THE BRIDGE

Making a splash

Wastewater treatment innovation improves water quality while saving space, energy and costs.

Page 6

FALL 2019

CIVIL & ENVIRONMENTAL ENGINEERING
UNIVERSITY *of* WASHINGTON

ENVIRONMENTAL ENTHUSIASM

First environmental engineering bachelor's degree cohort graduates.

Page 4

MESSAGE FROM THE CHAIR

This fall, as I have reflected on the department's continued growth, I have also been reminded of the successful partnerships and programs that have measurable impact locally and around the world.

Our feature story highlights one such partnership with King County, ongoing for almost three decades, that supports graduate students who work on wastewater treatment projects aimed at enhancing our city's infrastructure. Thanks to this support, current research promises to improve surface water quality and meet more strict environmental regulations in coming years.

In September, we welcomed Julian Yamaura as a full-time lecturer teaching construction courses and cultivating the next generation of heavy construction engineers. While faculty growth is always notable, this position is particularly remarkable as it was established by department supporters, who you will learn more about in this edition of *The Bridge*.

In October, we completed an onsite visit by ABET reviewers, which occurs every six years. ABET review and accreditation indicates that our educational programs meet the high standards established by the profession. This year's review will result not only in re-accreditation of our Bachelor of Science in Civil Engineering degree program, but also accreditation of the new Bachelor of Science in Environmental Engineering (BSENVE) program. After launching two years ago, the BSENVE program graduated its first cohort of 17 students this past spring. In this issue, you will hear from four graduates who explain how the program prepared them to succeed in the field of environmental engineering.

We are working to continuously improve our degree programs, and last year we enhanced our senior-year capstone design course by offering our first industry sponsored capstone design experience. For this project, an interdisciplinary group of students worked together to solve a real-world transportation challenge in Seattle. Currently, we are working with industry partners to establish projects for next year. These projects illustrate what is possible when we combine passionate students, faculty and industry members to prepare future engineers for success.

Laura Lowes
Chair & William M. and Marilyn M. Conner Professor

Industry sponsorship opportunity

Help support the upcoming UW ASCE regional student competition

The UW American Society of Civil Engineers (ASCE) student chapter will be hosting the ASCE Pacific Northwest Regional Student Competition in April 2020. In addition to the concrete canoe and environmental team competitions, the event will include a surveying and sustainable solutions building competition. To help support the event, UW ASCE is seeking sponsorships from companies in the greater Seattle area and beyond. Donations will help fund venue rental fees, food, parking and more. More than 400 engineering students will travel from Washington state, Oregon, Idaho, Montana, Alaska and British Columbia to attend the competition. To inquire about sponsorship, please contact asce@uw.edu.

AWARDS & ACCOLADES

Faculty awards

JESSICA KAMINSKY

Levitt Young Scholar Award

There's a first time for everything, including an award. Assistant professor Jessica Kaminsky is the inaugural recipient of the Engineering Project Organization Society's 2019 Levitt Young Scholar Award. The award recognizes pre-tenure scholars who have made notable contributions to project organization, an important component of the construction engineering field. Kaminsky conducts research on infrastructure for developing communities, with a particular interest in topics of social sustainability, the global south and contexts that experience significant change in basic infrastructure. Recent work includes advocating for better migrant care and educating the public about sanitation issues around the world.

DAVID STENSEL

Camp Applied Research Award

Professor emeritus David Stensel is the recipient of the Water Environment Federation (WEF) 2019 Camp Applied Research Award, the highest award bestowed by the society to a researcher who has helped advance the development of wastewater collection or treatment systems. The award recognizes Stensel's work to develop and advance biological nutrient processing technology in wastewater treatment, which uses microorganisms to break down organic substances in wastewater without the use of chemicals. In 1979, Stensel led the first installation of this system in the country in Palmetto, Fla., and has continued to advance the technology. The award also recognizes Stensel's work to co-author a wastewater engineering textbook that is widely used by professionals and in the classroom.

Alumnus award

THOMAS BOOTHBY

ASCE George Winter Award

While many engineers employ creative problem-solving in their work, alumnus Thomas Boothby, Ph.D. '91, takes creativity one step further—he's an amateur artist. In recognition of his devotion to both the arts and sciences, Boothby has been honored with the American Society of Civil Engineers' George Winter Award. The award recognizes the achievements of a structural engineer who embodies a humanistic approach to the profession. An architectural engineering professor at Penn State University, Boothby's research and teaching focus on the preservation of structures, structural analysis, design methods and assessing historical structures. He is known for applying his passion for art, history and culture to engineering projects when applicable.

Watercolor by alumnus Thomas Boothby, honored for his devotion to both the arts and sciences.

Environmental ENTHUSIASM

First environmental engineering bachelor's degree cohort graduates

It's been more than two years since the new BSENVE program launched - long enough for the first cohort to graduate. Learn how the program prepared these recent graduates for their future.

NAME:
Amber Longrie

LOCATION:
Tierra Cortada, Panama

OCCUPATION:
Volunteer, Peace Corps

AREAS OF INTEREST:
Water, sanitation and hygiene

What are you working on?
I am training men and women in a small town of 160 people in rural Panama on topics of water, sanitation and hygiene. For technical projects, I am working with the local people on their aqueduct system and water treatment; our biggest challenge is variation in water pressure along the distribution lines of the gravity fed aqueduct system. For sanitation and hygiene, I am still assessing the community's needs, but we have been practicing making soap and treating water at the household level.

How did the BSENVE program prepare you for your career?
The program prepared me in so many ways. I would like to shout out to professor Michael Dodd for his course on Drinking Water Treatment and his guidance on various water-related projects. The skills and knowledge I learned are things I am passing along to local community members to increase their accessibility to safe drinking water. The faculty's concern for ethics and global perspectives has really influenced me to be the person I am now, serving abroad with a sensitive lens toward environmental conservation, public health and human rights.

How would you describe your BSENVE program experience?
It was the best and most memorable part of my college education. The diversity of subject matter helped me gain global perspectives and insights. The technical material strengthened my understanding of engineering fundamentals and problem-solving skills. But more importantly, the passion of the people is what will really stick with me. I was surrounded with critically thinking, engaged and supportive individuals.

NAME:
Casey Madill

LOCATION:
Chestertown, Md.

OCCUPATION:
Environmental educator, Sultana Education Foundation

AREAS OF INTEREST:
Hydrology, coastal engineering and natural systems management

What are you working on?
I work on a tall ship in the Chesapeake Bay running field trips for 4th-6th grade students, where they learn about the history and environment of the area. I am also a deckhand, so not only do I help teach, I also help sail the ship. It's quite the task; the Sultana is a replica of a 1768 schooner in the British Royal Navy.

How did the BSENVE program prepare you for your career?
Everyone on my ship has different backgrounds and areas of interest. I have found that BSENVE has given me a unique, and very worthwhile, knowledge basis. I feel that I can bring something important to the table. Working on a ship is all about being part of a small team, and even though the topics we are teaching are not heavy engineering, having a more technical background has made me employable throughout environmental positions. And despite the fact that my career has so far been a bit out of the field, I feel very well prepared for it.

How would you describe your BSENVE program experience?
Having a small cohort with such talented and caring professors was invaluable, and I feel like I had a very unique experience amongst engineering degree programs. My experience could best be summed up by one word: supportive. I felt supported by peers, faculty and advisors throughout the program. I knew I could be successful because the people I was surrounded by believed in me.

NAME:
Tyler Oshiro

LOCATION:
Palo Alto, Calif.

OCCUPATION:
Master's degree student, Stanford University

AREAS OF INTEREST:
Water and wastewater management

What projects have you worked on?
I just finished my third summer internship with Brown and Caldwell in their Honolulu office. I worked primarily on water and wastewater management projects and planning studies. Some examples include well pump design, reclaimed water system planning and assessing the impacts of sea level rise on nearshore sewer systems and treatment facilities.

How did the BSENVE program prepare you for graduate school?
It allowed me to focus on environmental-related subjects I was passionate about with smaller class sizes and closer connections with students and professors. I'm confident that the depth and rigor of the courses will be an asset to me in my graduate studies, allowing me to build upon the strong foundation I developed. I appreciate that the professors designed classes to teach invaluable engineering skills such as report writing, oral presentations, data analysis and peer-reviewed journal comprehension.

How would you describe your BSENVE program experience?
It connected me with a cohort of like-minded students who became project partners, mentors and close friends. The curriculum was challenging, but we willingly helped each other to learn and overcome any difficulties we faced. Not only that, but the constant support from the faculty and staff was greatly appreciated. They were genuinely invested in preparing us as engineers, while also making conscious adjustments to the program to address our feedback.

NAME:
Alex Ratcliff

LOCATION:
Seattle, Wash.

OCCUPATION:
Mechanical engineer, PAE Consulting Engineers

AREAS OF INTEREST:
Sustainability and environmentalism

What are you working on?
I design mechanical and plumbing systems for buildings, using various calculations and code requirements to produce energy efficient and resilient building systems. PAE is the mechanical subcontractor on several UW projects; I've had the opportunity to work on the Population Health facility, Kincaid Hall, Health Sciences Education building and the new Foster School of Business building. The Seattle office works out of the Bullitt Center, which is one of the greenest commercial office buildings in the world. To work on sustainable infrastructure from inside the building that represents the epitome of our work is in itself incredibly valuable and inspirational.

How did the BSENVE program prepare you for your career?
The environmental engineering program gave me a broad and holistic understanding of environmental processes. Understanding the impact that small changes can have on a macroscale has proven invaluable in speaking to other engineers outside of my company. Because of the exposure to diverse topics in the degree program, I can speak the languages of civil engineers, structural engineers, architects and contractors.

How would you describe your BSENVE program experience?
Working with the faculty, staff and my peers to develop the curriculum was an enriching experience. Although it was challenging being the "guinea pigs" for the program, I'm incredibly proud of what we accomplished and am excited to see how the program progresses over the years.

Making a SPLASH

Wastewater treatment innovation improves water quality while saving space, energy and costs

Although treated wastewater is full of nutrients, some of these can be harmful to the ecosystem in excess amounts. That's precisely why alumnus Maxwell Armenta (MSCE '19) visited Seattle's West Point Treatment Plant twice per week for two years during his graduate studies.

From taking samples to monitoring equipment, Armenta helped to further an innovative new wastewater treatment system that researchers believe will improve surface water quality through nutrient removal at a lower cost than other options.

"At the end of the day, we are working on technology to save money in the long run," says Armenta, whose work on the project was funded by the King County Fellowship Program.

The research, which has been underway for three years, is led by principal investigator and CEE professor emeritus David Stensel, in collaboration with assistant professor Mari Winkler and professor emeritus David Stahl. The project is supported by the National Science Foundation, Water Research Foundation and King County.

"This is the most interesting thing I have worked on in my career," says Stensel. "We will be breaking new ground."

Addressing environmental needs

Every day, wastewater is treated at West Point Treatment Plant, located next to Seattle's popular Discovery Park, before being released into Puget Sound. In coming years, more strict environmental regulations may require nitrogen to be removed from wastewater prior to discharge to improve the water quality and marine habitat.

"In Puget Sound, nitrogen is a nutrient of concern, as it is potentially harmful for fish," Armenta says. "In part, the motivation for this technology is to remove nitrogen and ammonia."

To meet the projected regulatory requirements, which would be set by the state's Department of Ecology, King County would be looking at expensive and major upgrades to its three large regional treatment facilities: West Point Treatment Plant in Seattle, South Treatment Plant in Renton and Brightwater Treatment Plant in Woodinville.

"The modification of the existing treatment plants for nitrogen removal using conventional treatment processes would require additional plant footprint, large capital construction expenditure and increased operating costs," says Bob Bucher (BSCE '96, MSCE '03), senior wastewater engineer with the King County Technology Assessment Program.

Photo opposite page top left: Samples of granular sludge are lined up for controlled nutrient removal tests. Photo opposite page top right: Alumnus Maxwell Armenta observes the fast-settling properties of granular sludge, which is capable of removing nitrogen from wastewater. Photo bottom: The West Point Treatment Plant, which currently employs conventional wastewater treatment methods, necessitates large tanks including settling tanks called clarifiers. Photo credits: Dennis Wise and King County

Already quite sizeable, King County's treatment plants don't have the additional square footage needed to accommodate nitrogen removal equipment. The West Point Treatment Plant is currently site constrained, with conventional wastewater treatment methods necessitating aeration basins and large settling tanks, up to 150 feet in diameter, called clarifiers. The secondary process, which utilizes bacterial flocs to degrade contaminants and separate liquids from solids, requires numerous tanks, each providing a different environment, to complete various steps in the treatment process.

"King County would have to double their plant tankage at existing plants, but there is no space to accommodate that," says Stensel. "Nutrient removal is a growing urgency in our field and a major activity in the next 20 years will be converting existing plants to highly efficient nutrient removal. We are looking to do that with greatly reduced capital cost and possibly without additional footprint for existing plants."

Innovative bacteria

Currently employed in only about 20 treatment plants worldwide, the new technology the researchers are piloting utilizes a treatment process called granular activated sludge, which has been shown in some cases to save 75% of the space and 25% of the energy of conventional systems.

"The technology can address some of the energy demands, and quite importantly reduce the footprint," says Winkler. "It would be a paradigm shift in wastewater treatment."

The granular sludge system can complete various steps in the treatment process in a single tank, which uses fast-settling bacterial granules to separate liquids from solids. Through a microbial process, the granules support both oxygen rich and oxygen depleted environments in one tank, requiring less energy to recycle and pump flocs from tank to tank.

"Granular sludge is the hottest item in the wastewater treatment field now," Stensel says.

The UW researchers are working to advance the new technology in existing continuous-flow systems, such as the ones at King County. Rather than build expensive new treatment plants or decommission existing facilities to upgrade equipment, they are piloting a retrofit scheme at the West Point Treatment Plant.

"This is a totally innovative process scheme," Stensel says. "It has never before been tested in a retrofit."

To retrofit the treatment plant, the researchers are essentially adding granular sludge to the existing conventional floc treatment system in a process called bioaugmentation. Combining the two treatment methods is beneficial, as the bacterial flocs, which settle like a blanket, capture smaller particles compared to the granules. The fast-settling granules, which are not as tightly interlocked, allow more space for nutrient-removing bacteria to grow.

Continued on page 11

TACKLING a transportation challenge

Inaugural industry sponsored capstone gives students hands-on experience

While working to develop a new type of notification system for rare roadway disruptions, a team of students had an equally rare opportunity – to gain hands-on industry experience while still in school.

During the first-ever CEE industry sponsored capstone, six interdisciplinary seniors participated in everything from weekly meetings to presentations to concept development and stakeholder buy-in during winter and spring 2019. Sponsored by the Mobility Innovation Center, students received additional mentorship and input from WSDOT, King County Metro and Sound Transit officials.

"Working with industry members was eye-opening, because it gave us an understanding of the region's transportation network and how we could help improve it," says alumnus Steven Tuttle (BSCE '19), who now works at Sound Transit. "We hope that our research will be used to implement a comprehensive incident avoidance system for the Puget Sound region."

The students, who were from CEE, Human Centered Design & Engineering, Computer Science and Communications, were tasked with developing a mobile-based incident notification and navigation system to increase awareness about major traffic incidents and suggest alternate routes and modes of transport. The system would be used during rare road disruptions that shut down major arterials about once per year.

"The idea was to alert people about an incident and make it as easy as possible for them to follow recommendations," Tuttle says. "If someone has to take a bus instead of driving their car, we want to make that transition as easy and seamless as possible."

The students' solution, called Seattle Area Incident Avoidance (SAIA), enables agencies to share incident information and offers suggestions for travelers to either reroute or consider other modes of transport. The prototype also supports roadway users who may need to shift transportation modes by offering mobile ticketing, which allows people to more seamlessly take public transportation if they don't have a bus pass or cash on hand.

"There is currently no system that includes all the elements we included in our final solution," Tuttle says. "We took different aspects of incident alert systems throughout the world and combined them to work best for our region."

The student team with instructors and mentors from Mobility Innovation Center, WSDOT and Sound Transit after presenting their project at the end of spring quarter at WSDOT Transportation Management Center.

At the end of spring quarter, the students presented their final project to stakeholders. King Country Metro is currently considering how the students' work may be implemented in a future incident avoidance system for the Puget Sound region.

"They worked really hard, overcame every obstacle they faced, and at the end delivered a very professional presentation," says Andisheh Ranjbari, research engineer for the SCTL Center, who advised the students together with CEE associate professor Don MacKenzie. "Industry mentors were very happy and even astonished with what the team achieved and the amount of work they completed over the course of two quarters."

Interested in sponsoring an industry capstone?

To provide additional hands-on learning opportunities, the department hopes to expand the number of industry sponsored capstone design projects. If your company is interested in participating, please contact Jill Kaatz (jmd4@uw.edu).

One year, 36 deployments

The RAPID facility completes first year of operations

It's an understatement to say it's been a busy year. Responding to hurricanes, earthquakes, tsunamis, landslides and wildfires, the Natural Hazards Reconnaissance Facility (known as "RAPID") exceeded its target number of deployments for the year by 400%.

"During the past year, we helped 15 organizations—including universities, government agencies, and international partners—conduct state-of-the-art natural hazards reconnaissance missions worldwide. These field campaigns have produced data products that have already led to entirely new understandings of natural disasters and their lingering effects," says RAPID director, professor Joe Wartman.

Launched in September 2018, the center completed 36 deployments of equipment to 12 locations around the globe during its first year of operations. With the goal of reducing the adverse impacts of natural hazards, the center houses more than 300 pieces of data-gathering equipment, which are available to researchers throughout the world.

Funded by a five-year $6 million Natural Hazards Engineering Research Infrastructure grant from the National Science Foundation, the center is the first of its kind in the world. In addition to state-of-the-art equipment, the center also provides training and advisory services to support the collection, processing, analyzing and archiving of perishable data from natural hazard events.

Efforts during the first year were focused on developing and training a user base of researchers to operate the high-tech equipment. To this end, center faculty and staff conducted user trainings throughout the Northwest and East Coast, training more than 190 researchers.

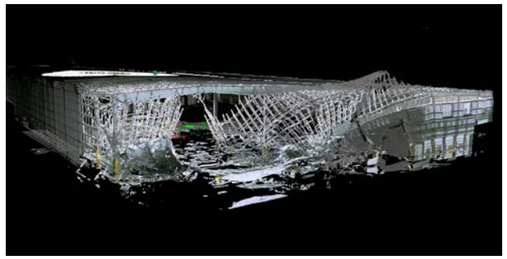
During year two of operations, center faculty and staff plan to offer training workshops with a special focus on the social science and coastal research communities. They will also continue hosting new data processing workshops, to teach researchers how to analyze data they've collected.

DEPLOYMENT DETAILS

During the first year of operations, data gathering equipment was deployed to disaster sites around the world. Below are a few highlights:

Hurricane Michael, Florida

The strongest hurricane to hit the Florida Panhandle in more than 25 years, Hurricane Michael struck in October 2018, causing severe damage and death throughout the southeastern states. RAPID Facility faculty and staff, together with researchers from Auburn University in Alabama, were deployed to Florida to collect data on heavily damaged large-volume steel buildings, which had a high rate of collapse during the hurricane. Researchers used drones outfitted with ultra-high-resolution cameras, lidar scanners and surveying equipment to discover a common cause of building failure: purlins, which are horizontal beams between the main roof beams perpendicular to the short dimension of the building, buckled from the combined forces of wind-induced wall pressure and suction of the roof.



A high-resolution lidar generated point cloud of a large-volume low-rise building damaged during Hurricane Michael.

Hokkaido Eastern Iburi earthquake, Japan

Following a 6.6 magnitude earthquake in September 2018, with an epicenter near Tomakomai, Japan, researchers from United States Geological Survey and University of Colorado set out to capture both rural and urban ground failure data using long-range lidar. The researchers found that heavy rainfall during the typhoon season, as well as loose pumice layered on clay, were responsible for a high concentration of landslides.

Drone image of landslide damage to a critical water treatment plant during the 2018 Hokkaido Earthquake. Photo courtesy of GEER

Working to alleviate ride-hail induced traffic trouble

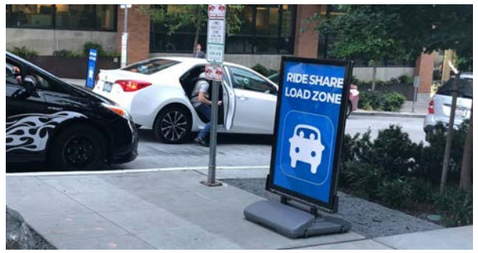
Although Uber and Lyft make transport easier for many passengers, ride-hail services often make transportation more difficult for other roadway users due to frequent stops in the travel lane and double parking.

To support less disruptive and easier passenger pick-up and drop-offs for ride-hail services, researchers in the Supply Chain Transportation & Logistics Center (SCTL) Urban Freight Lab found that offering designated curbside loading zones, together with technology that guides drivers and riders to these locations, helps alleviate impacts on traffic flow.

"This research uses a data-based approach to experiment with potential solutions aimed at improving traffic flow while accommodating changing traveler demands," says SCTL director, professor Anne Goodchild. "We are proud to provide robust analysis to support this collaborative approach to problem solving, where the public and private sector work together on shared regional challenges."

For the study, the researchers worked with the Seattle Department of Transportation (SDOT) to install additional curbside loading zones along three blocks in the South Lake Union neighborhood, an area with considerable congestion and ride-hail service usage. The researchers also developed an app using geofence technology, which creates a virtual boundary around a geographical location, to help guide drivers and passengers to the designed loading zones.

To test the effectiveness of the loading zones and geofence technology, researchers collected data from ground observations, user surveys and video analytics for six weeks. They found an increase in drivers who stopped at the curb, rather than in the travel lane, as well as a reduction in the average amount of time it took for drivers to load and unload passengers – a savings of more than 40 seconds. Passenger satisfaction also increased by 5% for pick-ups and 34% for drop-offs.



Testing designated passenger loading zones for ride-hail services. Photo credit: Urban Freight Lab

Transportation talk

PacTrans sponsors a conversation with regional leaders

To provide an opportunity for regional leaders to come together and share their thoughts on sustainable transportation, a panel discussion "Sustainable Transportation: A Conversation with Regional Leaders" was held last May.

With major funding packages at the state and regional levels gaining legislature approval, such as the recently passed 2019-21 transportation budget and Sound Transit 3 in 2016, leaders are now working to see these projects through on time and under budget, which has proven challenging with rising construction costs and other project complexities. Meanwhile, leaders are also trying to balance sustainability goals by encouraging density and alternative methods of transportation.

Panel speakers included Sound Transit CEO Peter Rogoff, King County executive and UW alumnus Dow Constantine, WSDOT deputy director for regional transit coordination and UW alumna Celeste Gilman, UW alumnus senator Steve Hobbs and King County councilmember Claudia Balducci. Professionals, faculty members and students interested in networking with potential future employers were invited to attend the event.

The event was hosted by the American Public Works Association UW Chapter, the Institute of Transportation Engineers UW Chapter and UW Planning Student Association, with support from Pacific Northwest Transportation Consortium (PacTrans).

Regional leaders come together to share their thoughts on sustainable transportation.

Encouraging fresh perspectives

Freshwater Initiative connects UW water researchers

Water-related research flows through many disciplines at UW, from engineering to environmental studies. To meet growing research needs, the Freshwater Initiative was founded in 2014 to bring together water scientists and engineers from various departments across UW.

The Freshwater Initiative aims to promote new and creative applications of freshwater research through collaborations with regional, national and global partners. In 2017, the first student steering committee was formed to guide the Freshwater Initiative to best support students as they develop the research, communication and professional skills needed to be successful in freshwater science. From Civil and Environmental Engineering, several graduate students are involved, as well as nine faculty who serve on the faculty steering committee.

Last year, a quarterly exploration series on Pacific Northwest dams provided an opportunity for students from various disciplines to come together to visit the Skagit River Hydroelectric project, participate in a student research roundtable and attend an expert panel to discuss management strategies and future research needs. During spring break, faculty and staff also collaborated with the e-Science Institute to host the first annual Waterhackweek, a five-day workshop that brought together water researchers from UW and around the country to learn about data science and collaborate on real-world water research projects.

Learn more about the Freshwater Initiative and sign up for e-news at freshwater.uw.edu.

Students involved in the Freshwater Initiative visited Ross Dam during an exploration series on Pacific Northwest dams.

Continued from page 7

"Granules are special because they grow organisms in a dense biomass that can oxidize ammonia and remove nitrogen," says Armenta. "Granular sludge is therefore a solution for removing nitrogen without bigger tanks."

Promising pilot

A major component of the pilot project was installed in September at the West Point Treatment Plant, enabling the integration of the new granular sludge technology with the existing system.

The researchers will continue testing the pilot system during the coming year, together with the company Ovivo, which is working to commercialize the technology. They are also partnering with the Los Angeles County Sanitation District, as officials there are interested in implementing a similar system.

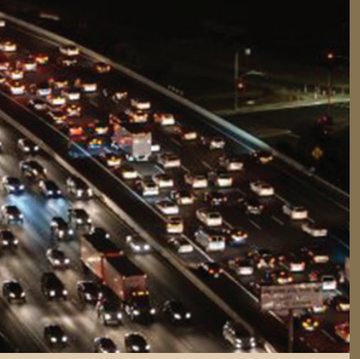
"It is unique that King County allows us to test these technologies, but it enables us to move forward with exciting, game-changing ideas and see if they are possible in practice," Winkler says.

KING COUNTY FELLOWSHIP PROGRAM

The regional provider of wastewater treatment for the Seattle metro area, King County has been heavily involved in the project by not only constructing and operating the pilot plant, but also funding a graduate student to work on implementing the innovative technology.

For the past 27 years, King County has partnered with UW CEE by financially supporting graduate students to work on wastewater treatment projects. Since 1992, the King County Graduate Student Research Fellowship Program has enabled 26 students to work on projects such as new treatment technologies, water reuse, digestion of waste to energy and removal of micropollutants harmful to aquatic life. Recent participants include Bryce Figdore (Ph.D. '17), Aparna Garg (MSCE '17), Kota Dan Nishiguchi (MSCE '19), John Carter (BSCE '18) and Shannon Cavanaugh.

RESEARCH HIGHLIGHTS

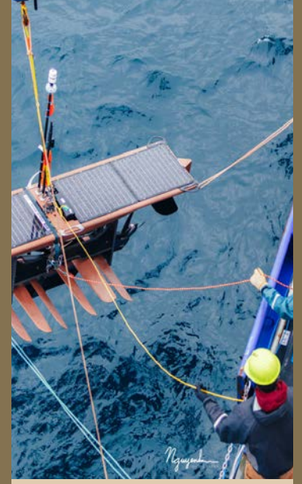


Americans cautious about autonomous vehicles

The perceived cost of commute time changes depending on who's driving, using the concept that time is money, according to new research led by CEE associate professor Don MacKenzie. Through a survey, researchers found that people considered a ride-hailing service at least 13% "less expensive," in terms of time, compared to driving themselves. If the researchers told people the ride-hailing service was driverless, however, then the cost of travel time increased to 15% more than driving a personal car. This suggests that people would rather drive themselves than have an autonomous vehicle drive them. The survey results are not surprising, according to the researchers, since driverless cars aren't commercially available yet and people are not familiar with the new technology.

Surprising arsenic-related discoveries in contaminated lakes

Although the American Smelting and Refining Company copper smelter near Tacoma, Wash., hasn't been operational for more than 30 years, legacy sediment contamination serves as a long-term source of toxicity in the area. After a surprising discovery that some shallow lakes, such as Lake Killarney in Federal Way, Wash., have unique characteristics that facilitate the movement of arsenic from lakebed sediment up into the food web, researchers are currently working to better understand the hydrodynamics of the lake. In deeper lakes, separate layers of water do not mix for extended periods of time, which keeps the arsenic trapped in the bottom waters devoid of oxygen and aquatic life. The researchers identified a daily heating and cooling cycle that occurs during the summer in shallow lakes, which causes the layers of water to mix, resulting in arsenic traveling up into the surface waters where the aquatic food web resides.

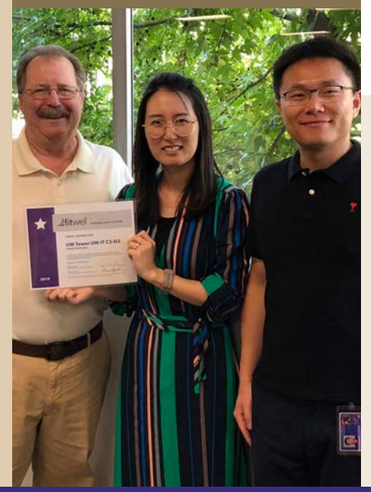


Wave Glider explores Antarctic waters

Using an autonomous surfboard called the Wave Glider, UW researchers led by CEE professor Jim Thomson are investigating the Antarctic Peninsula to better understand how the warming ocean interacts with ice shelves. The Wave Glider will first gather data near the Antarctic Peninsula, to analyze how the warming ocean interacts with ice shelves that protrude from the shore. It will then head north into Drake Passage, braving some of the stormiest seas on the planet that large research ships avoid. As it surfs along, the board will measure turbulence in the ocean, which helps to determine how heat and other properties move between the water and the air. The board sends information back via satellite, which researchers will retrieve once the mission is complete. In 2016, the researchers sent the autonomous platform, which has been upgraded with advanced capabilities, across the 500-mile channel between Antarctica and Argentina.

First university building earns Fitwel rating

UW Tower is the first university building in the world to be recognized as a Fitwel certified building thanks to the work of CEE assistant professor Amy Kim, post-doc Shuoqi (Stanley) Wang and support from the UW Tower facilities and IT teams. One of the leading certifiers of healthy buildings around the world, Fitwel was developed by the U.S. Centers for Disease Control and Prevention and U.S. General Services Administration to emphasize occupant wellness. Several enhancements were made to UW Tower, including adding standing desks, collaborative work spaces, enhanced emergency response kits and stairwell improvements to encourage using the stairs versus elevator. The researchers also added a display to advertise amenities within walking distance of UW Tower, from parks to gyms to restaurants.



ALUMNI NEWS

Construction completed: New faculty lecturer

Donors fund new position to inspire future construction engineers

He may be a new faculty member, but Julian Yamaura (BSCE '09, Ph.D. '18) is a familiar face. Completing both his undergraduate and graduate studies in the department, Yamaura was recently hired as the inaugural Tom and Marilyn Draeger/The Beavers Charitable Trust Lecturer.

Established by the Beavers Charitable Trust and longtime department supporters Tom (BSCE '68) and Marilyn Draeger, the full-time lecturer position will focus on teaching undergraduate construction engineering courses.

"Faculty play such a big role in educating and mentoring students, it really is an honor to be able to influence and have an impact on new generations of civil and environmental engineers," says Yamaura, who officially joined the department in autumn quarter.

By having a dedicated instructor focus solely on teaching construction engineering courses, without the pressures of research and other common faculty obligations, the founders of the position hope to inspire and prepare the next generation of heavy civil construction engineers to excel in the field.

"Many students have minimal knowledge of the industry when they arrive at college. This is despite the fact that outside of government and education, construction is one of the largest industries in the world," Draeger says. "The industry needs young people early enough in their career that we can teach them leadership skills."

Julian Yamaura

To help bridge the gap between academic studies and practical experience, efforts will also be made to increase the number of internship positions at companies affiliated with the Beavers, a social, honorary organization for construction companies and individuals who are involved in heavy civil construction projects. Draeger serves on the board of directors for the Beavers.

With both industry and teaching experience, Yamaura is well-suited for the position. He assumed a significant role in instructing undergraduate courses while he was a graduate student and was recognized with a UW College of Engineering Student Teaching Award in 2017. During graduate school, Yamaura also worked as an engineering consultant for Pavia Systems, Inc., assisting with developing construction project inspection technology. Prior to his graduate studies, Yamaura was a construction engineer for Atkinson Construction, working on large transportation infrastructure projects throughout the state.

SAVE THE DATE: 1970 class reunion

Calling all members of the CEE Class of 1970! We hope you will join us for your 50th reunion on Sunday, June 14, 2020. Return to campus to reconnect with classmates, visit with faculty, and be formally honored during the CEE graduation ceremony. An official invitation with all of the details will be mailed in early spring, but please contact Janeka Rector, assistant director of advancement, at janekar@uw.edu or 206-543-8779 with immediate inquiries.

Alumni from the class of 1969 celebrate their 50th reunion on Sunday, June 16. Pictured with their commemorative stoles are Paul Buckholtz (BSCE '69), Rudolf Pueschel (Ph.D. '69), Ichiro Ikeda (MSCE '69) and David Markley (BSCE '69), from left.

Enjoy the videos:

Engineering Lecture Series

The 2019 UW College of Engineering fall lecture series "The Future of Food" featured CEE faculty members who shared their expertise on how to improve the safety and sustainability of the food system. Enjoy the following videos at ce.washington.edu/news/video.

Growing More with Less: Smart Tech Solutions to Feed the World

Professor Faisal Hossain is utilizing global weather models and satellite data to develop technology to help farmers in Asia increase crop yield through sustainable water management.

Human and Ecosystem Health: Arsenic in Food, Water, Plants and Animals

An arsenic expert, associate professor Rebecca Neumann is advancing knowledge of how arsenic in local and global settings affects food and water quality, and the health of ecosystems.

SUCCESSFUL **SURPRISE**

Alumnus receives gift of supporting students

For the record, alumnus Rick Gilmore (BSCE '72, MSCE '75) wasn't merely surprised last spring when friends, colleagues and family presented him with the gift of supporting students in years to come.

"I was flabbergasted," Gilmore says. "It was quite an honor that my friends could think of doing something like that."

Two years in the making, the effort was spearheaded by Gilmore's close friend, alumnus Jeff Wright (MSCE '77) and his wife, Delores, together with a close group of Gilmore's friends and family. A week before Gilmore's 70th birthday, more than 150 people, including the UW Alumni Band, gathered for a surprise party where Gilmore was presented with a student support fund established in his name, the Richard Q. Gilmore Endowed Student Support Fund.

"It was the first time I've ever seen Rick speechless," says Wright, who befriended Gilmore when both were students. "Rick knows an incredible number of people and he's known the majority of them over decades. Our big fears were missing people who would be eager to contribute and having Rick find out what was going on."

The idea for a community gift for Gilmore surfaced during a UW Huskies football tailgate. After learning that a milestone birthday was approaching, Wright and his wife began thinking about what to give Gilmore for a birthday present.

"It occurred to us that all these people we know feel the same about Rick. He is an incredibly giving person. So instead of giving him something tangible, we wanted to give him something that would enable him to continue supporting others at the institution he cherishes," Wright says.

In 2017, Wright approached UW CEE academic leadership and advancement officers with the idea to establish an undergraduate student support fund in Gilmore's name. A planning group was formed and began reaching out to Gilmore's large network of friends, colleagues and family.

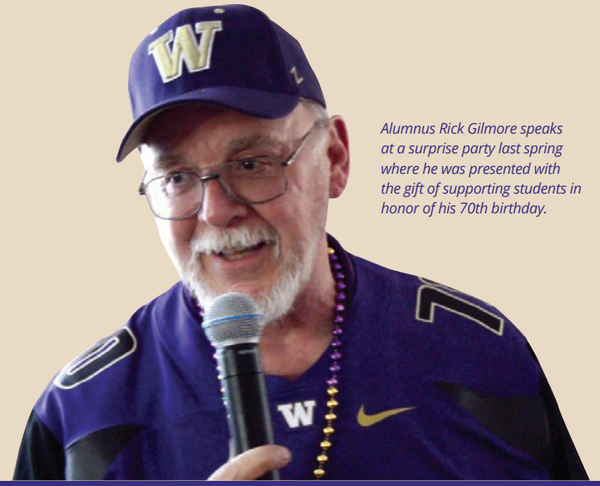
"Everyone was just delighted with the idea," Wright says. "The tribute event was a huge success, with generations of family and friends sharing stories about and best wishes to Rick."

Over the years, Gilmore has befriended and encouraged many engineering students and colleagues. While a student, he founded the inaugural Concrete Canoe Team and was an instigator of the ASCE Student Chapter Resume Book, which helped many students land their first jobs. To this day, Gilmore is a familiar face at department events and gatherings.

"Rick has a natural talent for maintaining contact with people and is always eager to provide guidance and support for his friends," Wright says. "He has been particularly effective in helping colleagues advance their professional careers."

Gilmore has held a number of engineering positions over the years, working primarily on public-sector water and sewer engineering projects, and served as chief engineer for the water and sewer districts in both Federal Way and Silver Lake. He was recently awarded Government Engineer of the Year by the Puget Sound Engineering Council for his lifelong accomplishments.

"They thought this was something that I would appreciate and they're absolutely right, it's absolutely wonderful," Gilmore says. "It will help students from a department that's been good to me in my life."



Alumnus Rick Gilmore speaks at a surprise party last spring where he was presented with the gift of supporting students in honor of his 70th birthday.

LASTING LEGACY

Remembering alumnus Allan Osberg's outstanding support

During his lifetime, alumnus Allan Osberg (BSCE '45) constructed more than roads and bridges. He also created a philanthropic legacy that will continue to support faculty and students for years to come.

"He was first and foremost a Husky," says Kimberley Lippman about her father. "His support of both faculty and students was a reflection of his deep appreciation for and ongoing relationship with the College of Engineering."

A longtime UW supporter, Osberg passed away at the age of 94 in March 2019. Over the years, he and his wife, Inger, funded both a professorship and a graduate student fellowship in the College of Engineering. Dedicated to higher education, Osberg also served as a trustee of the President's Club and was a member of the Foundation Board of Directors.

"They maintained ties with many of their graduate students over the years. Having an ongoing connection with cutting-edge projects undertaken by students and professors across all walks of engineering was a delight to them both," Lippman says.

Growing up in Seattle, Osberg had an early interest in engineering. After earning his bachelor's degree in civil engineering at UW, he completed a master's degree in civil engineering at Harvard, specializing in soil mechanics. After graduate school, Osberg returned to Seattle and joined the family business, Osberg Construction Company.

During his time with the company, Osberg oversaw the completion of several major projects in the Northwest and Alaska, including straightening the Sammamish River between Redmond and Lake Washington, reconstructing segments of the North Cross-State Highway (also known as State Route 20) and building the Yukon River Bridge for the Alyeska pipeline in Alaska.

"My father had a great deal of pride in constructing well-built projects that withstood the test of time. He enjoyed crafting new ways to build things and make them as robust as possible," Lippman says. "He was a thinker, but also a man of action. He liked to get things done and done well."

In recognition of his strong commitment to community service, Osberg was honored with a 2017 Diamond Award for Distinguished Service. The College of Engineering's Diamond Awards honor outstanding alumni and friends who have made significant contributions to the engineering field. In recognition of their cumulative giving over the years, the couple was also recognized as Laureates of UW.

"He gave of himself in terms of his expertise and experience as well as from his pocketbook," says Lippman. "My father recognized the value of community. He was always of a mind that if you set a good example, others would follow suit."

Inger and Allan Osberg

THE BRIDGE FALL / 2019

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ANNUAL
alumni tailgate

Good food, good conversations and a good time were had by all at the annual CEE department tailgate. More than 60 UW CEE alumni, family and friends gathered for a tailgate party before the Huskies Homecoming game against the Oregon Ducks on Saturday, October 19. Attendees connected with former classmates, learned about student projects and received department updates from chair Laura Lowes.