

CE CONNECTION

Your Link to the Department of Civil Engineering

FALL 2017 | ISSUE 24

Summer Bible camp group receives a warm welcome and unique introduction to engineering and computer science — Pg. 14

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SACRAMENTO STATE
Department of Civil Engineering

CHAIR'S MESSAGE



Dear alumni and friends,

Warm wishes to you and your families as we approach the 2017 Holiday Season!

As usual, the fall semester has been a busy time for the civil engineering students, faculty and staff at Sacramento State. Our golf tournament in early September was the best attended tournament we've

hosted in the seven years since we started the event. Thank you to those who attended and special thanks to Ashley Mihok (CE Department), Emad Ehsani (BKF), Bradley Waldrop (NV5), Terry Murphy (CA Lottery) and Rick Liptak (Dokken Engineering) for their fantastic efforts planning the tournament. In November, we hosted our 14th annual "Evening with Industry," featuring a panel of industry leaders and a keynote presentation by Grant Guerrieri from Clark Pacific.

Evening with Industry was especially celebratory this year with the opportunity to thank Clark Pacific for a \$200,000 donation to our concrete testing laboratory. As part of our thanks and acknowledgement, the university will be naming the lab after Clark Pacific. The gift further strengthens the Department's relationship with the prominent precast concrete company. Our recent fundraising efforts have been especially productive with another \$20,000 from Wood Rodgers for hydraulics testing equipment and an individual donation of \$25,000 from Louay Owaidat for geotechnical testing equipment. These gifts, combined with our annual department sponsors, are providing the resources we need to revitalize and modernize our lab spaces. Known for our hands-on curriculum, the upgraded labs are being outfitted with equipment and software our students need to be competitive as graduating engineers.

I hope you enjoy the newsletter and learning about all of the incredible efforts our faculty, students and alumni are engaged in.

Ben Fell – Chair, Department of Civil Engineering



SACRAMENTO STATE
Department of Civil Engineering



Support the Department

Looking for a way to support the Civil Engineering Department? We have four different funds that enhance our ability to educate students:

- ▶ **The Ken Kerri Endowment Fund** – Gifts to this fund support faculty and student enrichment activities.
- ▶ **The CE Freshman Scholarship Fund** – Scholarships are given to outstanding freshmen.
- ▶ **The Graduate Environmental/Water Resources Scholarship Fund** – Scholarships go to deserving graduate students in the environmental or water resources engineering areas.
- ▶ **The Department Trust Fund** – These resources support student attendance and participation at conferences and competitions, senior design project team expenses, and equipment for labs when other funds are not available.

To donate to any of these funds, go to www.ecs.csus.edu/ce/support.html and follow the directions for online donations.

Or mail a check made out to the appropriate fund to:

Attn: Ashley Mihok
California State University, Sacramento
Department of Civil Engineering
6000 J Street, MS 6029
Sacramento, CA 95819

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Upcoming Events

Gain access to all of these events through the Department of Civil Engineering Sponsorship Program! Information for 2018 sponsorship coming in January!

April 10, 2018:

10th Annual Ken Kerri Endowment Fund Luncheon

Ashley Mihok

STAFF
Profile



How long have you worked at Sacramento State?

Since 2014. I started at the front desk working for both Civil and Mechanical Engineering.

Where did you work before that?

As an office assistant for my dad's podiatry office in Alameda.

Are you originally from Sacramento?

I am from the Bay Area. I just wanted a change of scenery, of life, of job. My dad was selling his practice and I knew I couldn't afford to live in Alameda by myself. I knew Laura O'Neill, the person who was working in the Mechanical Engineering Office, and she told me about the job opening up.

▼ Photos from Ashley's recent trip to Ireland.



What's your favorite aspect of your job?

Working with the students. It's nice to see them come in during orientation as freshmen or transfer students and see them during their whole time here, and watch them walk across the stage at graduation.

What advice would you give to new Civil Engineering students? How about graduating students?

To get to know the faculty and myself and Riverside Hall; get familiar with coming into the office and talking to us so if they're ever lost or confused, we can point them in the right direction. Sometimes we get calls and students don't know where our office is or where to go, so if they were more familiar it would help cut down on stress.

Before they graduate, I'd say if they haven't found a job to come talk to us or Neysa [Bush] in the Career Center and see if there's anything we can do to help them as far as reaching out to certain companies. After graduation, keep in touch with us. Join our alumni network and come to our events as new industry [members] and not just students.

Why is the Civil Engineering Department's alumni network so strong?

I think because most of our grads tend to stay in the Sacramento area and work for companies that sponsor our program and department year after year. That's part of the reason why we have such a good, strong alumni network and ties to industry.

What do you like to do when you have spare time?

I like to go down to the Bay Area and hang out with my family. I have one sister and two brothers. They all have children, so I like to play with my three nieces and my nephew. And there's one on the way – we don't know if it's a boy or girl. I also like to go camping and up to the mountains; my family has a cabin in Twain Harte.

What was the last concert you attended?

I'm going to Foreigner and Cheap Trick tonight, but the last one was Dierks Bentley. They were having a Memorial Day sale where tickets were \$20 for several shows, so my friend and I went to six shows this summer.

Any exciting travel plans in your future?

I'm very excited to be going to Ireland for the first time in October! We're going on a castle tour, which is very exciting. We'll be staying in four different castles on each of the coasts of Ireland, and driving around and taking in all the history and scenery. The Cliffs of Moher are what I'm most excited to visit. It's a super beautiful view. I've seen pictures all my life and always wanted to visit.

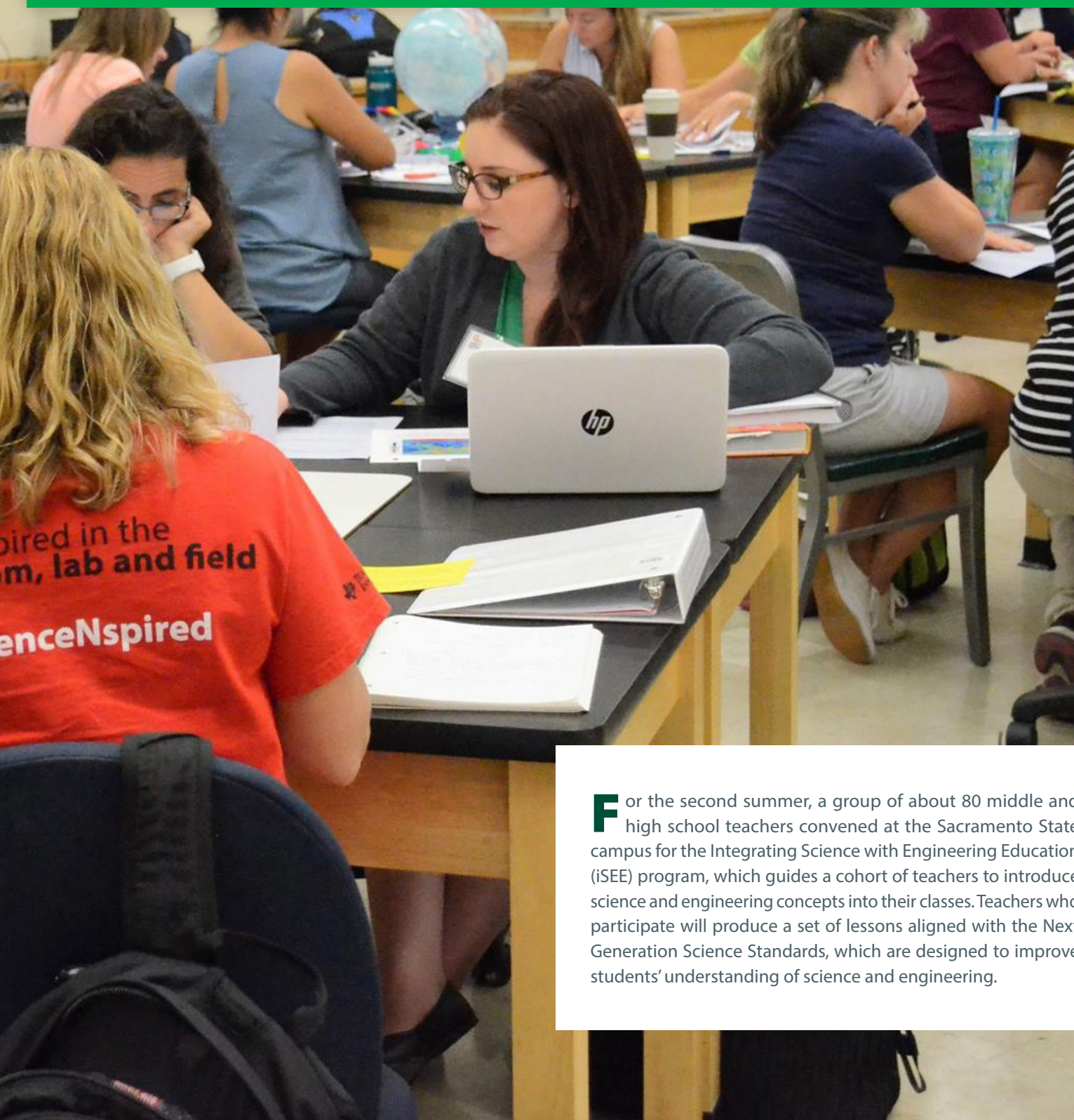
If you could have any super power, what would it be?

Maybe teleportation, because then you could go anywhere you wanted to. I'd be terrified to fly.

Complete this sentence: Happiness is....

Laughter. Family. Friends.

Local Teachers Return for Workshop Designed to Weave Engineering into Curriculum



For the second summer, a group of about 80 middle and high school teachers convened at the Sacramento State campus for the Integrating Science with Engineering Education (iSEE) program, which guides a cohort of teachers to introduce science and engineering concepts into their classes. Teachers who participate will produce a set of lessons aligned with the Next Generation Science Standards, which are designed to improve students' understanding of science and engineering.



“The teachers got really into it and brought up all these interesting questions, like ‘What do you prioritize, the money or public health?’”

— Dr. Poindexter

The iSEE program is presented by a partnership incorporating several regional school districts and the Sacramento Area Science Project, which includes Sacramento State and UC Davis. Professors from several of Sacramento State's colleges – including the College of Engineering and Computer Science – led the groups of teachers in workshops that explored chemistry, physics, life science and earth science. Instructors from local community colleges also took part in teaching the workshops.

“After last summer, the assignment the teachers had was to create a lesson module,” says Dr. Ben Fell, Chair of the Civil Engineering Department, who took a lead role in the iSEE Program. “They were teamed up with three or four other teachers to produce a lesson plan, watch each other give it, evaluate and then switch. Then they revised it during the school year, so a big part of what we did this summer was going over what they learned. As project leadership, we also took the lessons learned ourselves and built in some activities and presentations to help this year go smoother.”

Dr. Cristina Poindexter, Assistant Professor of Civil Engineering who specializes in water resources engineering, said she particularly enjoyed the workshop she helped teach that evaluated a DNA-based tool to detect water quality problems at sites where people swim.

“The challenge was for the teachers -who were acting as students – to figure out what kind of testing protocol they might implement for water quality testing at swimming locations like the American River,” said Dr. Poindexter. “Some techniques used to measure pathogens in recreational water require 24 hours to get any results and can only detect bacteria, not viruses or parasites. The advantage of the DNA technique was it's fast and detects viruses, but they still had to exercise engineering judgment to figure out what to test. They enjoyed it.”

Portions of the iSEE workshops focused on overcoming hurdles unique to teaching engineering; for example, the idea that an engineering lesson has to end in a physical product. “We try to break down that misconception,” said Dr. Fell. “So I gave an activity where they compared the designs of cell phones. They were

thinking about it in terms of sustainability and waste generated, but also functionality. So nothing was ever built, but they used what they learned to compare different designs. That's very much what engineers do.”

The cohort of teachers participating in iSEE gave positive reviews after the two-week program was over, and the Sacramento State professors who led the instruction were heartened to already see the teachers making significant progress since last summer in creatively approaching problems, as they did in the workshop about the DNA tool that detects pathogens in water.

“The teachers got really into it and brought up all these interesting questions, like ‘What do you prioritize, the money or public health?’” said Dr. Poindexter. “It's a balance, there's no one right answer. That's the guide Ben, Julie [Fogarty, Assistant Professor of Civil Engineering] and I were using for activities for the engineering component. We wanted open-ended, no-right-answer problems. If these teachers decide to implement the activities [from the iSEE Program], it's an exercise where students are working like engineers making a design, a protocol, doing cost-benefit analysis and weighing what's at stake.”





COURSE REDESIGN PROJECT AIMS TO IMPROVE STUDENT PERFORMANCE

After spending the past academic year testing out a new approach to lab work for “bottleneck” classes that trip up students, two Civil Engineering professors are already seeing positive results.

In its summer 2016 issue, CE Connection highlighted the Course Redesign with Technology Grants awarded to Drs. Ghazan Khan and Cristina Poindexter. During the 2016-17 academic year, both professors implemented the inclusion of a “pre-lab” element in one of their respective classes that has a higher-than-average rate of failure or withdrawal, in the hopes of strengthening students’ grasp of the material and improving overall pass rates for the classes in question.

“My proposal was to create three pre-labs,” says Dr. Poindexter, who added these modules to some of her hydraulics lab sections during the 2016-17 academic year. “Not to replace the existing labs, but assigned before the lab so that students can do the experiment virtually before getting to the lab and doing it.”

Meanwhile, Dr. Khan had his sights set on CE 147 (Transportation Engineering), which he says is a bottleneck course. “My proposal was to develop certain online modules, videos and supplementary materials to better prepare students for the lab exercises,” he says. “Going out in to the field and doing data collection has a lot of intricacies and it’s very difficult to explain it all in a classroom. By giving students some online supplementary materials to better prepare them for lab exercises, it would help them perform better in labs and reinforce their learning, which hopefully would reflect in their class performance.”

Dr. Poindexter reports that during the first semester of this pilot, she started small by showing videos or conducting pre-lab exercises to introduce students to the key concepts of water flow. “By the spring semester, I assigned students to actually run simulations of the experiment virtually with simulation software, and then collect data just like in a real lab.”

“Before, there was no chance for them to ask questions...With this module, you give them an opportunity to learn before the lab and use the lab time to ask clarifying questions, then go out into the field much better prepared.”

— Dr. Khan

The student feedback she received was very positive: “I surveyed the students and they were happy with it,” says Dr. Poindexter. “I was surprised how much they were interested in computational fluid dynamics, or flow simulation. That motivated me to try to have more” lab sections with pre-lab activities.

She hopes to eventually expand the virtual simulation pre-lab activity from the current two to all six hydraulics labs. “This time I’ll try to compare the data we get from the virtual lab to the real lab,” says Dr. Poindexter. “I think it’s helpful for the students to have more exposure to the virtual lab; it exposes them to this field that could be important for their careers. Flow simulation is important for civil engineers – we do it for rivers, pipe systems – I’m excited about it and hoping to expand it.”

Dr. Khan says that in his experience, students in his CE 147 class would come to the lab and spend a third of the three-hour allotted time reading required materials, then go out into the field for data collection. “Before, there was no chance for them to ask questions,” he says. “With this module, you give them an opportunity to learn before the lab and use the lab time to ask clarifying questions, then go out into the field much better prepared.”

“Some students learn at a slower rate, others pick up very quickly,” continues Dr. Khan. “By giving students online modules, you give them the flexibility to take their own time, maybe repeat some of the information they might have to revisit.”

Like Dr. Poindexter, he is incorporating the pre-lab modules into his labs one at a time, learning what works and what doesn’t. “The modules have quiz questions embedded to ensure students are going through everything and not skipping content,” says Dr. Khan. And though he’s quick to point out that it’s not necessarily attributable to the new modules, “the initial results are that this is the first time in at least two years I’ve been teaching this course that we don’t have a single failing student in the class.”





"This is the Civil Engineering Alumni Golf Tournament. In my heart I want these people to reconnect."
— Rick Liptak, President at Dokken Engineering

Event



6th Annual CIVIL ENGINEERING *Golf* TOURNAMENT



"It's nice to be able to help everyone in the industry get together, have a good time, and interact with students."

— Brad Waldrop, Managing Director at NV5 and member of
Golf Tournament Planning Committee





Summer Program for Kids Opens World of Engineering



Two large groups of middle school and high school students from Northern and Central California who were participating in a summer Bible camp received a warm welcome and unique introduction to engineering and computer science, courtesy of the College of Engineering and Computer Science (ECS).

"One of the themes of the camp is service," said Dr. Eric Matsumoto, a camp adviser and leader. "We try to instill in them the aspiration to become good citizens that serve society with meaningful jobs, and engineering is such a natural avenue for them to explore." As he collaborated with fellow ECS faculty and staff to plan an afternoon ECS event, several ideas sprung up, including a video, guest speakers and lab tours.

The camp's students were divided into two groups, with the girls attending "Engineering Day at Sac State" first, and the boys several days later. Each group of 40 consisted of about 30 students plus college students and adults who served as camp counselors. After eating lunch in the Union and listening to a motivational speech, students took a tour of campus, and finally arrived at Riverside Hall.

Students were captivated by an NSF video on engineering that starts with kids dreaming of flying cars, skateboard boosters and holograms. Then, Dean Lorenzo Smith welcomed them to the college, followed by "real-life advice" from Neysa Bush (Director of ECS' Career Services Office) and a 40-minute panel discussion about college with four engineering professors and two college students. From there, the attendees were further divided into two groups that rotated through labs focused on simple hands-on activities in structures, hydraulics, mechanical engineering, material science and computer science.

"It was an incredible amount of labor, and very carefully timed," said Dr. Matsumoto. "The support from professors, staff and [Sacramento State] students was impressive, and we had an army of great people speaking. We wanted to convey that engineering is not a cake walk, but the reward is great if they are willing to dream big and work hard."

After Dean Smith was introduced, the students showed their appreciation to him by singing a camp song, which he said was the best welcome he'd ever received. He then told a story about an infant who was born fragile and underweight, and had to be treated in an incubator. He emphasized the role engineering played in neonatal incubation technology, and later revealed that he was talking about his own son, now a healthy, athletic young man.

"The kids were blown away by the dean's talk," said Dr. Matsumoto. "They talked for days about how approachable he was and the example he gave about his son. The other faculty and I were also deeply impressed."



The panel of four professors and two college students addressed questions from the attendees. One of the students stressed diligence and service activities in middle and high school, while the other shared a personal story about flunking a class, and then learning time management to get back on his feet.

Dr. Matsumoto paid special attention to ensuring female engineers were well-represented on the panel and in the faculty, staff and students giving presentations. "Women are underrepresented in civil engineering," he said. "My wife and daughter both studied civil engineering, and I wanted to do a good job for the girls in the group."

This wasn't the first time such an event has taken place on campus – in fact, over the past six years, the college has hosted many groups of young people visiting campus for customized engineering experiences. "We've hosted everyone from disadvantaged elementary students from local schools with low test scores, to kids who are in the GATE (gifted and talented education) program," said Dr. Matsumoto. "We want all of them to value education and recognize that they can become an engineer."

The Bible camp, called "Summer School of Truth," included a diverse representation of students from a network of various churches located between Sacramento and Fresno. After the event, the camp attendees had a chance to give testimonials about their experience, and several of them indicated their fresh interest in college, particularly engineering.

"Some of these kids' parents don't know what college provides and how to help them get into college," said Dr. Matsumoto. "Their eyes lit up when they realized, 'I can be an engineer.' It was very fulfilling."



New Faculty Group Targets a Multidisciplinary Approach to Geological Disaster Response

A destructive earthquake poses innumerable civil engineering challenges, but damaged buildings and bridges are not the only negative impacts that make life miserable for victims of earthquakes and other geological hazards. Observing that a wide array of expertise is needed to respond to the myriad of civilian needs after a disaster, Dr. Richard Armstrong saw an opportunity.

"The problem of geological hazards and their effects on communities is best understood within the context of geological risk — georisk," says Dr. Armstrong. "In determining risk, there's the hazard part, but there's also the vulnerability, so it's a multidisciplinary problem. For example, to assess the risk associated with a hurricane, you need someone in atmospheric science to focus on the hazard itself, but how does civil infrastructure respond? If power lines are down, that's another problem because no power means it's hard to refrigerate food and safely store other supplies, and without safe food and supplies, a community is vulnerable to the spread of disease. To look at the entire problem of risk and how it affects humans, you need expertise in all of those areas."

Living in California, the specter of natural disasters is never far, so Dr. Armstrong began thinking about the multidisciplinary approach that is necessary in responding to a geological disaster, and how he could incorporate this concept into the curriculum at Sacramento State.

"I wanted to improve my own course offerings," says Dr. Armstrong. "So I started talking to a few other faculty in the university and they had interest in creating a group to talk about potential overlap in our classes, and ways of integrating some of the material we each have. For example, if I'm talking about the impacts of engineering geology, it would be great to work with a geology

faculty [member] who could help me improve the technical content, delivery or application of this material."

The Georisk Faculty Scholarship Community (FSC) was born out of those conversations, and its purpose is twofold: to strengthen teaching techniques and material, and to help identify potential avenues for research. The project's deliverables over the next academic year include two course improvement sessions as well as two sessions in which participants will propose new course offerings. The group will also explore a georisk study track whereby students would take a set of courses from multiple departments, possibly resulting in a certification or the basis for a master's thesis.

"Hopefully this will provide students — whether taking classes in areas such as civil engineering, geology or geography — to see how the different fields fit together to solve these problems," says Dr. Armstrong. "My hope is that the next time I offer a class related to earthquake engineering, I'll be able to provide a better picture to my students. Another opportunity is guest lecturing. I'm also hopeful there will be areas of research for master's students as well as undergraduate students to work on. Once you get a job in practice, invariably these different fields are working together."

In addition to improving the curriculum in the areas represented by its members (so far, Civil Engineering, Geology and Geography), the FSC aims to identify areas for potential research grants. "My hope is that we'll have some significant overlap and collaboration between different disciplines that relate to geological hazards and risk," says Dr. Armstrong. "For us to tackle some of these problems, we need a diverse group of faculty so we can leverage all their expertise. I'd like us to work together, share ideas and strengthen one another."

Khanh Nguyen

Khanh Nguyen is a graduate student in the program who expects to receive her master's degree in December. Since coming to the U.S. from Vietnam in 2009, she's found her niche in structural engineering at Sacramento State.

How did you decide to major in civil engineering?

I lived in Vietnam, and at the time, my major was architecture. So when I came here to study abroad, I heard that I needed seven years to complete an architecture degree. Seven years plus one year for English — that's eight years. I didn't think I could handle [college for] that long. Also, at the time I had some relatives living in Sacramento so I didn't want to move to another place. Sac State doesn't have an architecture major, but one of my relatives spoke to me about civil engineering. It sounded interesting, so he said that Sac State had a strong civil engineering program. And it's close to my house!

Tell us about your involvement with the PCI (Precast/Prestressed Concrete Institute) Student Chapter on campus.

I have attended PCI events and meetings since 2015. That year, I was one of the members of the PCI Big Beam competition team. We designed a girder that fit all design criteria of the competition. After completing the design, the girder was fabricated at Clark Pacific and sent back to school. Finally, the girder was tested at the structural lab. Based on the data that was collected from the test, we wrote a report and sent it out to compete with other schools.

Are you involved in any other student organizations or competitions?

I was an officer in SEAOC (Structural Engineers Association of Central California) and Engineers Without Borders, which [consisted of] students who study engineering and want to go to another country and help out. We had to have funding to travel so we were unable to do that.

What has been your favorite class so far?

I think all classes are interesting and I learn from all of them. My favorite classes are the ones that relate to structural, concrete and steel design.

What is it that draws you to structural engineering?

I studied architecture for four years in Vietnam but for architects, they don't study much about structural engineering, and I wanted to know about that.



How do you like it here?

When I began studying at Sac State, I met many friends in the Civil Engineering Department. They're all good friends, and I've met many great professors too. I don't regret my choice to come here to study.

Which professors have stood out in your educational journey?

Professor Matsumoto. I took some classes with him. He was our advisor for the PCI Big Beam Competition. Because I was a research assistant for his grad students and his projects starting in 2014 or 2015, I have worked with him for a long time. Now, he is my advisor for my master's project.

My master's topic is about developing design provision for partial-depth precast deck panels for California. Based on the literature review, I will establish design methodology, analyze the effect of various parameters, and provide design tables for precast deck panels. Dr. Matsumoto has been a great help to me with his guidance, knowledge and expertise.

Do you have a job right now?

I've been working at Con-Fab since June. I like it; I'm learning a lot.

What are your plans after graduation?

Working. And I plan to take the PE exam next year.

How has your experience at Sac State been?

Awesome. I've met many friends and great professors.

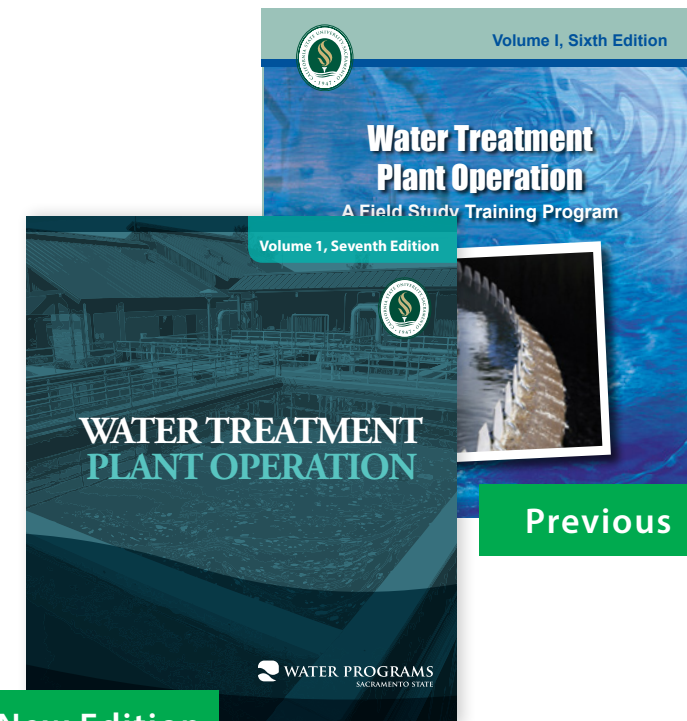
GRAD STUDENT
Profile



OFFICE OF WATER PROGRAMS UPDATES MANUAL WITH USER-FOCUSED IMPROVEMENTS

The Office of Water Programs (OWP) was established in 1972 by the late Dr. Ken Kerri, the beloved Sacramento State civil engineering professor who left an indelible mark on the water and wastewater treatment industry and in the hearts of his many students and colleagues. OWP is known as the nation's premier training provider for operators and managers of wastewater and drinking water treatment, collection, and distribution systems. In addition to operator training, OWP focuses on engineering research and planning, stormwater policy, water quality, and water resources.

New Edition



To qualify to take licensing and certification exams (administered by a state or an association), operators and managers need to meet educational requirements. OWP courses meet the educational requirements for these certification exams.

"We're the largest training provider in the nation," says Dr. Ramzi Mahmood, director of OWP. "All states and Canadian provinces approve our courses and use our educational materials. We typically enroll about 18,000 to 20,000 operators a year."

Until recently, OWP produced and printed the Water Treatment Plant Operation manual in-house. Through a new partnership with Pearson Publishing, the manual has been updated and now features a full-color design and a more user-friendly look and feel. OWP's remaining 18 training manuals are slated to be updated and produced in color.

"About two years ago, we started converting our books with Pearson," says Dr. Mahmood. "Before, we published in-house and because we're a small operation, printing in color was prohibitively expensive for us. Before, we used a mostly text, two-column layout with black and white figures. The layout is different now."

The new layout features a greater emphasis on graphics to convey information. "We focused on a redesign that has a more modern look that will help operators to learn," says Dr. Mahmood. "We have numerous features to enhance learning. For example, the tables have a clearer design and aren't just black and white, and the problems and useful information are highlighted with colored boxes."

Dr. Mahmood is quick to credit the team of subject matter experts, editors, and graphic designers that continue to

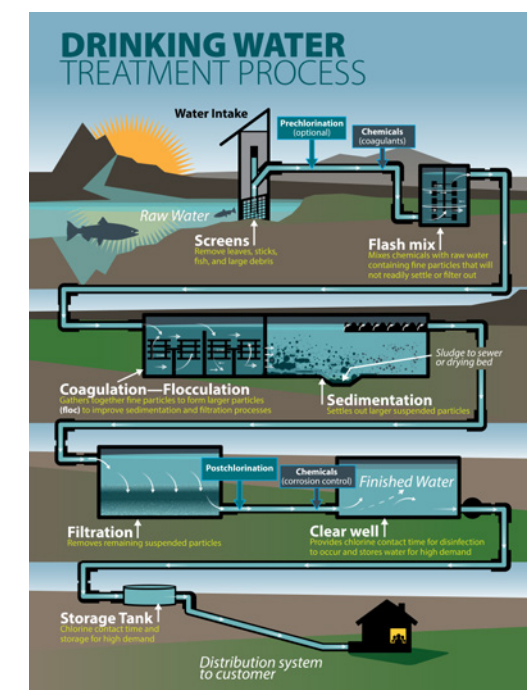
collaborate on the effort to revise all of OWP's materials. "We are transferring 19 titles—all of our books—so it will take about five years," he says. "We have a full team. We go in and mark up pages and update the content; it's a lot of work."

Besides the aesthetic benefits of the updated manuals, the new arrangement with Pearson also eliminates the need to store inventory and to predict demand for printed materials. "With the previous manuals, we would print a large number of copies to reduce the cost," says Dr. Mahmood. "With Pearson, we have a better handle on that. They develop algorithms and print the manuals as needed, so they're smaller batches. This gives us a better cycle in terms of updating the manuals. Once we settle in, I anticipate we'll be on about a three-year cycle [of updating the materials]."

The new manuals do come with a higher price tag—past versions cost \$49 and the new edition will be around \$90, but this is the manual's first price increase in eight years. "My aim is to keep our training materials accessible to operators, and I believe this price is still a bargain," says Dr. Mahmood. "If you look at comparable books, they sell for significantly more than our manuals."

OWP's online course offerings are also in line for improvement, with Pearson bringing to the table its significant expertise in working with universities that provide online courses. "We've spent quite a bit of time to develop courses and Pearson is helping us accomplish what we envision. They have a lot of experience and capacity in this area."

The new Water Treatment Plant Operation manual, Volume 1, 7th edition, is now available through OWP's website and training programs.



◀ Fig. 1.1 Drinking Water Treatment Process, found in the new edition of Water Treatment Plant Operation.

PROFESSOR MERAYYAN HELPS “SAVE HINKLE CREEK” NATURE AREA IN FOLSOM



An overheard conversation at Starbucks led to Professor Saad Merayyan assisting with an effort to save more than 100 oak trees from destruction in the Hinkle Creek nature area, a picturesque 40-acre nature park nestled in a Folsom neighborhood.

The Hinkle Creek nature area houses a sewer line that services 28 homes in the adjacent neighborhood. During construction in the 1970s, the sewer lines in this development were built behind the homes rather than in the street for cost-saving reasons, says John Combs, a member of the Save Hinkle Creek working group. “The manholes are covered in grass in the nature area,” says John. “It’s easy for them to overflow and not be identified.”

In the early 2000s the city of Folsom was fined \$700,000 for the release of 700,000 gallons of waste into the American River. The overflow was far from Hinkle Creek, but the event prompted the city to undertake a major initiative to better maintain its sewer systems. The more stringent regulations required access to the sewer manholes by a huge vactor truck used to flush lines and vacuum out waste. This is usually a simple task since most sewer lines are located in the roadway, but in the Hinkle Creek nature area it would require the construction of a 12-foot-wide road through the heart of the pristine nature area, necessitating the removal of about 100 oak trees in its path.



Neighbors who resisted the idea of removing these trees and disturbing the peaceful nature area formed the Save Hinkle Creek working group in January 2015 and began communicating with city staff and attending Folsom City Council meetings to protest the project and propose alternative ways of maintaining the sewer lines. The group’s membership swelled, and in August 2016 they convinced the city to allow a contractor to clean the sewer line. “We cleaned and camera inspected it end-to-end without having to put one wheel of a vactor truck in the park,” says John.

Still, the city needed proof that the sewer lines would be able to contain an overflow without the use of vactor trucks for maintenance. “We worked with a number of people in the sewer business to come up with an alternate plan,” says John. But Save Hinkle Creek still found itself up against the city’s contractor, whose team included professional engineers with considerable expertise who were recommending the paved road.

“That’s where Saad [Merayyan] came in,” John continues. “A guy sitting behind us at our Save Hinkle Creek meeting at Starbucks said, ‘I couldn’t help but overhear what you’re talking about. I used to be in the sewer business. Sac State has a really good Civil Engineering Department that specializes in sewer processing and design; why don’t you talk to them?’ So I went online and contacted Saad.”

Dr. Merayyan met with the working group several times. “We talked about other alternatives to maintain the service line without the need for a permanent road,” he says. “The question became, ‘How can we convince the city that the alternatives we came up with are environmentally friendlier, while ensuring that the sewer line was properly maintained?’”

At the June 13 meeting of the Folsom City Council where the city staff hoped the council would approve the plan to pave an access road, more than 250 people showed up in support of finding alternative ways to service the sewer line. John explained that about 50 people signed up to speak, and council members limited each person to three minutes’ speaking time.

After he gave a brief overview, John says, “the second person up was Saad. He barely got through his background and was on slide

three of his presentation when the mayor said, ‘Sorry, time’s up.’ The citizens who were there said they wanted to hear what Saad had to say. The meeting had to be called to order and someone in the crowd said, ‘I’ll give him my three minutes!’ and others followed suit. He still had to hurry, but the idea was that the crowd stood behind him and wanted to hear what he had to say.”

Dr. Merayyan supported the alternative plan to properly maintain the sewer line proposed to the city by the Hinkle Creek working group. This, followed by testimony from about 40 citizens in attendance at the meeting, achieved a key objective: “We convinced the city to at least give alternatives a shot before going through with permanent road construction,” said Dr. Merayyan.

With Dr. Merayyan’s help, the Save Hinkle Creek working group had developed a four-point plan as an alternative to the city’s proposed approach. John says the plan will save money and minimize the impact on the natural environment, and ensures the sewer line is properly serviced and maintained to prevent overflows.

“There will be some trees that we can’t avoid being impacted, even with our proposal,” says John. “The sewer line does have to be repaired. At the end of the day, Hinkle Creek flows into the American River so sewer overflows need to be prevented.”

Since that June council meeting, the Save Hinkle Creek working group reported on its website that state water quality regulators affirmed “there are a variety of methods that can be used to clean up a sewer overflow effectively. Their opinion allows the city of Folsom the flexibility to develop alternate methods for managing an overflow.”

The entire Hinkle Creek working group is grateful to Dr. Merayyan for his contribution to the successful effort to “Save Hinkle Creek.” The group stated that “Saad’s qualifications and experience were critical to validating our alternative approach to building the road and cutting down the forest.”

Says Dr. Merayyan: “I was happy to help in the effort to save Hinkle Creek, and also to serve my local community in Folsom.”



Alban Gjongecaj

ALUMNI Spotlight



“Sac State can produce most of the structural engineering needs of the area...The facilities are there, and the industry support is there to provide labor or materials.”

— Alban Gjongecaj



When Alban Gjongecaj ('12, MS '14), PE, was a student at Sacramento State, it became clear he doesn't do anything halfway. He devoured every chance to participate in a competition or club that involved structures. One year, he was on three competition teams and participated in Mid-Pacific Steel Bridge and Concrete Canoe as well as the Precast/Prestressed Concrete Institute (PCI) Big Beam Competition, and advanced to nationals on all three.

“I had a good time overall,” he says. “I was very involved in clubs and student chapters of ASCE (American Society of Civil Engineers) and SEAOC (Structural Engineers Association of Central California).” In 2013, Alban also established the Sacramento State student chapter of PCI – one of only two in the nation.

Now an associate engineer for Burne Engineering in El Dorado Hills, Alban says “it was almost a given” that he'd follow in his father's footsteps as a civil engineer. “Any chance I got, I'd go with him,” says Alban of his childhood. “I was around construction a lot of my life. Even in high school I steered my studying toward math, physics and natural sciences. By the time I finished high school, there wasn't anything else that attracted me as much as engineering.”

Although he briefly considered a focus on environmental engineering, a structures lab gave Alban his moment of clarity – and he knew he'd found his calling. He continued to the graduate program after getting his bachelor's degree, and it was during grad school that he began working at Burne Engineering. He received his Professional Engineer licensure just over a year ago. Now he's living his dream, working on houses, buildings and bridges for Burne.

“We do a lot of residential and small commercial buildings,” says Alban. Most of Burne Engineering's work is in El Dorado, Sacramento, or Placer County, with some jobs as far as Truckee to the east or the Bay Area to the west. They build large custom homes from scratch, and undertake complex renovation projects. “I did a seismic evaluation for the old City Hall in Placerville, which is from the late 1860s. It's on the National Register of Historic Places. I also worked on an old church from the 1860s in Lone where we did floor framing and repair. I'm fascinated by old construction – how things were done when they didn't have the advantages we have today. It's amazing to see the craftsmanship that went into it.”

Alban says he spends at least two days a week in the field, and he relishes the chance to get out. “Most structural engineers wear suits and ties. I'm a jeans and boots guy, always running around.” He enjoys climbing around attics and foundations to observe existing framing techniques that he can incorporate into new plans for a building.

One of Alban's early professional projects was the Badger Street Bridge in Sutter Creek. “Shortly after I started [in 2013], I did the independent check for a small two-lane bridge, and it just finished construction earlier this year,” he says. “So I got to see a bridge all the way through to construction in the first few years of my career, which is unusual because bridge projects tend to expand for years.”

Happily settled in at Burne, Alban's future plans include sitting for his Structural Engineer licensure in the coming years. “I appreciate the environment I work in, it's very friendly,” he says. “I've always had great support from my office.” He makes it a point to help guide newer engineers joining the firm, which already employs seven Sacramento State alumni.

He continues to keep in touch with his fellow alumni from the College of Engineering and Computer Science, even outside the office. “We have some trips we started at Sac State,” Alban says. “We go to Tahoe in the winter and a camping trip in the summer.”

It's also important to Alban to maintain ties with the Civil Engineering Department itself. Earlier this year, he presented his master's thesis at a PCI bridge conference in Cleveland jointly with Dr. Eric Matsumoto, who served as Alban's advisor during his research about the use of the California Wide Flange Girder in conjunction with precast deck panels. He also hopes to bring increased visibility to the department through his involvement with SEAOC.

“I'm chairing the SEAOC convention committee for 2019 and I sit on a couple other committees,” says Alban. “The profession is always changing and evolving with new research that comes up.” Pointing out that Sacramento State is uniquely positioned

near many key state agencies like Caltrans, Division of the State Architect and the Office of Statewide Health Planning and Development, he believes “Sac State can produce most of the structural engineering needs of the area.” He sees potential in using the Civil Engineering Department's concrete and structures labs beyond their current function, perhaps as a place to do tests and solve in-depth problems. “The facilities are there, and the industry support is there to provide labor or materials,” he says. “I'd like to see that at Sac State. They're uniquely positioned to develop structural engineers.”

Alban describes his overall experience at Sac State as exceptional. “I gained practical and technical skills, made lifelong friends, and enjoyed just about all of it,” he says.



Faculty

“We can see how bacteria are working and accomplish lots of processes for wastewater and water treatment without expense, chemicals or expending energy for physical processes.”

— Dr. Motlagh



FACULTY
Amir
Motlagh, Ph.D.



Joining the department for the fall 2017 semester is Assistant Professor of Civil Engineering Dr. Amir Motlagh, who comes to Sacramento State from his postdoctoral fellowship at the University of Central Florida. He earned his Ph.D. from the University of Utah and his focus is environmental engineering.

Classes: Principles of Environmental Engineering (CE 170), Environmental Quality Processing (CE 252C)

What is your research focus?

During my postdoctoral it was mostly solid waste management, and before that I worked on wastewater treatment processes and water treatment processes; specifically, the microbial communities that optimize those processes.

For different processes in water and wastewater treatment, we can take advantage of bacterial communities. Different types of microbial communities include bacteria or even algae; that is something I'm very interested in. We can see how bacteria are working and accomplish lots of processes for wastewater and water treatment without expense, chemicals or expending energy for physical processes.

This is a very sustainable way to treat water and wastewater. There are good bacteria that help different types of food to be digested better; that's why probiotics are used for people. They have some live bacteria to help the microbial communities in the stomach get a balance on their population. So we are using the same concept in water and wastewater treatment. We call them “bugs” for doing the same function, which is to degrade those nutrients – the contamination we have in water or wastewater.

Is this a new concept in water and wastewater treatment?

It's been used for almost a century. Over that century we are getting better technology and better quantification measurements so that we can optimize these processes and figure out how by using less energy, we can have better performance. Instead of

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Sacramento State recently entered into a contract with the California Department of Transportation (Caltrans) to evaluate alarm systems that warn road crews of danger when moving vehicles encroach onto a work site.

“These work zone intrusion alarm systems are new devices coming up in the market and are primarily used in work zones to warn workers on the road of any intruding vehicles that could potentially hit them,” says Dr. Ghazan Khan (*left*), the Civil Engineering Professor who, jointly with Dr. Kevan Shafizadeh (Associate Dean of the College of Engineering and Computer Science, *right*), serves as principal investigator (PI) on the project.

Dr. Khan expects the project to span about 26 months, and it brings more than \$270,000 to the university. “Caltrans is interested in using [one of] these devices,” he says. “We’re going to find out which ones are the most useful as far as Caltrans is concerned, then develop some recommendations and plans to help Caltrans use these in their work zones. This is an important research project to help improve work zone safety in California, and a great step forward for our transportation research program at Sacramento State.”

Their backgrounds in safety research made Dr. Khan and Dr. Shafizadeh well-matched to the project, and it's going to provide an excellent opportunity for up to four students authorized to be hired under the contract. “These students will be paid for the work they do, and also their tuition is going to be paid,” says Dr. Khan. “The co-PIs and students are going to be in the field testing the equipment and then reporting on its effectiveness.”



It's important research that has the potential to save the lives of workers whose job sites expose them to traffic, and it shines a light on the university's capabilities. “This project fits very nicely into the mission statement of our department and the college, in that we want to give our students hands-on experience and to integrate research into the student learning activities.”

“This project fits very nicely into the mission statement of our department and the college, in that we want to give our students hands-on experience and to integrate research into the student learning activities.”

— Dr. Khan

Faculty (continued)



Dr. Cristina Poindexter recently received a Research and Creative Activity (RCA) Faculty Award from the Office of the Chancellor of the California State University system to study subsidence levels in Delta wetlands.

The RCA Faculty Award allows faculty members to apply for funding – administered by the Research and Creative Activity Committee

– to assist them in advancing their professional aims, and to cultivate the research and creative activity necessary for any professor. Dr. Poindexter will conduct her research over the 2017-18 academic year.

“I’ve been working with a graduate student, Katie Duncan,” says Dr. Poindexter. “She’s using this project as her thesis. We’ve been visiting a wetland that was a pilot built in the 1990s to test the idea of restoring the wetland to very subsided land – to see if that could be the solution to reverse the process that caused the land to be so far below sea level. Wetland plants don’t fully decompose due to the flooded conditions, so there ends up being an accumulation of plant matter, and eventually there are detectable increases in surface elevation at the wetland. Four centimeters per year, according to the U.S. Geological Survey. In some places, it’s nine centimeters.”

Along with undergraduate student Margarita Kovalchuk, Katie and Dr. Poindexter have studied whether there is a reason for the variation (4 cm vs. 9 cm). “It could be related to the flow pattern of the wetland,” says Dr. Poindexter. “We’re doing different types of measurements to see what the hydraulics of the wetland are, and then comparing that to accretion data.”

Though she acknowledges that the discrepancy could simply be due to the flow patterns changing with the seasons, Dr. Poindexter has hopes for more wetland research in the future – on a bigger scale. “The one we studied was a pilot version and wasn’t that big,” she says. “Bigger wetlands are designed differently so they might have different hydraulic flow patterns. This is a much bigger project [than the pilot]. This is a way to decide if that’s worthwhile and to see what type of equipment is needed.”

In other news, Dr. Poindexter is looking forward to incorporating a new river surveyor into the curriculum of her hydraulics lab, which is required of every Civil Engineering student. The river surveyor – also known as an acoustic doppler current profiler, or ADCP – is used to measure the flow in a river as well as for oceanographic studies in areas like the Bay or the Delta.

The device, which Dr. Poindexter says measures about 1-2 feet in diameter, is towed as it floats atop an attached board measuring about 6 feet long. It works by sending down acoustic beams into a particular “cell” (section) of water, and the sound is scattered by particles within that cell’s water flow. This results in a signal being sent back to the device, which records the information and provides a breakdown of flow velocity per cell.

“We have this major important river next to us,” says Dr. Poindexter. “Not only is it close, but it also becomes the subject of a lot of infrastructure spending. Two billion dollars was spent in the Sacramento area on flood protection, so it will come up again for students who stay in the area and work in water resources engineering fields. It’s nice to give them exposure to issues related to the river by using this equipment.”

“We have this major important river next to us... It’s nice to give [students] exposure to issues related to the river by using this equipment.”

— Dr. Poindexter

—Amir Motlagh, Ph. D.

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adding chemicals or physical processes that need lots of energy, we are just taking advantage of these bugs for our purposes.

What do you think of Sacramento?

It’s great – it’s really close to the climate that I have in my hometown, with lots of trees and a river in the middle of town. But here there are two rivers! It’s been great.

What’s your impression of Sacramento State so far?

I like the student-oriented focus on teaching. It’s my passion to teach, and when I see even one student get inspired and get that understanding of one thing they never understood before, or coming to me and bringing a new idea – I was really excited to join Sac State because of that focus being put on the teaching.

Also, I can involve students in the research. I’ve been here a short time but I’ve already had two master’s students show interest in getting involved in research. Here, I see that passion even in undergraduates. There are lots of talented students here. I see a bright road ahead for me and the students; we can accomplish a lot of things in terms of teaching as well as the research.

What do you hope to accomplish at Sacramento State?

My first goal is to be a productive and inspiring professor, whether in the course or even applying that knowledge outside of the classroom. For example, aquaponics is an interesting system we can introduce to K-12 students because it involves lots of engineering. We have a sensor that’s electrical, pumps that are mechanical, fluid going through the system – that’s fluid mechanics. We need to have a water treatment process as well – that is environmental engineering. You can see there are different components from different engineering fields that are involved and that’s a good example to show students, maybe high school or junior high students who haven’t determined what major they want to pursue. Maybe it will inspire them and encourage them to study engineering in college.

I remember one of the reasons I chose Civil Engineering was because I was reading an article about a concrete canoe competition. I thought, ‘That’s really cool!’ It’s kind of like a puzzle, even small pieces play a role in any decision-making process. When these kids are making the decision of what major they’d like to pursue, these small pieces will play a significant role in their decision. I’ve worked with younger students before at the University of Utah. We had a few demo sessions and hands-on experiments for high school students where we measured different nutrients and contamination in water. One of my plans here is to initiate and promote that kind of outreach.

Are you involved in any student engineering organizations yet?

I was president of the Water Environment Federation student chapter at University of Utah. I saw the advantage of being involved, for me as a person, and as a student. We had guest speakers from industry, which helped students to figure out what they wanted to do and what expertise they needed to get during their undergraduate studies. That is one of the chapters we don’t have in the Civil Engineering Department so I’m thinking about establishing that. I haven’t committed to anything this semester, but I’d like to get involved in [the campus chapter of] ASCE as well.

FACULTY
Profile





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