faculty who employ particular teaching practices in their introductory computer science classrooms known to better engage students, especially women and underrepresented groups.

Recipients of the EngageCSEdu Engagement Excellence Awards demonstrate unique, refreshing approaches in developing course materials that foster an inclusive, interactive classroom environment and encourage confidence in students to persist. Recipients contribute their best materials to EngageCSEdu, a dynamic collection of high-quality, peer-reviewed instructional materials for introductory college and high school computer science courses.

Dr. Gondree is recognized for the assignment he designed for CS 115 titled, "Air Quality Index Calculator," which he then turned into an open educational resource (OER). In this project, students make a calculator that determines the Air Quality Index (AQI) given user-input sensor data. All calculations follow methods published by the US Environmental Protection Agency (EPA) and give students practice handling user input, round/truncating, calculating the max and min, and must handle a simple calculation that requires either a look-up table or conditionals.

"Make no mistake that retention is equally important as recruitment, when it comes to increasing women's

*(Continued on page 17)*

meaningful participation in computing," says NCWIT CEO and Co-founder Lucy Sanders. "Because these award recipients use sound teaching practices to energize and empower their students, they make a critical impact on students' experiences with computing and can encourage students to continue in the field."

In the U.S. in 2017, women earned 57 percent of all undergraduate degrees. Yet, women earned less than one-fifth of all computer information sciences undergraduate degrees. Course materials that incorporate collaborate learning, interdisciplinary connections, and other particular teaching practices can help to engage and retain more underrepresented students in computing.

## Emeritus Dean Swanson Continues Support of Students in the Sciences

Dr. Anne Swanson, a Kellogg National Fellow, was Dean of the School of Natural Sciences at Sonoma State University from 1992 to 2000. The Student Opportunities Fund was started because of the experience of a work-study student in Dean Swanson's office. The Geology student, Theresa Hartman*, who was a single mother, had submitted a research abstract to the Geological Society. When she received the notification that her abstract had been accepted and she was invited to make a presentation, she burst into tears. Already struggling financially, she knew she would never be able to afford to attend. Anne and the Administrative Manager at the time, Carol Currier, knew that they had to find a way to help. Anne went to the University Foundation and set up a fund, and she and Carol walked the halls and collected donations. They were able to gather enough money to send the student to make her presentation and the fund has continued to support students ever since. When Anne retired, the fund was renamed in her honor–the *Anne and David Swanson Student Opportunities Fund*–and Anne and her husband David have included the fund in their Estate Plan ensuring that students will be able to take advantage of this opportunity for many years to come.

Dr. Anne and David Swanson

Recently, Anne has been contacted by the Science History Institute's Center for Oral History to be interviewed for their series, *Science and Disability*. As a scientist who has had a disability since birth, Anne was considered a "bridge" or "transition" person because not only did she advocate for her own education and career at a time before people with disabilities in the US had civil rights, she also advocated for civil rights for others in her field.

*We recently contacted Theresa, SSU class of 1995, who is now in Houston working in geoscience and training and development for the multinational oil and energy organization Schlumberger. She remembers Anne as a "force to be reckoned with" who encouraged her to go the extra mile to achieve her goals. Theresa says that the Geology Society presentation experience was an essential element in her acceptance to a master's program at the University of New Orleans and ultimately into a successful career. It also taught her the importance of sharing her work: "If you don't share it, it's not really science—it is only through the passing of knowledge that it is science." Theresa is an appreciative recipient of Anne's generosity at a time when she needed it the most. —*Kirsten Tellez*

# EdgeCube Delivered to SEOPS in Texas

Technical mentor Dr. J. Garrett Jernigan, current team leader David Story, and original team leader David House with EdgeCube during final sunlight testing on Sep. 21, 2019. Credit: Douglas B. Clarke.

EdgeCube underwent final testing at SSU and is now on its way to space! Technical mentor Dr. J. Garrett Jernigan and current student team leader David Story traveled to Austin Texas on September 23 to integrate the 1U CubeSat with the dispenser and do final vibration tests. EdgeCube successfully passed these tests and it will be shipped to Cape Canaveral for launch to the International Space Station, currently scheduled for December 4, 2019. Following that, EdgeCube will be boosted into a higher (~500 km) orbit by SEOPS' Cygnus booster. This will happen sometime in January 2020. After that, EdgeCube will be operated using the radio antennae installed on the roof of SSU's Student Center. After launch, EdgeCube will survey the Earth's chlorophyll by studying light in the "red edge", a near-infrared transition in the chlorophyll spectrum. Development of EdgeCube was funded by NASA grant NNX16AL81A, as well as support from the Koret Foundation and the SOURCE program. *–Dr. Lynn Cominsky*

# Dr. Glas Publishes PhD Research in Prestigious *Hydrogeology Journal*

Major kudos are due to Dr. Robin Glas for publishing her final paper from her PhD research in the prestigious *Hydrogeology Journal*. Her research on a wet pile of rocks in Peru has received much attention in the field, and she presented this work as the invited speaker at the International Association of Hydrogrologists conference in Portugal last fall. The paper is called, "Hydrogeology of an alpine talus aquifer: Cordillera Blanca, Peru."

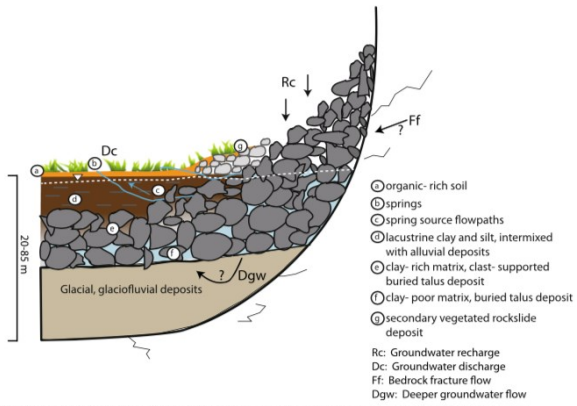



**Fig. 8** Conceptual model of Quilcayhuanca talus aquifer, including recharge zones at valley edge and zones of maximum storage

The hanging valleys of the Cordillera Blanca in the Peruvian Andes have the potential to store significant amounts of seasonal rainwater. This seasonal storage is extremely important for water resources in the region as Peru's glaciers melt away at accelerated rates with climate change. Her paper looks at a typical valley wetland in the Cordillera Blanca Range, and uses geophysics to characterize its aquifer potential. If you are interested in reading the paper, a laminated copy is on display in the hallway outside of the geology faculty offices, Darwin 118, along with other publications from members of the Department of Geology.

This is the second paper that Dr. Glas has published in 2019. She discussed her work, "Historical changes in New York State streamflow: Attribution of temporal shifts and spatial patterns from 1961 to 2016", on September 11, 2019 for the M*A*T*H Colloquium. This paper examines statistical trends and patterns over the past half century for all of New York State and surrounding areas. The methodology includes a spatial

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clustering analysis that allowed her to look at streamflow on a regional scale. Summer precipitation has shifted upward along with annual low flows, and the winter-spring center of volume (WSCOV) of streamflow is shifted earlier because of wetter Januaries, and not spring snowmelt, which is the commonly accepted driver of WSCOV in the literature. —*Phil Mooney*

## Governor's Commission

Dr. Mark Gondree, Department of Computer Science, is serving on the California Governor's Cybersecurity Task Force (GCTF) Workforce Development and Education (WDE) Subcommittee. The committee is charged with the development and implementation of a comprehensive California Statewide Cybersecurity Education Pipeline/Pathway, statewide across all levels of education (including K-12, associates, bachelors, graduate degrees, and professional training certifica- credentials). The Cybersecurity Career Pipeline and pathway project goal is to prepare 50,000 qualified cybersecurity professionals for the State of California between January 2020 and December 2030. He was invited by the chair of the Workforce Development/ Education Subcommittee, Dr. Keith Clement (CSU Fresno).

## New Courses in SST

The Department of Biology is offering the following new courses:

- Genetic Basis of Human Disease (BIOL 380)
- Applied Bioinformantics (BIOL 484)
- Instructional Skill in Biology (BIOL 501)

The Department of Computer Science always explores fascinating subjects in their Special Topics (CS 385) course. Recent topics include:

- Cloud Computing and Software Quality Assurance: taught by local industry professional and MS-CES alum, Jorge Cabrera
- Supercomputing Practicum: taught by top supercomputing researcher from Lawrence Livermore National Laboratory, Barry Rountree
- Computing Professions: preparation for the job market, including resume prep, tech interview practice, and panels with alumni
- Web Frameworks: the cutting-edge, complex frameworks used to build today's websites—we've come a long way from hand-coded HTML
- Human-Computer Interaction

Dr. Alexandra Miller in the Department of Physics and Astronomy developed the following course, which is being offered for the first time this semester:

- 20th Century Physics: From Black Holes to Zombie Cats (PHYS 100): The first thirty years of the twentieth century completely revolutionized the way we understand the world around us. With the advent of Special Relativity, we learned that time can tick by at different speeds for different observers. In the quantum domain, we found that objects can simultaneously exist in multiple places at once. These incredibly foreign phenomena seem so strange in part because they only noticeably occur at scales outside the realm of everyday human experience: at very high speeds, with incredibly heavy masses, and/or of miniscule sizes. Nonetheless, over the last 100+ years, technological advances have allowed us to build a mountain of scientific evidence supporting these seemingly bizarre behaviors. In PHYS 100, we will cover the basics of Special Relativity, General Relativity, and Quantum Mechanics. We will end by touching on modern developments in physics and discussing the edge of our current knowledge, e.g., Quantum Gravity and Quantum Information. The course will primarily be conceptual, requiring only high school -level algebra to solve problems. It will furthermore assume no prior physics experience. Finally, this course satisfies GE are B1 or B3. For more information, please contact Dr. Alexandra Miller.

2000 - Graduation


2007 - Pi Day

2019 – Seawolf Decision Day with MESA students

Every day the students in the School of Science and Technology at Sonoma State are accomplishing great things! From scientific research to makerspace creativity, from geological discovery to outstanding nursing accomplishments and engineering excellence! As Dean, I am inspired daily by our student's achievements.

When I came to Sonoma State 25 years ago as the first female faculty member of the Computer Science Department in the School of Natural Sciences, I had no idea that this University experience would lead to the career of a lifetime. At that time, there were 1,200 students pursuing degrees in our School, today we are teaching over 500 classes with more than 2,100 students. As our offerings grow beyond the basic classroom setting funded by the state, the need to provide additional financial support grows with them.

**Now I am asking for your help. In celebration of my 25th anniversary at Sonoma State, I hope to raise $25,000 to support our faculty offering SSU students innovative and essential programs.** Faculty such as:

- Dr. Sara Kassis from Engineering, who leads our Women in Tech initiative and our Solar Regatta team.
- Dr. Megan D'Errico who advises our MESA (Mathematics, Engineering Science Achievement) students providing essential peer to peer counseling.
- Dr. Derek Girman in Biology who studies the California Tiger Salamander using environmental DNA sampling techniques alongside student researchers in the field and in the laboratory.
- Dr. Omayra Ortega in Mathematics & Statistics opening new areas for our students in big data questions linked to infectious disease.
- And so many more!

Your gift will enable our faculty and students to reach the level of excellence that is our shared goal. Together, we can help today's students reach new heights and prepare the STEM and Health leaders of tomorrow.

Thank you,

Lynn Stauffer, Ph.D.
Dean

For more information, contact:

Kirsten Tellez

Director of Development

tellezk@sonoma.edu

707.664.4151

*"Faculty in Science & Technology really encouraged me out of my comfort zone and to go after much more than just my degree."*

–Dr. Austin Griffith, Biology Alum and Local Dentist

**Click to donate**