Hello Everyone,

Welcome to our first issue of 'The Lens', Focusing on Research, Scholarship and Creative Works at California State University – Sacramento.

We are pleased to bring you this monthly newsletter highlighting the scholarly achievements of our faculty and students. Each issue will spotlight faculty research and creative activities, profiles in leadership, innovations, student success stories, impactful initiatives and more that is happening on our campus and in our community.

We are very excited to have the opportunity to bring to you the many windows of who we are and the excellent work that we do. We thank you in advance for taking a few minutes out of your day to explore our newsletter and learn more about the exceptional people who make Sacramento State an extraordinary place to be.

Please do not hesitate to contact myself, or a member of the Office of Research, Innovation and Economic Development, with comments or questions, stories and ideas for future issues. I look forward to hearing from you and about you.

Sincerely,

Yvonne Harris
Associate Vice President
Research, Innovation and Economic Development

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Student participants at the NSM Symposium and the Fall Poster Forum (Image: Nancy Chan)

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FALL POSTER FORUM SHOWCASES MORE STUDENT RESEARCH THAN EVER BEFORE

BY NANCY CHAN

Sacramento State’s annual multidisciplinary Student Research and Creative Activity Fall Poster Forum reached full swing at the Redwood Room, highlighting student research across all seven college departments on Nov. 4.

Over 130 posters were showcased, marking a big leap from last year’s 83 posters.

“As a researcher you learn early on that you are not going to solve everything, but it is satisfying to build on the work of others to explore new problems and come up with new answers,” Student Research Center Director Ronald Coleman said.

Coleman attributed the increased involvement to the combined efforts of the Natural Science and Mathematics’ faculty, the Summer Undergraduate Research Experience program and staff at the dean’s office.

The SURE program in particular allowed students to pursue their preferred research by paying them and recognizing that most Sac State students needed to work to support themselves, Coleman said. As a result, SURE reduces the need for students to get summer work and primes them to present their work later.

“It feels like a great honor to present our work in a major forum,” said Angad Pal Dhanoa, an undergraduate computer engineering student.

Dhanoa’s experience with presenting research was limited to Sac State’s engineering and computer science department.

His team centered their work around a 150-square foot tiny house run on solar energy, built by fellow engineering students. Dhanoa’s role was developing a versatile mobile app that measured energy and water use, along with temperatures within and outside the tiny house. His goal is to have his app help people save money on bills and contribute to greener homes.

“In our solar-run house, we were producing more energy than we can consume,” Dhanoa said. “We’re trying to create compact houses that are sustainable so we can cut down on the usage of natural gases and get away from nonrenewable resources.”

Maximizing impact while reducing an overall footprint was a theme in electrical and electronic engineering graduate student Emanuel Dupart’s project as well.

Under Dr. Warren Smith, Dupart focused on creating a bilirubin detection system to benefit infants affected by hyperbilirubinemia, a medical condition marked by an excess of bilirubin – a chemical normally broken down by the liver. Left untreated, hyperbilirubinemia can lead to jaundice, brain damage or death.

“One method [of detecting hyperbilirubinemia] is very invasive – it’s what known as a heel stick,” Dupart said. “It cuts into an infant’s foot to collect blood samples. It takes away precious amounts of blood that infants don’t really have.”

Dupart’s research hit home for him, because he has a sister who was born prematurely and diagnosed with hyperbilirubinemia. He described her experiences with it “disheartening.

“By using light wavelengths through an infant’s goot detect bilirubin levels, Dupart’s system wouldn’t require puncturing skin.

“What I’m working on is a test bed for controlling the cyclic nature of the light being transmitted,” Dupart said. “We need to be able to do this at a fast-enough frequency, where we’re collecting multiple samples per heartbeat in order for our calculations to be effective.”
Given the precision required for continued development, Dupart admitted his project was “nerve-wracking,” but he loved the knowledge he gained. “It gives students an idea of real world research and real world applications of the work they’re doing in school,” Dupart said. “It shows me how to apply the things I’m learning in class, especially signal processing, and the things I’m learning in upper division courses.”

Presenting his work during Fall Forum served as another way to truly earn what he learned.

“If I’m going to be working on this project, then being able to present it to someone else means I know the information well enough,” Dupart said.

For returning student Donna Walters, presenting at Fall Forum and helping represent Sac State’s business department helped her realize a longtime dream. Her research proposal involved esports and how they could bump up leadership skills and academic success among college students.

“Engagement with esports are going to lead to student leadership skills,” the business administration major said. “When you have different student leaders that are in positions of team captain or board of directors, they are organizing the community as a whole and helping ensure the longevity of the community.”

Walters honed her ideas with business administration professors Ramakrishna Dantu and Kevin Lovelace to figure out what she called “untapped research” in applying esports to academia.

“When I was approached with this opportunity, I immediately jumped on it,” Walters said.

Not only would she be bringing awareness to esports on college campuses, but she would be giving students a taste of the different graduate programs available. Her research inspired her to continue her studies past obtaining a bachelor’s degree.

“It’s so exciting because it’s something I’m very passionate about, and I also get to fulfill a lifelong goal of performing research itself,” Walters said.

Graduating biology major Cyrus Espino also believed in the transformative power of doing and sharing research.

“I personally love presenting to other students. Talking about it is just as important as doing the research – if you don’t talk about it and let other people know, you’re not inspiring other people,” Espino said.
By studying the wing shapes of flying squirrels in motion and rendering them into matrices with 3-dimensional points, Espino hoped to help create more efficient aircrafts.

“This is basically a pilot study that will lay the framework for future lab members,” Espino said. “When I’m long gone, since this is my senior year, I hope future researchers that come into the lab will see I laid down the building blocks and take it to the next level.”

NATURAL SCIENCES AND MATHEMATICS (NSM) RESEARCH SYMPOSIUM BRINGS OUT UNIQUE STUDENT RESEARCH

BY NANCY CHAN

At Sacramento State’s University Union, the banquet-style Redwood Room was abuzz with discussion as well as congratulations to student researchers who presented over 90 posters for the Natural Sciences and Mathematics Student Research Symposium on Oct. 24.

“What this is about is giving students the opportunity to show what they’ve done to the community — fellow students, family, spouses, children, everyone. Some of it is finished, some of it is not,” said Ronald Coleman, the director of Sac State’s Student Research Center.

For research projects along with research proposals, students worked alone or in groups supervised by faculty mentors. Dr. Lisa Hammersley, the interim dean of NSM, spoke on how “excited, proud and grateful” she was to see the collective body of work in one space.

“It is amazing to see this,” Hammersley said. “I don’t know where else graduate and undergraduate students put in this level of work.”

Starting the groundwork locally

Microbiology undergrad Alessandria Rodriguez did her project on bacteria on campus under Dr. Enid Gonzalez-Orta as a continuation of what she studied in BIO 145, a class that focuses on microorganisms that live in the soil and water.

She paid special attention to bacteria that might produce antibiotics effective against other bacteria known for being antibiotic-resistant — strains known as ESKAPE pathogens.

“Antibiotic resistance is a huge problem. Bacteria become resistant to the drugs we use,” Rodriguez said. “Throughout the world, ESKAPE are the most common ones that cause infections. It’s dangerous because if antibiotics don’t work, your body has to do all the work.”

Rodriguez put in work through examining select bacteria for antibiotic production. After running many tests, she sent her results to sequencing labs to confirm different strains’ DNA.

The Sac State bacteria she found that tested positive for antibiotics were strains of streptomyces and bacillus bacteria. According to Rodriguez, the former “produces two-thirds of all antibiotics in the world today,” and she expressed an interest in growing strains together to see if they can grow antibiotics at a greater volume.

“It’s a lot of troubleshooting,” Rodriguez said. “Still, I’m excited.”

Biology grad student Emalee Ousley was also excited about her upcoming research, doing her proposal with assistant professor Lani Gleason and three biology undergrad students.

Her focus was on red abalone, a coastal bivalve native to California, and the relationship between their intestinal...
bacteria and thermotolerance. By examining the former, Ousley will better understand the shellfish’s health in relation to rising ocean temperatures.

“No one’s done research like this before,” Ousley said. “People have looked into starvation in juvenile recruitment, but not gut microbiome.”

Ousley explained that red abalone have faced “significant decline” in the last 10 years due to climate change, and partly because young red abalone die during periods of El Niño because there’s less food for them.

“A lot relies on red abalone,” Ousley said. “It’s food, it’s recreational fishing, it’s a $44 million industry; it affects our ecosystem and has a huge economic impact.”

As a result, Ousley got acquainted with red abalone research from previous years as well as came up with a testable procedure for her proposal.

“Procedures are so important. If you have any issues with your procedure, the scientific community won’t accept your data,” Ousley said. She hoped to finish sequencing and data analysis by the end of summer 2020.

Going further with NSM

Coleman, who has been involved with the NSM department for the past eight years, called this year’s symposium “tremendous” while underscoring the importance of ongoing paid research for emerging scientists at Sac State.

He also extended thanks to Hammersley and Yinfa Ma, the associate dean of NSM. “Lisa and Yinfa not only encourage students, but they also found funding to give students stipends and give professors money to spend their time,” Coleman said.

Investing in students notably builds “a culture of student research and opportunities,” Coleman added. He wanted students to have those opportunities and have them be readily available.

“The challenge at Sac State is students have complicated lives. They have [extended] families to support or have to support their own families, so if they aren’t compensated, they won’t have time to do research,” Coleman said.

His hope is for the symposium to continue building the profile of the NSM department. “Through word of mouth, it’ll keep building,” Coleman said. “It’ll be a snowball effect.”

AT CARLSEN CENTER’S VENTURE SCHOOL, ENTREPRENEURIAL MINDS MATTER

BY NANCY CHAN

Although boot camps are usually associated with physical fitness, Sacramento State’s Venture School offered a 6-week and 12 days long entrepreneurial boot camp from October through November that challenged student minds to bring their best business ideas forward.

The sessions included learning how to build a proper business plan, validating it with solutions and product market analyses and executing it via pitching to investors or mentors.
Jyoti Das, the entrepreneur in residence who oversaw and helped develop Venture School, said it was important for students to shift into maker mindsets — thinking in ways that require creativity, problem solving, revision and endurance.

Subsequently, students entering Venture School leave with long standing skills and valuable connections to Sac State’s Carlsen Center for Innovation and Entrepreneurship.

“They continue to become our consultants and clients, and we will help them with their ventures to grow and eventually get launched,” Das said.

Dolores Sanchez called herself “a beneficiary of the Carlsen Center’s guidance and teaching.” She was happy to launch her venture Mental Health Navigator.

“Mental Health Navigator is a place for people who suffer from mental illness to connect, to learn and to locate services from trusted providers,” Sanchez said. “I feel great passion for this and I want it to make an impact with the community.”

Sanchez, who graduated from Sac State with a master’s in education 16 years ago, was diagnosed with mental illness and did not feel there was enough resources for people to get back on their feet.

Venture School’s training allowed her to shape Mental Health Navigator to the point where she has a pitch deck along with “a really good sense of how to move my business forward.”

“It’s been a series of going here, doing a lot of customer discovery and research, and ideating business plans,” Nicdao said.

Nicdao’s enterprise ROCK-IT is an app-based gaming platform designed to teach young people financial literacy. The games within the app would break down concepts children could both understand and enjoy.

His inspiration came from discovering the book “Rich Dad Poor Dad” by Robert Kiyosaki when he was 17 and someone around his age at the time dropped their copy.

Because Kiyosaki resembled Jackie Chan, Nicdao’s interest was piqued. He borrowed the book and instead learned how essential financial literacy is for everyone.

“I realized that a lot of schools and education systems don’t prioritize learning money. So that’s what made me really get inspired to do this venture — to teach youth of financial literacy they wouldn’t otherwise get,” Nicdao said.

Much like the rockets the app is named after, ROCK-IT has its users start from one point and taking off.

As a Vacaville native, Nicdao came to Sacramento and felt welcomed by the community and opportunities for startups to thrive.

"For Azriel Nicdao, an undergraduate freshman and pre-business major, Venture School is only the beginning."
GeoLanes, Chénéé Williams’s app, focused on locations in a more physical way, generating personalized tours based on a person’s location and interests.

“It creates a connection for people in their locale, so you’ll be able to make the connection between you and the world based on your location,” Williams said.

Williams has a bachelor’s in accounting and a master’s in sports management. She currently works for the state of California as a chief budget officer, but has always loved traveling.

Through Venture School, she learned how to better prepare pitches for potential investors for GeoLanes.

“The course gave great information on how to get prepared and what are some of the data that needs to be included to be an effective presentation,” Williams said.

Ultimately, Williams wanted to be known as someone who cared about the community through service, where GeoLanes would be a channel to demonstrate both.

“I want to be able to set myself to be open to learning about people, about culture, about different things of the world that I would never, ever imagine,” Williams said. “That’s where I see myself as an entrepreneur who is doing things.”
PROFILES IN RESEARCH, SCHOLARSHIP, AND CREATIVE WORKS

Introducing Dean Sheree Meyer of the College of Arts & Letters

(RESEARCH AND CREATIVE HIGHLIGHTS)

- Sac State microbiome studies get significant financial boost
- Projects aim to boost women's interest in computer science

(UPCOMING EVENTS AND OPPORTUNITIES)

- Department of Art Fall 2019 Senior Showcase - December 2 - 13, 2019
- Engineering & Computer Science Senior Design Showcase - December 5-6, 2019
- Student Research & Creative Activity Spring Symposium (Click to Register) - March 9, 2020

For any questions or suggestions, please send an email to knodt@csus.edu

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(video: Cameron Romero)