CSU BAKERSFIELD

NSME

IMPACT

FALL 2026



AI at NSME

How students and faculty are exploring artificial intelligence

COLLEGE OF NATURAL SCIENCES, MATHEMATICS AND ENGINEERING
CSU BAKERSFIELD



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A MESSAGE FROM THE DEAN



Greetings, NSME Community, Partners and Friends,

It is my great pleasure to welcome you to the fourth edition of NSME Impact, with a collection of amazing stories that highlight the college's growth. Last academic year, we proudly celebrated 411 NSME graduates as they moved on to the next chapter of their lives. This fall, we welcomed more than 800 new freshman and transfer students to NSME. It is exciting to see our college community continue to grow and, even more importantly, to see the opportunities we offer our students continue to expand.

As reflected in the stories, our faculty, staff and students are striving to:

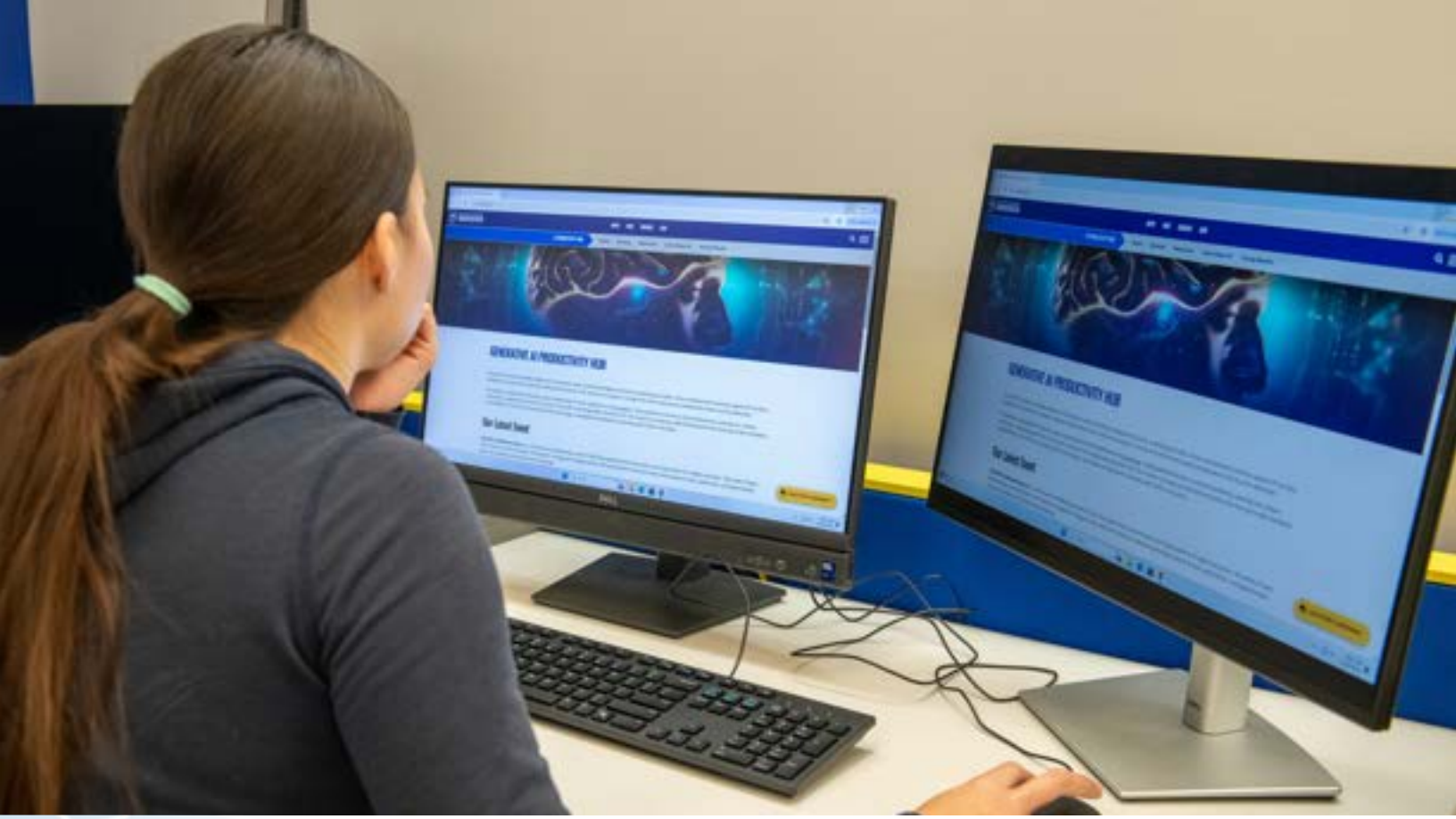
- Expand innovation through AI tutors, humanoid robotics, creative applications of AI and the growing CSUB Hub for Statistics, Applied AI and Data Innovation.
- Expand where learning can happen through our first faculty-led engineering study abroad program with K-water, a global leader in water resource management in South Korea. Nursing students traveled to Argentina. Others spent their summers conducting research at Lawrence Livermore National Laboratory and engaged in research and professional experiences beyond the traditional classroom.
- Expand our facilities as we watch the new Energy Innovation Building rise from the ground and actively collaborate with industry and community to reimagine a new model of collaboration that support innovative research and education.
- Expand our reach into the community through Roadrunner Science Fridays, the MESA Center, pre-med advising and other STEM and health outreach.
- We are very proud that our outstanding undergraduate and graduate students both received the President's medals in the 2025-2026 academic year, and our outstanding faculty received campus wide recognition for their research, innovation and leadership.

As NSME grows, we are creating more opportunities for students to discover their interests, gain meaningful experiences, and prepare for their futures; and more ways for us to contribute to our community and region. None of this would be possible without our dedicated faculty and staff, talented students and alumni, and generous community and industry partners. I am deeply grateful for all that you do.

I hope you enjoy the stories in this edition and share the pride I feel in how far we have come, and the excitement about where we are going next.

NSME — the future starts here.

Dr. Jianyu (Jane) Dong,
Dean of the College of Natural Sciences, Mathematics and Engineering



AI at NSME

How students and faculty are exploring artificial intelligence

Science and technology have always moved fast, and with the rise of artificial intelligence that has never been truer. California State University, Bakersfield aims to be on the forefront of the AI revolution, with plenty of opportunities for students to get early exposure to the tech that could change their lives and careers.

In addition to the university's recent partnership with OpenAI, faculty within CSUB's College of Natural Sciences, Mathematics and Engineering are engaging students with a variety of AI programs and projects — from tutors, to humanoid robots, to attempting to reboot a Shakespearean tragedy.

For Dr. Anjana Yatawara — an assistant professor in the Department of Mathematics and founder of the CSUB Hub for Statistics, Applied AI and Data Science Innovation — efforts to introduce AI to students are about preparing them for the future, making them competitive in the job market and giving them real research experience.

"We are helping them, exposing them to these tools and making our students ready for the changing scope of industry," Dr. Yatawara said. "Before artificial intelligence, a job might have been done by a 20-member team, but now you can do the same thing using a two-member team. So you have to become the person who knows how to use artificial intelligence tools to get your job done efficiently."

Whether in the classroom, in faculty research or in The Hub (see sidebar), AI is here at CSUB. Ahead, learn more about a few ways NSME faculty is bringing AI to campus.

Course-specific AI tutors

Dr. Alberto Cruz — a professor in the Department of Computer and Electrical Engineering and Computer Science (CEECS) — and Dr. Yatawara are principal investigator (PI) and co-PI on ELEVATE: Enhancing Learning Experiences Via AI TEchniques, a $150,000 grant from California Learning Lab.

Through the grant, the duo has worked on creating course-specific AI tutors for classes of all kinds of subjects. If students are already using large language models (LLM) like OpenAI's ChatGPT or Anthropic's Claude for help with their homework, Drs. Cruz and Yatawara wanted to figure out a way for them to use it properly as a tool.

"Usually, students just take the question and put it into AI and take the answer directly, and there's no critical thinking; they get the quiz or homework done, but they don't learn anything," Dr. Yatawara said. "Rather than using AI as an answer generating machine, we give our students some dedicated prompts that convert it into a thinking path."

The tutors, unique to each class, were developed through either custom versions of ChatGPT or through open-source models that Dr. Yatawara's team fine-tunes on the course material itself. Students access them through Canvas or a direct URL. Dr. Yatawara emphasized that the classes are still taught traditionally in the classroom, but the AI tutors offer another way for students to ask questions and are particularly convenient if they need help after hours when professors might not be quick to respond to email.

By feeding these AI tutors appropriate class materials like syllabi, textbooks and lecture notes, educators can trust that the tutors are far less likely to give students information that conflicts with the course. They are also programmed to not give students direct answers but to work with them like a thinking partner, Dr. Yatawara said.

"I know the information this bot provides is



More on the CSUB Hub for Statistics, Applied AI and Data Science Innovation

Beyond knowing how to work with AI as a user, NSME is also committed to offering students the chance to work in AI research. Founded in January 2025, the CSUB Hub for Statistics, Applied AI and Data Science Innovation is the backbone behind much of NSME's AI projects. Located in Science III, room 214, the Hub houses two large servers plus individual state-of-the-art workstations.

The Hub focuses on two kinds of research: that on AI models themselves and research that needs heavy computing power that statistics and applied mathematics demand.

"At a large research university an undergraduate might wait months for time on hardware like this, or never touch it at all," Dr. Yatawara said. "Here, they sit down and run the computations that end up in the paper. They also find out what research actually feels like, including the analysis that does not work and the reviewer who disagrees with you. You cannot teach that in a lecture."

Work run on the Hub's machines has already produced four peer-reviewed papers, with more under review. Two of them, both on air pollution exposure inequality, were written with CSUB undergraduates as co-authors, including Tom Regpala. The other two are Dr. Yatawara's own work on financial forecasting, including one testing how well AI models estimate market volatility.

Through the Hub, Dr. Yatawara also hosts the Statistics, Applied AI and Data Science Colloquium. Bringing professionals to campus gives students the chance to learn about current AI topics and industry.

"A textbook is two years behind by the time students read it," Dr. Yatawara said. "Somebody who did the work last month is not. Students should hear directly from the people whose jobs are changing."

very streamlined for my specific class, that specific section," he said. "I'm more confident in my students using this as a help bot rather than a general-purpose chatbot."

For his own classes, Dr. Yatawara has created subject teaching bots, homework bots and exam review bots. Instructed not to give full answers, the homework bot will instead offer help by giving definitions, theorems and maybe a hint. The exam bot pulls from uploaded past exams and generates unlimited practice exams so students can get an idea for what they will be asked to do on test day.

"The beauty is we can customize these things to fit different purposes," he said.

The grant, which was awarded in the fall of 2024 and ran through summer 2026, required Drs. Yatawara and Cruz to not just come up with AI tutors that work for their own respective classes, but that can be easily adapted by professors in any given subject. After they developed the tutors and determined the right prompts for their needs, the second phase of the grant saw them bring on colleagues from psychology, philosophy and religious studies, management and marketing and more.

"We wanted to help more faculty to implement what we have learned in their own classes, if they think it's useful," he said. "We help them come up with their own prompts, because my prompts are specific for statistics, Dr. Cruz's prompts are specific for computer science, but they can tweak a good prompt that would be good for their class."

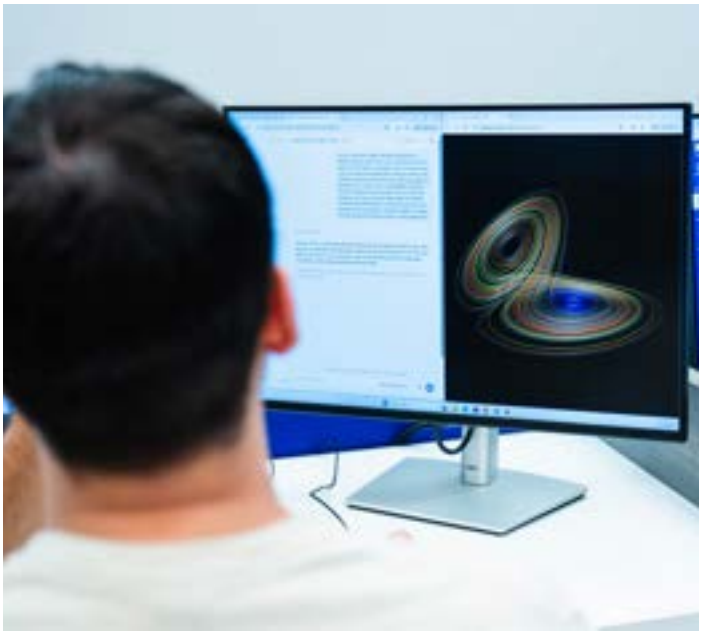
Recent computer engineering graduate Tom Regpala was already familiar with AI before taking Dr. Cruz's Computer Architecture II course in the Spring 2025 semester. He had seen the way classmates in other classes became increasingly reliant on AI for easy access to homework solutions, even using it to cheat on tests. Because of that, he was at first skeptical about the AI tutors in Dr. Cruz's class.

"I initially felt like I wanted to prove to myself that I did not need AI to succeed in the classroom," Regpala said. "What changed this mentality was the realization that AI, whether we like it or not, is here to stay, especially in my field, where most industry jobs in computer engineering are pretty much expected to use AI in their workflow."

Regpala explained how Dr. Cruz encouraged students to use the AI tutors for classwork in his flipped classroom model, where instructional content was done at home and homework was done as projects during class time. Students would use particular prompts for the AI to guide, but not solve, problems, and they would be required to submit a transcript of the AI interactions.

"My perspective has changed to where I view AI as you would a calculator," Regpala said. "It is a tool to use once you understand what exactly you are trying to do. Like how in high-level math courses, basic arithmetic skills are assumed, so you would use the calculator for redundant work. I would never use AI to do something that I do not understand."





Students working in the Hub

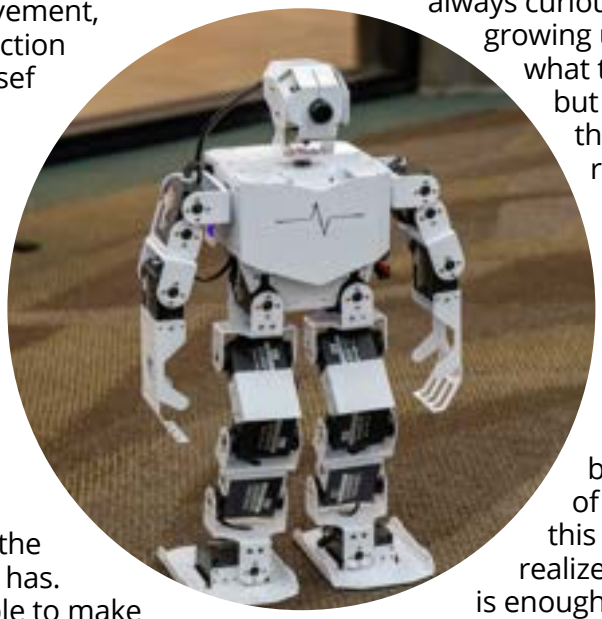
Humanoid robotics

CSUB's work in the realm of artificial intelligence isn't limited to Bakersfield. About 90 miles southeast of the main campus is the university's Antelope Valley (AV) location, where Dr. Yasser Youssef teaches as part of NSME's CEECS department. Earlier this year, Dr. Youssef led a workshop on humanoid robotics and applied AI.

Over 12 sessions in the spring, a small group of nine computer science students at CSUB-AV worked with TonyPi humanoid robots. Students learned how the robots — each about 15 inches tall — move, detect objects, track faces, respond to voice and gestures and make decisions using AI-related computer vision techniques, Dr. Youssef said.

"The idea developed from a broader effort to expand hands-on AI and emerging technology opportunities for CS students at the AV campus," Dr. Youssef said. "We recognized that many students are interested in AI and robotics but often have limited access to practical robotics systems and research-oriented experiences. The workshop was designed to bridge that gap by introducing students to real humanoid robotic platforms and giving them opportunities to work directly with AI-based robotics applications."

Supported by a grant from the U.S. Department of Education, the project brought together two areas of computer science: robotics and AI. While the robotics side focused on movement, sensors, servo control and interaction with the physical world, Dr. Youssef said, the AI side focused on computer vision, decision-making, adaptive behavior and explainable tracking systems.



"Each session we learned the logic behind various aspects, and we got to visualize the robot to execute these concepts," said Brenda Murillo, a computer science student at CSUB-AV who participated in the workshop. "A specific instance I enjoyed was first learning about the pre-coded movements the robot has. With very little effort, we were able to make the robot dance and take a bow, which was very cute to see."

After learning the basics of the TonyPi robot, like how to make it do simple tasks, students learned



Brenda Murillo works on an AI-based robot.

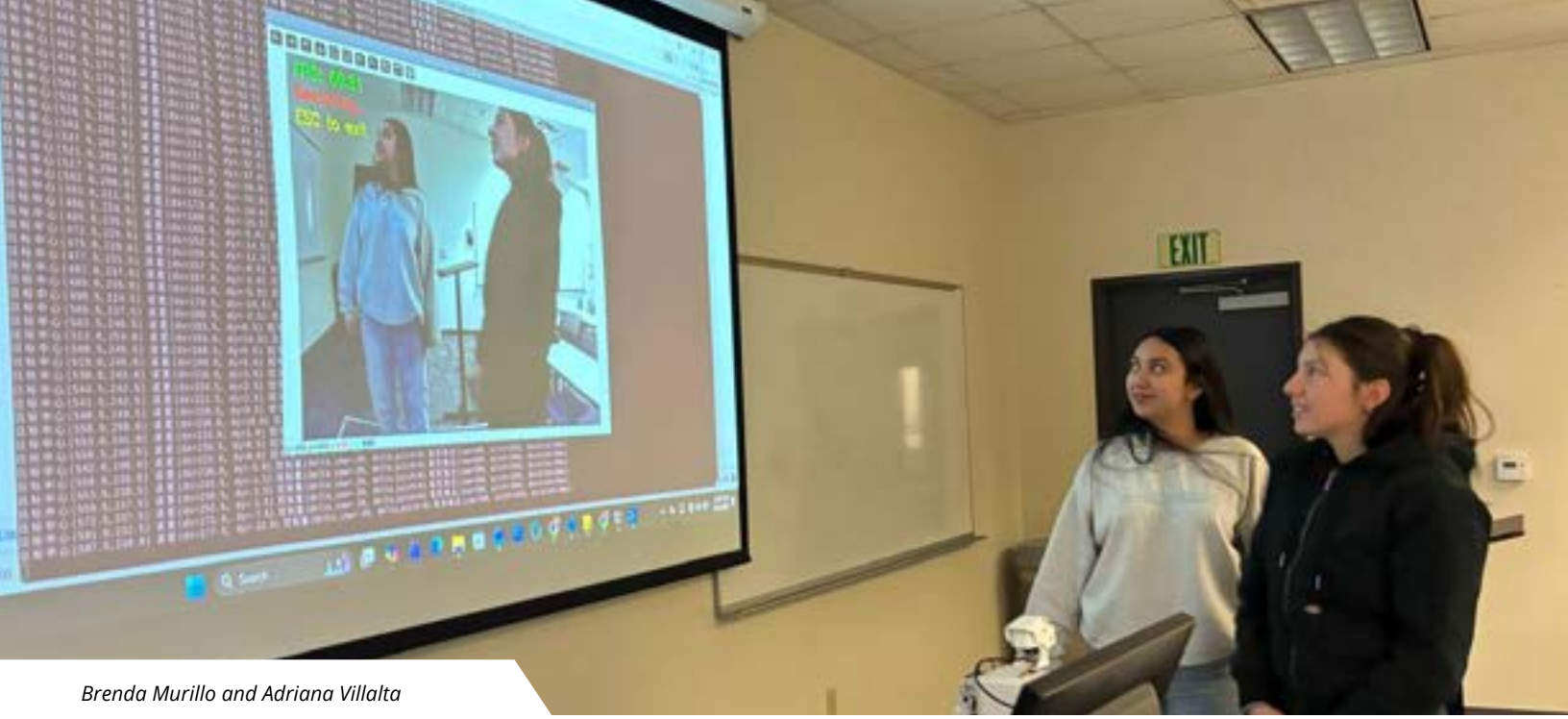
face and color recognition, then audio interaction, Murillo explained. Then, they worked on it tracking a ball by color, running experiments on how it is detected under different lighting conditions. The group has written a paper on their work and is currently trying to get it published.

"This workshop gave me the opportunity to work collaboratively, which is extremely key to working in computer science," said Murillo, who plans to pursue a career in data science and machine learning. "Dr. Youssef has encouraged us to explore different avenues within computer science, and he has created opportunities for us to grow."

Computer science student Adriana Villalta wanted to join Dr. Youssef's workshop because she was always curious about toys and robots growing up. She didn't know exactly what to expect from the workshop but was surprised to learn how the preset software that the robots came with could be customized for all kinds of different tasks.

"Sometimes it can be intimidating to join something because you think that everything will have to be done from scratch, but that is not the case most of the time," she said. "I think this workshop has helped me realize that sometimes curiosity is enough to be able to handle a new project. You don't have to have everything figured out in order to start."

Villalta hopes to land a job in cybersecurity but is open to other paths like IT, firmware



Brenda Murillo and Adriana Villalta

implementation or development and robotics.

"There is so much room for implementation of AI in robotics as you can use AI algorithms to run tasks where the robot has to decide on an action to take," Villalta said. "AI robotics was a fun experience as it was rewarding seeing the robot do certain tasks after algorithm implementation."

Dr. Youssef followed up this spring workshop with a summer project on agentic AI with CEECS department chair Dr. Saeed Jafarzadeh. Agentic AI, Dr. Youssef explained, are systems that observe information, reason about a situation, make decisions and take actions. Students built a smart security system prototype for a lab environment using cameras, sensors, RFID cards and AI agents.

"Many universities are currently expanding AI education, but one important advantage of smaller and growing programs is the ability to create highly hands-on and student-centered experiences," he said. "At CSUB-AV, students often work directly with faculty in smaller collaborative environments, which allows for closer mentoring, more direct participation in research activities and stronger hands-on involvement."

In his own research, Dr. Youssef focuses on applied artificial intelligence systems, particularly in areas like computer vision, explainable AI, intelligent systems, robotics applications and machine learning.

"I am especially interested in how AI systems can explain their decisions, adapt to changing conditions and operate safely in practical applications," he said. "The broader goal is to help develop AI systems that are practical, trustworthy and accessible for real-world use."

AI Shakespeare

Many have read Shakespeare's "Macbeth" and wished for the central character to end his path of violence before his political ambition and paranoia lead him to a tragic end. Talking him down toward a more peaceful resolution would, of course, change the very nature of a Shakespearean tragedy but it would also prove the power of skillful de-escalation.

Dr. Nick Toothman, an associate professor in the CEECS department, is part of the team working on "Stay Thy Blade," an AI-based video game that allows players to interact with characters like Macbeth. Using fictional scenarios, players can practice de-escalation strategies that could ultimately help them navigate real-life conflict resolution in the future.

"The goal is to give players the chance to speak with a character from a drama and get the real-time feedback of a conversation, with the idea that these characters — using modern AI techniques — can be fine-tuned to match a profile that we draw on from the source text," Dr. Toothman explained. "They can respond in character based on the strategy being used."

"Stay Thy Blade" is a follow up to "Play the Knave,"

a motion-capture virtual reality game that is equal parts Shakespeare and karaoke. As a doctoral student at University of California, Davis, Dr. Toothman worked on "Play the Knave" with an interdisciplinary team made up of fellow computer scientist and adviser Dr. Michael Neff, and English professors Dr. Colin Milburn and Dr. Gina Bloom. "Play the Knave" has been used in classrooms to make Shakespeare more accessible since 2015.

Since early 2025, current UC Davis computer science doctoral students Kyle Mitchell and Nicholas Treynor have been working with Drs. Bloom, Milburn and Toothman to give the Shakespeare VR concept a second act with "Stay Thy Blade." While Treynor has focused mostly on AI sentence transformers and classification, Mitchell is developing the character engine.

With the UC Davis team's work centered around a desktop computer experience, Dr. Toothman was brought on to bring "Stay Thy Blade" to virtual reality. Instead of just seeing Macbeth pacing the castle's rooftops, players can be right there with him.

In the scene, Macbeth has already killed King Duncan to take his throne, and according to a prophecy, Macbeth's violence won't stop there. Macbeth's mind is "full of scorpions" as he wrestles with what to do. Whether the player talks Macbeth off the ledge of more violence or pushes him further into it depends on how they talk to him.

"Using the text of the play, the developers have come up with character personality traits they feel are true to Macbeth," Dr. Toothman said. "Through conversational interactions, his mood will change after each response, depending on different factors. What really makes all this interesting is the tuning process of figuring out what makes a character tick, trying to quantify that in a way that feels reliable, but also at times unpredictable as a mad king would be."

Demonstrating how "Stay Thy Blade" works in a quick run-through, Dr. Toothman showed the backend of the game, where he could see how his attempts to calm the character were received. Asking Macbeth how he feels, for instance, is recognized as acknowledging emotions and active listening.

Virtual reality adds a new layer of possibilities for how the AI Macbeth can respond to a player. A simple "What's wrong?" can be read as either sincere concern or antagonizing sarcasm



Players interact with Macbeth in "Stay Thy Blade."

depending on the player's body language and tone, and Dr. Toothman wants Macbeth to respond accordingly.

"Now we can have nonverbal communication as well," he said. "How we're posed, where we're located, hand gestures that we perform … it opens up opportunities for what we can analyze and apply when we're communicating with an AI character."

In addition to the "Macbeth" scene, the team is also working on a scene from "Romeo and Juliet" with Lord Capulet. While "Stay Thy Blade" is focused on Shakespearean scenes, Dr. Toothman said future uses for the platform could involve real-world scenarios for employee training programs.

In May, the team gave its first presentation of the VR version of "Stay Thy Blade" at the Meaningful XR conference in Portland, Ore. The next milestone will be having a downloadable demo for anyone to try out, hopefully this fall.

Though CSUB students haven't been involved in the AI component of Dr. Toothman's research yet, two students— Jaden Bowers and Geneva Regpala — helped work on the server used to run both "Play the Knave" and "Stay Thy Blade." Two more students, Justin Lowe and Juan Carlos Sandoval, helped with shared spatial anchors to improve the experience of two players using VR in the same room.

Dr. Toothman said he's approached AI research with caution, having heard stories on both the ways it has helped software engineers and the instances when it has gone off the rails and deleted files.

"We have the privilege of knowing what these things can do in the wrong environment without too much care," he said. "That means we have to prepare our students for these things just as well. I think in our department, we're very well situated to tackle some of these issues."



Dr. Gyeong Sung Kim and students outside Daecheong Multipurpose Dam in South Korea.

Engineering students travel to South Korea to learn about water, energy

Engineering students learn a lot in the classroom, but seeing the real-world applications of the concepts they study can bring them to life even more. This summer, seven students from California State University, Bakersfield got the opportunity to take experiential learning to the next level with a study abroad trip to South Korea.

Led by Dr. Gyeong Sung Kim, an assistant professor in the Department of Physics and Engineering, the trip focused on the country's water and energy industries. From July 26 to August 8, students toured facilities across South Korea, seeing how another country addresses common resource issues.

"Rather than learning only through lectures or textbooks, I wanted students to visit operating facilities, meet professionals in the field and see firsthand how engineering, science and technology are being used to address challenges related to water, energy, sustainability and infrastructure," Dr. Kim said. "My hope is that when they encounter these concepts again in their courses, they will be able to connect the equations and theories to something they have actually seen and experienced."

The trip was a collaboration with the Korean Water Resources Corporation, or K-water, the country's public water management agency. Before working in CSUB's College of Natural Sciences, Mathematics and Engineering (NSME), Dr. Kim worked for K-water for around 19 years and knew it would offer a unique learning opportunity for his students.

With advanced technologies like AI-operated water treatment plants, wastewater reuse, hydropower, tidal power, floating solar and integrated water management systems, South Korea was a particularly valuable setting for the two-week trip, Dr. Kim said.

"I was very happy with how engaged and cooperative the students were throughout the program," he said. "They actively asked questions and showed a genuine willingness to learn, which made the experience very rewarding for me as an instructor."

Visiting the Chungju Dam was a major highlight of the trip for engineering major Maryjane Chavez and electrical engineering major Jose Soto. In addition to supplying water to the surrounding area and generating hydroelectric power, the dam also uses the surface of Chungju Lake as a space to house floating solar panels.

"That was really nice because we got on a boat and we drove a couple minutes into the water and we stepped onto the floating solar panels, and they told us about them right there," Soto said.

Another highlight of the trip for Chavez was the Gyeongin Ara Waterway, a manmade waterway connecting the West Sea to the Han River that acts as flood control. It is also used for transportation and as a recreation area for the public.

The trip covered several cities, with visits to the Sihwa Tidal Power Plant, the largest tidal power plant in the world; an AI-water treatment plant representing some of the most advanced technologies currently being used; and a wastewater reclamation facility that supplies reclaimed water to Samsung Electronics, highlighting how water that would otherwise be discharged can be reused.

"South Korea, and K-water specifically, have a great deal of manpower and time invested in renewable energy and have made considerable effort to lower water and air pollution," Chavez said. "It is to the extent that renewable energy cultivation and sustainability was a notable part of every site the class visited, and the experts were very enthusiastic to speak on how their site or team had been working towards a greener future."



Jose Soto



Maryjane Chavez

Soto was interested to see the ways K-water uses any type of water — including wastewater, salt water and river water — from everything from homes to data centers.

"They have a lot of ingenuity," Soto said. "They think really broadly. They just think of different



Students at K-water Headquarters



Haeundae Beach in Busan

ways to use their limited supplies, and that's something that we have to learn how to do."

The students also had some free time in the evenings and on the weekend to explore South Korean culture. They shopped on the streets of Myeongdong in Seoul, experienced a traditional Korean sauna and bathhouse (jjimjilbang) and took the high-speed train to Busan, where they went to the beach and had a Korean-style barbecue party.

Though she loved indulging in a major skincare and makeup haul in Myeongdong — to the point that she needed an extra suitcase by the end of the trip — Chavez said the most noteworthy activity was the weekend trip to Busan, where she had wanted to visit for years. The students stayed with Dr. Kim's friends and their families, staying right across the street from the beach and enjoying bingsu, a dessert of frozen milk and toppings that made for a refreshing treat on a hot and humid day.

"That weekend truly felt like a vacation and a much needed slow-down in the middle of our busy, exciting schedule," she said.

In addition to bingsu, the students also ate pork backbone soup, fermented soybean stew and a wide variety of other foods. Dr. Kim was pleased with how fully the students embraced Korean culture and food.



Myeongdong shopping street



Eating Budae Jjigae



Gosan AI-powered Water Treatment Plant

With the first trip a success, Dr. Kim is already planning the next one and working to expand the program so students in other NSME programs can participate. He sees potential in more educational trips that could include students in chemistry, biology, geology, math and public health.

"Beyond the technical knowledge, I hope the students gained confidence, curiosity and a greater appreciation for interdisciplinary and international collaboration," he said. "I also hope the experience encouraged them to think more broadly about their own academic and career paths and to recognize that many of today's environmental and technological challenges cannot be solved by a single discipline."



Chungju Multipurpose Dam



Gyeongin Ara Waterway



CSUB celebrated the groundbreaking of the Energy Innovation Building earlier this year.

CSUB breaks ground on Energy Innovation Building

A new facility that will serve as the hub for energy research at California State University, Bakersfield has moved a large step closer to becoming a reality.

The university held a groundbreaking ceremony in January to celebrate the start of construction on the new Energy Innovation Building (EIB) on campus. The 56,000-square foot, three-story facility will be located south of the Science III building and is expected to open in 2027.

"Today, we will dig our shovels into the soil to launch a construction project that will expand the footprint of this university, both in terms of our physical composition and the more transcendent realm of progress, possibilities and audacious thinking," said President Vernon B. Harper Jr. "Friends, we are breaking ground on more than a building — we are breaking ground on a bold vision for this region. With the Energy Innovation Building, Kern County is staking its rightful claim as California's leader in the advancement and evolution of the science of energy."

Sen. Shannon Grove said the students who will utilize the new building will be "the mind resource — and the human resource — for the energy capital of the entire United States one day, out of this building that will be built behind us."

The EIB will serve as the home for the California Energy Research Center as well as Extended Education and Global Outreach. There will be 20 new offices for faculty and administration.

More than 10,000 square feet of the Energy Innovation Building will be devoted to teaching labs and over 8,000 for research space. It will also include 1,500 square feet of student collaboration space as well as a 240-seat hall where the university can host research symposiums, conferences, academic competitions and other events.

"It's so exciting to celebrate this important milestone with so many of our friends and

partners in Kern County," said College of Natural Sciences, Mathematics and Engineering Dean Dr. Jane Dong. "This has been an amazing journey, and what inspired me is how our community came together to transform the dream into reality."

This groundbreaking was the result of a decade-long effort by CSUB and community leaders to obtain approval and funding for the project. Thanks to these efforts, the university was able to secure an $83 million allocation from Gov. Gavin Newsom and the state Legislature as part of the 2022-23 state budget to help fund the facility.

"Ten years ago, when CSUB put the construction of this building atop of our wish list, the project was just that — a wish. Today, we are gathered to witness what happens when a wish is reinforced by the resolve of a university and a community of leaders," said President Harper.

Mayor Karen Goh said the EIB will give rise to new ideas and technologies that will have a significant impact on energy production in the region.

"Today, we're celebrating the rise of our workforce as CSUB prepares students for long-term success in the evolution of energy and in innovation," she said. "This center gives us an opportunity to create a workforce of people who will boldly innovate and find solutions to problems that our minds can't even conceive of today."

To Mayor Goh, the Energy Innovation Building serves as an example of what can be achieved when CSUB and the community work together to execute a shared vision.

"When education, industry, government, and our community come together, we don't just wish. We don't just imagine what's possible. We build it," she said.

Throughout the spring and summer, work on the building has continued to slowly transform a wide open lawn into the future home of innovation on the CSUB campus.







Construction on the new building has continued throughout the spring and summer and now into the fall (Top to bottom)



Students from the Health Science Academy at Mt. Whitney High School in Visalia visited campus in October 2025 for Roadrunner Science Fridays.

Seeing themselves at CSUB

Roadrunner Science Fridays gives K-12 students early look at college

On any given Friday during the academic year, students from local K-12 schools are visiting the California State University, Bakersfield campus and getting a glimpse into what their futures could look like. From scientific demonstrations in laboratories to meeting with current Roadrunners and even eating lunch in the Student Union, they are encouraged to imagine their lives as CSUB scholars.

The university's College of Natural Sciences, Mathematics and Engineering (NSME) regularly hosts students from fourth through twelfth grade as part of its Roadrunner Science Fridays program. Funded by Edison International, the program is a way to get younger students on campus early to learn about options at CSUB for those interested in science, technology, engineering, mathematics and health care careers.

"I want them to have such a great interaction with our students and faculty that they think, 'I want to go there. I want to be a Roadrunner,'" said Director of NSME Grants and Outreach Dr. Andrea Medina.

Every tour is different, tailored by members of Dr. Medina's Grants and Outreach team to suit the interests or age range of the visiting students. High-school students from engineering classes will get a tour more focused on CSUB's engineering programs, research and labs, for instance, while elementary students might get more hands-on activities showcasing the fun of science in general.

The program started in 2016 but was revitalized post-pandemic when COVID restrictions were lifted. It now sees about 15 visits per academic year, with around 100 students per group, Dr. Medina said. In 2024, Roadrunner Science Fridays was nominated for a Beautiful Bakersfield Award in the Education category.

Organizing the visits and spearheading the tours most days is Abel Núñez-Guerrero, outreach & community college coordinator for NSME. Núñez-Guerrero and former student assistant Daniela Moreno were key players in formalizing the tours' agenda and rotations over the last few years.

Núñez-Guerrero typically welcomes students by introducing himself and getting students excited for the day ahead. He will hype them up by clapping and getting them to stomp their feet. He'll even dance if he needs to, he joked.

"Abel's enthusiasm is infectious," Dr. Medina said. "Everyone knows Abel and has good things to say about him. He's a fantastic representative of NSME, and we're lucky to have him on our team."

Last October, sophomore students from the Health Science Academy at Mt. Whitney High School in Visalia visited campus for a day geared around CSUB's nursing program, public health program and pre-medical advising. Their teacher,

Tim Perrotta, has been bringing students in this program to CSUB for three years.

"We were hooked after the first year because it was just a really great experience," Perrotta said. "Every year when we go, students' comments are, 'Wow, that's really cool. I never knew it existed. This is definitely in my top three now.' One of the reasons that it appeals so much is the family-like atmosphere of the smaller school."

At this visit, Perrotta's students learned about CSUB's public health program from Associate Professor Dr. Linh Bui, heard from recent nursing graduates about their work in local hospitals and clinics, visited chemistry labs, learned about the physics of waves and their application to the medical field and interacted with a panel of current students about their experience at CSUB.

Most of the Mt. Whitney students know about universities closer to Visalia, but Perrotta wants them to know CSUB isn't a far drive. At about an hour-and-a-half away, CSUB is far enough for his students to feel like they are away from home but still close enough for weekend visits and holidays.

"We need to expose them to what's available at CSU Bakersfield as well because for some of our students, that might be the better choice," Perrotta said. "The first year we went, when we got back to school, I asked the students, 'Now that you've been there, how many of you would consider CSU Bakersfield?' and 75 percent of them raised their hands."

It isn't just the proximity to home that makes CSUB a great option for his students and others in the state. With the energy, health care, aerospace and agriculture industries in Kern County, there are plenty of jobs available to those with STEM and health care degrees.



Dr. Linh Bui tells students about CSUB's public health program.

"There are a lot of employment opportunities in this area," Perrotta said, noting CSUB's connections with industry partners. "If they like going to school here, then maybe they would like working down here and living down here."

For Perrotta, university visits are all about showing students that college is within reach for them. He knows they learn from the demonstrations and like touring the campus, but the best part for the kids is interacting with the students, faculty and staff.

"It's more about the people, and I think they've felt connected to the students when we're here," Perrotta said. "The effort that CSU Bakersfield makes to welcome us is really appreciated."

Núñez-Guerrero might lead the tours now, but he still remembers his first introduction to CSUB as a kid visiting campus from Buttonwillow. His father would make the long drive so he could participate in a science program, conducting experiments in some of the same buildings he shows students around today.

"I want them to feel the same way I did," said Núñez-Guerrero, a CSUB alumnus himself. "It's just exposing students to a bright future and the opportunities that are here and the sense of family. It's about being able to show students the door to a better place, because some students don't know that door's here."

Want to arrange a visit?

Educators from local or out-of-town schools interested in participating in Roadrunner Science Fridays are encouraged to reach out to the NSME Grants and Outreach team at nsmego@csub.edu. In addition to those mentioned in the story, other possible stops on a tour can include the Chevron Fab Lab, the Environmental Studies Area, nursing simulation labs, other research labs and more!

NSME represented at CSUBIOTECH Symposium

Four students represented California State University, Bakersfield at the annual CSUBIOTECH Symposium in January, presenting their research on topics like microbes, fungi and carrots.

The January 24 symposium brought together students and faculty members from across the CSU system, with one event held at CSU Los Angeles for southern California campuses and another held in Sacramento for northern campuses. At either location, students had the opportunity to share their research in the realm of biotechnology, learn about their peers' work and attend workshops and talks.

"This symposium is particularly interesting for students because it provides a positive environment for first time presenters," said Dr. Isolde Francis, a professor in CSUB's Biology Department. "The audience contains lots of faculty from the different campuses, and they do a really good job to go talk to as many students as possible to not only give feedback to the presenting students but to also actually learn from them."

Dr. Francis attended the symposium with two of her graduate students, Donald Hudson and Francisco Ortega. Her lab collaborates regularly with Chemistry Professor Dr. Danielle Solano, whose students Jazmin Rodriguez and Jonathan Valencia also attended the symposium.

"I encouraged both students to apply to and attend the CSUBIOTECH Symposium because presenting research to a professional audience is a critical skill for students who intend to attend graduate school or pursue research-focused careers," Dr. Solano said. "My hope was that they gained experience and confidence in communicating their work and received constructive feedback on their research."



Francisco Ortega and Donald Hudson with Dr. Isolde Francis

With Dr. Francis as his mentor, Hudson's research focuses on microbiology and plant-microbe interactions, studying how certain bacteria interact with plants and influence their growth and development. Specifically, he looks at how these plant-associated bacteria control their behavior through gene regulation, especially genes that affect movement.

"In simple terms, I study the 'control switches' inside these microbes to see how turning specific genes on or off changes what the bacteria do," Hudson explained. "I hope to better understand how microbes interact with plants and how we might manage those interactions in beneficial ways. This kind of work matters because microbes play a major role in crop health and understanding them better can support improved agricultural practices and future biotechnology applications."

Though it wasn't Hudson's first time presenting his research, he said it is always rewarding to share his work with people outside of his bubble and explain it in ways people can understand regardless of their scientific background.

For Ortega, part of sharing his research includes explaining that not all bacteria and fungi are bad. In his graduate research, he studies mycorrhizal fungi in local carrot fields, investigating the identities of the fungi to potentially use their benefits to improve carrot production.

"Finding the species of the fungi will be very helpful to conduct more research on how we can potentially boost them in the fields where they are already found and accustomed to climate conditions," said Ortega. "If we can boost the fungi, then perhaps this may lead to benefits for the carrots grown in these fields as studies have found mycorrhizal fungi to benefit plants in a variety of ways."

With previous presenting experience, Ortega wished he could say he wasn't nervous to share his work at the symposium. Though he isn't a fan of public speaking, he takes these events as opportunities to grow as a biologist, boosting the skills he will need to communicate his work to others.

"I tend to feel anxious up until the time to present my research, but once I get going, the time just seems to fly because I get excited whenever anyone comes up and asks me to walk them through my work," he said.

Rodriguez and Valencia, Dr. Solano's chemistry students, have worked closely with Dr. Francis' lab on a project on a new bacterium belonging to the Streptomyces genus. While the biology lab discovered this bacterium, which makes an as-of-yet unknown antifungal substance, the chemistry students have been trying to identify the substance, Valencia explained.

"Our collaborators initially observed that the newly isolated Streptomyces sp. GM18-153 was inhibiting the growth of the fungal plant pathogen Sclerotium rolfsii in their lab," said Rodriguez, who graduated from CSUB with her bachelor's degree in biochemistry last fall. "Sclerotium rolfsii causes Southern Blight disease, leading to crop destruction and economic loss yearly in Southern California. What was observed in the lab initiated the effort to isolate, purify and identify the active compounds produced by GM18-153 that could be causing the inhibitory effect."

Both Rodriguez and Valencia found the CSU Biotechnology symposium a comfortable space to share their research.

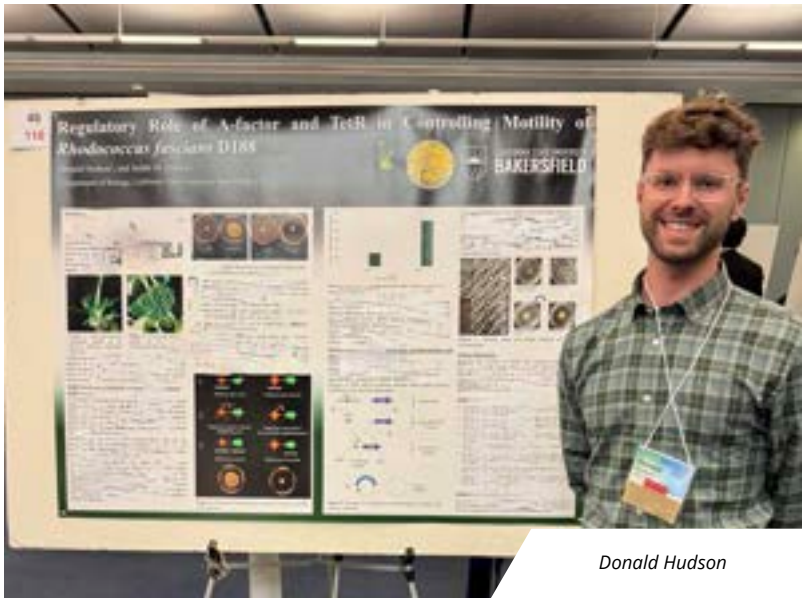
"I really appreciate how much the organizers tried to foster a welcoming environment and how they had lots of different opportunities for learning with the different speakers, sections and talks they had available," said Valencia, a biochemistry major.

While the student researchers have spent plenty of time diving into their own research, the symposium gave them the opportunity to learn about other topics within biotechnology.

"One big takeaway from the symposium was seeing how diverse the projects were," Hudson said. "Although we were all in the realm of biotechnology, the projects ranged from robotic arms to the microbiome of deep-sea octopuses and everything in between. Also inspiring were the talks given by former CSU students who have now progressed their careers in amazing ways, going deeper into the biotechnology field."

Ortega, who is on track to graduate with his master's degree this semester, said his time at CSUB has been rewarding, thanks in part to opportunities like this symposium.

"I have grown as a biologist because I have been provided with many opportunities ... to develop my professional skills and further my education," he said. "I have learned that there is always more work to be done as a researcher and that one project can lead to many more projects because there is still much that is unknown in this world."



Donald Hudson



Going places with geology

Studying geology at California State University, Bakersfield has taken Maggie Izumi places, from conferences in Washington D.C. and Anaheim to research with Lawrence Berkeley National Lab in the Bay Area. Then, it took her back to her home state of Hawaii.

Born on Oahu, Izumi moved to Bakersfield as a child. At 30 last fall, Izumi graduated with her bachelor's degree in geology, but before she could complete the program, one requirement remained: a field camp assignment, which Izumi would undertake on the Big Island, through the South Dakota School of Mines.

"It's like coming full circle for me," she said of returning to Hawaii.

Izumi's family moved to Bakersfield because there were fewer opportunities to support themselves in Hawaii. Both teachers and CSUB alums, Izumi's parents always encouraged her curiosity and interest in science. Though Izumi first wanted to study civil engineering, there were early signs that geology would be her calling.

"I was going through a lot of my old childhood stuff, and I stumbled upon rocks," she recalled. "I had rocks! Oh my gosh, looking back on it now, I guess I've always just kind of liked rocks."

Izumi graduated from Centennial High School in 2013 before studying civil engineering for a year at Cal Poly. After getting married in 2015, she moved to South Dakota but found herself starting from scratch when she divorced about six years later. Returning home, she enrolled at Bakersfield College in 2022 with her family's encouragement.

Izumi was close to finishing her associate degree, but a physical science requirement proved more influential than she could have expected. Among her options was a geology class with Dr. Chris Benker. She thought it would be "just rocks and dirt" and an easy A.

"In the very first class, in the first 10 minutes, he's like, 'By the end of this course, I'm going to convert some of you guys to geology majors,'" she recalled. "And I just thought to myself, 'That's so dumb. Who would ever fall for that?' And sure enough, by the time the class was over and done with, I had fallen in love with geology."

Transferring to CSUB, Izumi quickly felt at home with the faculty and her classmates in the Geological Sciences Department.

"Our department is small, but that doesn't mean there are no opportunities," she said. "You get so

much one-on-one interaction with your professors, and when you have that, you really can make a name for yourself and from there, you have all these research opportunities."

Not long after starting at CSUB, she joined Dr. Matthew Herman's lab, where she studied seismic events like the 2024 earthquake in Taiwan.

Dr. Herman, an associate professor of geology, said Izumi didn't require much motivation to start a project, making her easy to mentor.

"In my opinion, the best scientists are people who ask lots of questions about the way things work," he said. "Maggie is intensely curious and this drives her to explore as many areas of geology as she can."

Izumi's time working with Dr. Herman overlapped with her participation in the CAL-EPIC internship, a partnership between CSUB and Lawrence Berkeley National Laboratory (LBNL). For the summers of 2024 and 2025, she traveled to the Bay Area to work with scientists in the cutting-edge LBNL labs on projects that aim to solve real-world problems.

Izumi's work centered around finding ways to take hydrogen from the air and pump it into unused oil wells. As a clean source of energy, the hydrogen can then be pulled up to use when needed with the excess stored when it is not.

With CSUB co-mentors Dr. Herman and Dr. Liaosha Song, Izumi worked to characterize the electrical properties in western Kern County to be used for such storage.

"It's so rewarding," Izumi said. "It's definitely been a lot of work — I won't downplay that — but I know it'll pay off. The things that we are researching, it's groundbreaking work."

In Hawaii for her field camp, Izumi worked with fellow CSUB geology grads Tyler Garza and Garrett Cooper. In the Hawaii Volcanoes National Park, the trio studied the Kilauea volcano integrated with initiatives of the United States Geological Survey Hawaii Volcano Observatory to monitor current activity and volcano hazards.

With grad school on the horizon, graduating didn't yet feel like a significant milestone, Izumi said — more like checking a box on a to-do list that still has another major task immediately following it. But



Maggie Izumi with Tyler Garza and Garrett Cooper in Hawaii.

it did offer a brief moment to slow down a bit and reflect.

"After my divorce, I just thought, that's it," she said. "I didn't really have any direction in life, and between my friends, my family, my professors in the department, they've all just supported me. I couldn't ask for a better support system because it's taken me so far in life, and I'm grateful for that."

Following graduation, Izumi returned to CSUB in the spring 2026 semester to start her master's in geology. She spent this past summer back at LBNL conducting much of the research for her master's project and will soon switch her focus to finishing classes, analyzing her research and writing her thesis.

Dr. Song, an associate professor of geology at CSUB, worked closely with Izumi on her CAL-EPIC research and will serve as her faculty mentor for her graduate program.

"Maggie is a self-driven student who excels in practical, lab-based projects," he said. "She brought her enthusiasm to the lab and consistently went above and beyond expectations. Being her thesis advisor, I have no doubt she will bring that intrinsic motivation and dedication to lab experiments and her future thesis."

Izumi isn't sure what she'd like to do after grad school but hopes to work in clean energy. She'd like to work in town for at least a few years and plans to get her geologist-in-training license before later taking the professional geologist test.

"From there, I'll just see where things take me."

NSME welcomes three new tenure-track faculty members



Dr. Helen Capehart, Nursing

Dr. Helen Capehart has been part of the Nursing Department since 2022, when she joined as part-time faculty before transitioning to full-time lecturer in 2025. This year, she returns as a tenure-track assistant professor working in both the undergraduate and doctoral nursing programs and serving as both programs' Simulation Director. Born on the Central Coast, Dr. Capehart moved to Taft as a child and earned her Bachelor of Science in Nursing (BSN) from CSUB in 2006 and later her Family Nurse Practitioner degree from CSU Dominguez Hills in 2012 and her Doctor of Nursing Practice (DNP) degree from Touro University, Nevada in 2024. After first working as a registered nurse in the Neonatal Intensive Care Unit at Kern Medical, Dr. Capehart has since worked in private practice and at Kern Medical outpatient clinics as an FNP in family medicine and recently started working in the mobile clinic serving rural communities. Dr. Capehart has three daughters with her husband Adam and enjoys camping, going to the beach and watching her kids play sports.



Dr. Ly Ly Trieu, Computer & Electrical Engineering and Computer Science

Dr. Ly Ly Trieu joined the Department of Computer & Electrical Engineering and Computer Science as an assistant professor in Spring 2026. Originally from Vietnam, Dr. Trieu earned her Ph.D. in computer science from New Mexico State University in Las Cruces. Dr. Trieu's research focuses on AI, particularly explainable AI (intelligent systems that justify their decisions) and AI applications in agriculture. In her free time, Dr. Trieu enjoys reading, traveling, hiking, learning about new technologies and spending time with friends and family.



Dr. Denae Ventura, Mathematics

Dr. Denae Ventura joins the Department of Mathematics this fall, most recently from Mount Holyoke College in Massachusetts, where she was a visiting assistant professor. Dr. Ventura earned her master's and Ph.D. in mathematics at National Autonomous University of México in Querétaro before going to UC Davis for postdoctoral research. Her research focuses on combinatorics and graph theory, areas of math that study patterns and networks and how different objects are connected. Dr. Ventura is excited to make Bakersfield her home with her partner and their two pitbulls. She enjoys running, spending time outside and traveling.

More NSME news

CSUB opens new MESA Center



Dean Jane Dong, Mayor Karen Goh and students celebrate the opening of the MESA Center.

California State University, Bakersfield celebrated the opening of its new Mathematics, Engineering and Science Achievement (MESA) Center with a ribbon-cutting ceremony on April 17, welcoming students and the community to learn more about how the new center will support students.

MESA is a nationwide program that supports underrepresented and first-generation students studying science, technology, engineering and math subjects by offering additional support, mentoring and hands-on experiences.

With around $135,000 in funding from Chevron and a $250,000 K-16 Regional Collaborative grant from the Kern County Superintendent of Schools, that vision has now been realized.

“By working together, we are creating a clear path from classroom to career, with the right support our students need to succeed and to grow into professionals, to serve our region,” said Dr. Jane Dong, Dean of CSUB’s College of Natural Sciences, Mathematics and Engineering. “That impact will be significant.”

CRC donates $75,000 to support students in Energy Innovation Building

The California Resources Corporation (CRC) is donating $75,000 to CSUB to support students in the Energy Innovation Building.



Omar Hayat and President Vernon B. Harper Jr.

The gift will support student activities and fund the purchase of new equipment for a collaboration space on the second floor of the building — which is currently under construction and is expected to open next year — where students, faculty and community partners can share ideas and conduct research together.

In recognition of the donation, CSUB will name it the California Resources Corporation Collaboration Space. CSUB and CRC celebrated the partnership during a signing ceremony in July.

CRC Executive Vice President and Chief Operating Officer Omar Hayat said the gift is a symbol of the company’s commitment to the community and to the university. CRC is one of the largest local employers of CSUB graduates.

“It’s a great honor for us to do our part in this great project,” he said. “We believe that projects like this will pay dividends for a long time to come and that our future generations will benefit from that.”





Nursing students serve patients in Argentina

This summer, 21 students from the Department of Nursing went to Argentina to serve patients in need. This is the latest international trip for the department's Global Nursing Outreach program, which aims to give students perspective into health care in other countries and improve the future nurses' understanding of the obstacles some patients face in obtaining care — lessons in service and empathy they will take back home with them.

In indigenous villages in Argentina, students helped patients with glucose and blood pressure screenings, lice treatment, oral hygiene, parasite awareness and more. They also worked in workshops with students from a local nursing school in Tartagal.

To support future trips, donations to the Global Nursing Outreach program can be made at give.csub.edu. Find it as a fund option in the Natural Sciences, Mathematics and Engineering category.



NSME formalizes pre-med advising

Students interested in a future in medicine can now get more information about various pathways to medical school with NSME's Pre-Med Advising program. Made up of faculty members from the Department of Biology and the Department of Chemistry and Biochemistry, the pre-med advising team helps support students every step of the way, with personalized advising and guidance through the medical school application process.

Through collaboration with medical schools, local clinics and hospitals, the program brings opportunities such as field practice at Kern Medical, coaching and mentoring from partner medical schools and more to help our students prepare for taking the next step toward their medical career.

Two NSME students named top CSUB grads of 2026



Kelbi Banducci (left) and Alexandra Brown (right)

Every spring, CSUB President Vernon B. Harper Jr. awards the top undergraduate and top graduate student with the university's highest honor, the President's Medal. This year, both top students were biology majors from the College of Natural Sciences, Mathematics and Engineering — an emphatic statement of support for girls and women in science.

Undergraduate student Kelbi Banducci and graduate student Alexandra Brown were first chosen as the top grads for their department before earning the titles of Outstanding Undergraduate for NSME and Outstanding Graduate for NSME, respectively.
Both students stood out for their hard work, research experience, mentorship of peers and brilliance in their studies.

Following graduation, Banducci will start in the competitive Medical Science Training Program at Vanderbilt University in Nashville. She hopes to become a physician and researcher. At CSUB, Brown honed her skills not only as a researcher but an educator too, teaching introductory biology classes while earning her degree. Now, she is a full-time, tenure-track faculty member in the biology department at Bakersfield College.

NSME students chosen as Sally Casanova Scholars

Biochemistry student Heather Gross and biology student Jocelyne Lopez were both chosen as Sally Casanova Scholars through the California State University's California Pre-Doctoral Program this year. Each will receive $5,000 to help cover application fees and provide opportunities for them to visit doctoral-granting institutions, participate in summer research experiences and connect with potential faculty mentors and experts in their field.



"It presents a really great opportunity, a great stepping stone. I feel like it opens a lot of doors that a traditional undergrad doesn't usually have access to," said Gross, who plans to pursue a doctorate in toxicology. "It's providing us with a lot of resources that really accelerates the application process. It's a great program, and I think it really helps students here at CSUB."

— Heather Gross, Biochemistry



"I feel very honored. I feel like it's very meaningful. It reflects my academic journey and my struggles," said Lopez, who plans to earn her Ph.D. in microbiology. "I feel that by having this title, it gives us an edge in our applications and to be able to apply to as many programs as possible and choose one that is able to help me with the specialty I want to go in. I think this program helps put our names out there."

— Jocelyne Lopez, Biology



Sean Toledo and Brooklyn Stitt

NSME students spend summer at Lawrence Livermore National Lab

Computer science students Brooklyn Stitt and Sean Toledo were chosen out of a pool of applicants from all over the country to intern in Lawrence Livermore National Laboratory's Cybersecurity and Critical Infrastructure Summer Institute (CSI), living in Livermore from early June through late August this summer.

While Stitt worked under CSI's Energy Cyber Sense umbrella developing an automated software build and artifact-generation pipeline, Toledo worked through the lab's Global Security organization on software development for the North American Energy Resilience Model.

"I'm really grateful for the opportunity to spend my summer at LLNL and for everyone who helped me along the way," Toledo said. "I came into the internship wanting to become a better programmer, but I feel like I also grew a lot in confidence and in how I approach challenges. I'm excited to take what I learned into my final year of college and whatever comes next."

"My biggest takeaway is to love what you do," Stitt said of her time at LLNL. "When you genuinely enjoy what you are working on, the experience becomes that much more rewarding. I loved being challenged and learning something new every day. Getting to do that alongside people who also love what they do made the experience invaluable."

NSME staff and faculty awarded at University Day

Ahead of every school year, CSUB recognizes exceptional staff and faculty at University Day. This year, members of the NSME family were honored with three awards. **The NSME Grants & Outreach** (bottom left) team received the Outstanding Department Award for their work on tours, research programs and other outreach events; **Dr. Heidi He** (bottom right) received the Jacquelyn Kegley Faculty Leadership and Service Award for her work as the founding director of the Doctor of Nursing Practice program; and **Dr. Anthony Rathburn** (right) received Faculty Scholarship and Creative Activity Award for his research on marine and environmental science, in which he involves many CSUB students.







CERC holds conference, names chief researchers for 2026-27



Panelists J. Andrew McAllister, Kate Gordon, Aaron Hegde and Jason Cater discuss the opportunities and challenges of data centers in Kern County.

The California Energy Research Center (CERC) hosted its fifth-annual conference on April 9, bringing experts from the realms of academia, industry and government to the California State University, Bakersfield campus for a day of presentations, panels and discussions.

Previously known as the Carbon Management Symposium, the event was renamed the California Energy Research Conference to better encompass the wide range of topics the center covers relating to state and regional energy issues. New this year were two separate tracks guests could follow for more specialized discussions: one focusing on power and energy and another focusing on subsurface.

"Energy is a multidisciplinary conversation, and CERC reflects that today," CERC director Katy Larson told guests, going on to encourage them to think about what makes Kern County unique.

"The region is a living laboratory for applied energy research. The diversity of energy resources in infrastructure here creates real opportunities for innovation, from conventional energy production to emerging work on carbon management and power systems. What stands out is not just that the research is forward-looking, but that it's immediately relevant and impactful."

The center also recently named its two Chief Researchers for the 2026-2027 academic year. Dr. Chengwei Lei (Computer and Electrical Engineering and Computer Science) will bring his expertise in power and energy, while Dr. Tathagata Acharya (Physics and Engineering) will bring his on subsurface fluid flow. They will lead research cohorts, coordinate proposals, help shape CERC programming and develop partnerships across academia, industry and government.

To keep up with CERC, go to csub.edu/cerc.

Congratulations to our faculty members who received tenure and/or promotion this year!

Brian Ryals
Professor – Mathematics
Promotion

Chengwei Lei
Professor – CEE/CS
Promotion

Alberto Cruz
Professor – CEE/CS
Promotion

Jesse Bergkamp
Professor – Chemistry
Promotion

Isolde Francis
Professor – Biology
Promotion

Jonathan Troup
Associate Professor – Mathematics
Tenure and Promotion

Linh Bui
Associate Professor – Public Health
Tenure and Promotion

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