THE BRIDGE

A biochar solution for urban runoff

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CIVIL & ENVIRONMENTAL ENGINEERING

UNIVERSITY *of* WASHINGTON

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MESSAGE FROM THE CHAIR

Welcome to the spring 2024 edition of *The Bridge*. As I am writing this, it truly does feel like spring on campus. The cherry trees on the Quad just passed peak bloom, students are preparing for finals and graduation, the Concrete Canoe and Steel Bridge teams are gearing up for their annual competitions, and the department is getting ready for commencement activities. For the first time since 2019, Engineering Discovery Days took place on campus. During this two-day event in early May, elementary and middle school students visited the UW to engage in hands-on activities that introduced them to engineering disciplines.

We continue implementing our strategic plan and are working hard to increase enrollment in our programs to meet the demand for our graduates. This takes many different forms, from better outreach to students who have been accepted to the UW but have not yet committed, to informational sessions for pre-major engineering students, to streamlined prerequisites for our majors and curriculum. Another pillar of our strategic plan focuses on visibility and engagement, and in this issue of *The Bridge*, Associate Chair Anne Goodchild discusses the activities of our new External Engagement Committee to strengthen ties with the broader CEE community.

This edition's feature story showcases research by Assistant Professor Jessica Ray and her team to improve stormwater quality in urban watersheds by using a black charcoal-like substance rich in carbon called biochar. Other research highlights include work by Associate Professor Brett Maurer and Ph.D. student Morgan Sanger to use AI for earthquake predictions, a NASA project by Professor Faisal Hossain to track surface water from satellites, and research by Assistant Professor Bethany Gordon that emphasizes a partnership with communities during design rather than a top-down imposition of solutions. The breadth of research topics in our department reinforces the reach of our community in shaping the world around us and continues to inspire me.

Bart Nijssen
Chair & Professor

Department honors

Professor Dorothy Reed

Professor Dorothy Reed was inducted as a fellow of the American Society of Civil Engineers (ASCE) in September 2023 and became a fellow of the Structural Engineering Institute (SEI) in January 2024. This honor, awarded to just 3% of ASCE members, recognizes those whose "contributions and creative solutions have changed lives around the world."

Professor Emeritus Steve Burges

Professor Emeritus Steve Burges was the 2023 recipient of the American Water Resources Association (AWRA) Fellow Member Award. The award recognizes his notable contributions to water resources science and technology. His work throughout his career with CEE significantly advanced understanding and management of hydrologic and water resources engineering.

Graduate student Nathalie Thelemaque

Graduate student Nathalie Thelemaque was awarded the 2024 Graduate School Medal. This prestigious award recognizes one UW graduate student for their outstanding citizen-scholar work. Thelemaque was selected from a competitive pool and evaluated on her ability to integrate academic expertise with social awareness, demonstrating civic engagement and the capacity to promote political, cultural and social change.

Professor Emeritus Steve Kramer serves as graduation keynote speaker

On June 1, CEE held its graduation celebration at the Alaska Airlines Arena in the Hec Edmundson Pavilion on campus. The event celebrated nearly 300 students receiving bachelor's degrees, master's degrees and doctorate degrees from the department. Professor Emeritus Steve Kramer served as the keynote speaker for the event.

Kramer's research in geotechnical engineering throughout his career has significantly advanced our understanding of soil liquefaction, seismic hazard analysis and earthquake engineering education. His role in developing seismic risk assessment methodologies and his authorship of the textbook "Geotechnical Earthquake Engineering" have cemented his status as an expert in the field. Kramer's academic and professional achievements have been recognized through numerous awards and honors, including the ASCE Norman Medal and election to the National Academy of Engineering.

Beyond his research and publications, Kramer has been a catalyst for change in global engineering practices through his involvement in numerous international projects and collaborations. One notable example is his contribution to earthquake risk reduction initiatives in Japan and Turkey, where his expertise in seismic hazard analysis helped develop innovative earthquake-resistant construction methods. These efforts have led to safer infrastructure in regions prone to seismic activities.

During his keynote address, Kramer shared insights from his career and offered graduates advice on navigating the evolving landscapes of civil and environmental engineering with innovation and creativity, leaving them ready to embark on their own professional journeys.

Morteza Derakhti joins the department

CEE is pleased to welcome Morteza Derakhti to the department faculty as an assistant professor. The appointment formalizes his dual role at the UW, where he already holds a position in the Applied Physics Laboratory (APL).

Derakhti brings a comprehensive background in ocean wave and coastal modeling, specifically in coastal engineering and computational fluid dynamics (CFD). He comes to the department with bachelor's and master's degrees in civil engineering from the University of Tehran, as well as a Ph.D. in civil engineering from the University of Delaware. He joined the UW faculty in 2018.

His research portfolio covers a broad spectrum of topics, from the dynamics of ocean waves and their impact on structures to the exploration of nearshore hydrodynamics, extreme weather phenomena and the effects of climate change. Derakhti's work is notable for integrating advanced CFD and wave-phase-resolving numerical models with empirical data from fieldwork and laboratory studies. He aims to improve how we understand and manage coastal areas and oceans, making it easier to tackle challenges like erosion, flooding and the impacts of climate change.

In addition to his research, Derakhti is dedicated to teaching the next wave of engineers the skills necessary to address contemporary challenges.

Department launches new External Engagement Committee

Understanding the importance of partnerships with industry and the community, the department established an External Engagement Committee over the past year. Chaired by Professor Anne Goodchild, this committee is dedicated to celebrating and enhancing the department's connections with external partners, including those in industry, government and communities.

"This committee will shine a spotlight on the outstanding work that our faculty are doing working with and for partners outside of the university," Goodchild says.

The committee, primarily composed of faculty, reflects the department's longstanding tradition of leveraging committee structures to organize its activities. Its establishment represents a strategic shift towards more focus on external engagement.

"Our goal is to ensure that more people know about the great work we're doing in the department. We want to highlight our projects and partnerships to show how we're helping to advance engineering practices and education and making a positive difference in society," says Goodchild.

One first step is highlighting long-standing partnerships in the department. The committee hopes that publicizing current relationships can serve as a foundation for building further awareness and fostering additional partnerships in the future.

External Engagement Committee Chair Anne Goodchild

The committee will help establish a Department Advisory Board this year and is working to improve department communications with partners off campus. They are also working on ways to learn from our communities and gain more understanding about the current state of external relationships, their benefits to faculty and students, and potential areas for further investment.

Highlighting external partnerships

CEE faculty work with partners across industry, government and community sectors. These collaborations offer insight into the reciprocal benefits and collective impact of joint endeavors.

The Beavers, a social organization in heavy engineering construction, sponsors two professorships in the department. Currently, they are held by Steve Muench and Julian Yamaura. The organization began sponsoring the Tom and Marilyn Draeger – Beavers Charitable Trust Professorship in 2011 and has been a long-time scholarship sponsor to the department as well. Construction companies that are members of The Beavers provide about 20% of the department's summer internships. Beyond financial support, The Beavers actively engage with undergraduates, organizing an annual construction site field trip each year that offers invaluable real-world insights into the construction industry's workings.

Professor Julian Marshall and his research group have teamed up with the research team at **Front and Centered**, a coalition of community organizations focused on environmental and climate justice policies in Washington. Together, they are collaborating on research addressing air pollution disparities around the state. This partnership operates through a unique model where Front and Centered guides the research focus based on community needs, ensuring the work is impactful and poised to drive real change.

THE BEAVERS
A HEAVY ENGINEERING CONSTRUCTION ASSOCIATION

More than 200 attend CEE career fair

Last November, the department celebrated its 18th annual career fair, an event that showcased the strong connections between students and industry leaders. With more than 240 students engaging with 95 employers, the fair was a place for networking, learning and laying the groundwork for future careers.

"The energy was through the roof. There was just a buzz in the room for the entire event," says Brian Kinnear, the lead undergraduate advisor for CEE.

The decision to host the career fair during the autumn quarter, a first for the department, was met with positive feedback. This timing aligns more closely with industry hiring cycles, facilitating timely and meaningful connections between students and potential employers.

A number of the employee representatives were CEE alumni, which showcased the diverse range of careers that graduates embark on and provided current students with relatable insights and connections.

CEE junior Robert Stricker emphasized the tangible benefits of attending. "I have had several interviews for internships thanks to the connections I made at the career fair," he says.

Looking ahead, the department is eagerly preparing for the upcoming 2024 career fair in October.

Are you an employer interested in participating in our next career fair? Contact us at ceadvice@uw.edu

Photo by Julia Davis

Discovery Days returns to campus for the first time since 2019

Over two days in early May, the UW campus transformed into a whirlwind of discovery as more than 7,000 students from across the state took part in hands-on activities and learned about scientific concepts that could help them on their path to becoming future engineers.

The eagerly awaited return of Engineering Discovery Days, on May 2–3, 2024, showcased the curiosity and enthusiasm of Washington's elementary and middle school students. The event saw unprecedented demand, with registration for day one closing within six minutes and day two within 90 minutes.

Students, staff and faculty volunteers, including many from CEE, hosted more than 60 exhibitor booths. From shake table exhibits, where students tested model structures against simulated earthquakes, to experiments in water quality, the young participants were offered a glimpse into the challenges and rewards of civil and environmental engineering. These practical, engaging activities were designed to inspire a new generation of engineers.

Before its hiatus due to the pandemic, Engineering Discovery Days had been held annually for more than 100 years. The event has long been a bridge connecting the community to the College of Engineering and fostering curiosity and innovation in students who could go on to be future UW engineering graduates.

Top: Elementary school students learn about testing structures using shake tables.

Right: Students learn about water quality testing.

A biochar solution FOR URBAN RUNOFF

By Julia Davis / Photos by Mark Stone

CEE researchers are testing biologically derived charcoal filters and fungi as tools for purifying city waters, a step towards eco-friendly solutions.

In cities around the globe, stormwater runoff remains largely untreated, collecting everything from heavy metals to pesticides before flowing into our waterways. This environmental challenge requires innovative solutions, and biochar may just be the key. CEE Assistant Professor Jessica Ray and graduate student Amy Quintanilla are exploring how this sustainable material, made from recycled food waste, can not only integrate with natural environments, but also effectively filter out harmful contaminants from stormwater. Their research presents a potential solution to tackling urban water pollution, offering hope for healthier ecosystems and safer water sources.

The promise of biochar

Stormwater is a leading cause of nonpoint source pollution in urban watersheds, according to Ray, who is the Robert O. and Irene V. Sylvester Family Endowed Professor in Water Resources. But most cities have no formal treatment process for it. This runoff collects contaminants as it flows across city surfaces, from roads to rooftops, before discharging into rivers and oceans largely untreated. The implications of this process are far-reaching, affecting water quality, wildlife and human health.

At the heart of Ray and Quintanilla's research lies biochar, a black charcoal-like substance rich in carbon and made by burning organic materials at high temperatures in an environment with limited oxygen.

The key characteristic that makes biochar so effective in environmental applications is its highly porous structure, which provides a large surface area for the adsorption of pollutants. By converting waste into biochar, not only is the volume of waste reduced, but its transformation into a beneficial product contributes to a mutually beneficial cycle, turning potential pollutants into tools for environmental remediation.

"The biochar that we're designing is specifically targeted to filter out the contaminants we find most harmful in stormwater," Ray says.

This tailored approach ensures that biochar is highly effective at capturing pollutants like heavy metals and "forever chemicals" like PFAS, which are prevalent in urban runoff and never break down in the environment.

Green lab trials

To see how Ray's version of biochar behaves when it comes to cleaning stormwater, Quintanilla is conducting experiments to assess its efficacy in removing harmful pollutants from stormwater, specifically targeting acetaminophen, benzotriazole and sulfamethoxazole — common yet concerning substances found in pharmaceuticals and personal care products. These contaminants often find their way into our stormwater systems and from there, into natural water bodies.

Quintanilla's experimental design involves growing Juncus patens plants in varied conditions: some are planted in untreated soil, others in soil mixed with biochar, and a third group in soil treated with a combination of biochar and beneficial fungi obtained from the lab of fellow CEE Professor Mari Winkler. By watering these plants with a solution that mimics contaminated stormwater, the study evaluates the biochar's ability to filter out pollutants as well as its impact on the health of the plants and, by extension, the surrounding ecosystem.

The exploration of the symbiotic relationship between biochar and fungi introduces the concept of mycoremediation into environmental remediation. Mycoremediation is a green technique that utilizes fungi to break down or remove pollutants from the environment. The technique leverages the natural ability of fungi to secrete enzymes that can degrade complex and harmful substances into less toxic forms.

In Ray and Quintanilla's experiment, they are adding the fungus Trichoderma harzianum to enhance the biochar's effectiveness in absorbing pollutants while also exploring the biochar/fungus system's ability to break down these pollutants more effectively.

"This specific fungus was chosen for its ability to potentially use the biochar as a food source, thereby increasing contaminant absorption and promoting contaminant degradation," Quintanilla explains.

Moreover, there's an underlying hope that the fungus will support plant growth, adding another layer of environmental benefit to the biochar application.

"We're not just assessing biochar's capacity for removing contaminants, but we are deeply interested in how it influences the broader environmental health into which it is introduced," Quintanilla explains.

The choice of contaminants — reflecting common exposure in urban environments — highlights the study's relevance to current environmental challenges. Through this research, the team seeks to provide insights into how biochar could be a key component in sustainable urban stormwater management, offering a dual benefit of water purification and environmental enhancement.

By exploring the potential of biochar, they aim to address the technical aspects of water filtration and contribute to the broader conversation about sustainable urban development and environmental protection.

"Our goal is to create a filtration media that can be easily integrated into existing water management systems," says Ray.

Toward clearer waters

Ray and Quintanilla's research has implications far beyond the lab. By showing biochar's efficacy in reducing stormwater pollutants, their work could serve as a blueprint for integrating this material into urban water management strategies.

"What we're doing here has the potential to change the way cities manage stormwater," Ray says. "Our goal is to make water treatment more accessible and effective, especially in areas that might lack the resources for more conventional treatment systems."

Ray and Quintanilla hope that studying the relationship between biochar, fungi and plant systems will eventually lead to a method of stormwater treatment where water purification processes are seamlessly integrated into the urban landscape, enhancing ecosystem health and resilience along the way.

Top left: Quintanilla waters the plants with contaminant-laden water. Right: Quintanilla runs the effluent water from the plants through a filter that removes large particles so they can then determine the effectiveness of biochar and fungi in removing contaminants.

Using AI in earthquake predictions

Associate Professor Brett Maurer and Ph.D. student Morgan Sanger's recent research on the utilization of artificial intelligence (AI) in predicting soil liquefaction earned them the prestigious 2023 Outstanding Paper Award from Earthquake Spectra, the journal of the Earthquake Engineering Research Institute (EERI).

Their paper, "Why AI models for predicting soil liquefaction have been ignored, plus some that shouldn't be," examines the slow adoption of AI models in soil liquefaction prediction, despite the growing body of literature and potential for improving hazard and risk assessments. Maurer and Sanger reviewed 75 publications, uncovering key barriers to AI model adoption, including inadequate comparisons with traditional models, deviations from best practices, impractical applications, and the complexity and inaccessibility of AI methodologies.

Their work lays out a constructive roadmap towards successfully leveraging AI in earthquake engineering. They identify models that exemplify best practices and offer commentary on how future models might be created and distributed effectively. Their findings suggest that with thoughtful application and adherence to rigorous standards, AI can play a pivotal role in advancing the field.

Associate Professor Brett Maurer and graduate student Morgan Sanger

Advancing surface water tracking in Bangladesh

By Julia Davis

During a recent training workshop in Bangladesh, Professor Faisal Hossain continued his work as part of NASA's newly launched Surface Water and Ocean Topography (SWOT) mission. The workshop trained local stakeholders and marked a crucial step in implementing this space-based water-tracking technology in Bangladesh.

The SWOT mission uses advanced radar interferometry technology to measure the elevation and coverage of Earth's surface water. The project marks the first time scientists have been able to measure both the precise location and elevation of water, a notable advancement in global water monitoring.

By offering detailed insights into water volumes and their geographical distribution, SWOT enables scientists, policymakers and local authorities to better manage water resources. This technology is particularly vital for Bangladesh, a country frequently affected by monsoons, flooding and drought.

As one of the leads in developing SWOT's application plan over the past decade, Hossain has been instrumental in bridging the gap between cutting-edge technology and practical implementation for users around the world.

Bangladesh, a nation located at the extensive delta of the Ganges River, faces existential threats from climate extremes and rising demands for water, food and energy. In response, the government has already invested in water-tracking sensors around the country.

Local engineers and agricultural officers expect to gain valuable insights into water dynamics from the SWOT mission data. This information is crucial for making informed decisions about crop sowing and harvesting, optimizing irrigation during dry months, and effectively managing flood and drought conditions.

Hossain on a boat in Bangladesh on the Padma River during his December 2023 training workshop as part of NASA's SWOT mission.

> "I think about using behavioral and social sciences as tools to shift culture and the status quo away from some very opaque and inequitable systems that we have in place. The outcome is about getting frontline communities in the room and actually being able to shift some power to them." – BETHANY GORDON

Community-driven DESIGN

By Julia Davis

Engineering is often thought of as a quest to design what is needed — a field dominated by concrete and steel, where equations and physical laws dictate the work. But Assistant Professor Bethany Gordon wants to challenge the notion that engineering is solely about the physical. Her research asks: What if engineers put a larger focus on integrating the complexities of human behavior, equity and community needs into design?

"Often, we think about research as looking at the community and asking, 'What do they need to change?' But that puts a lot of strain on the community. So instead, we're trying to reverse the gaze and ask, 'How can we as engineers change our systems and our outlook to help facilitate changes in the community?'" says Gordon, who joined the CEE faculty in autumn 2022.

Inspired by decades of grassroots efforts and environmental justice scholarship, this approach emphasizes a partnership with communities rather than a top-down imposition of solutions.

"I think about using behavioral and social sciences as tools to shift culture and the status quo away from some very opaque and inequitable systems that we have in place. The outcome is about getting frontline communities in the room and actually being able to shift some power to them," Gordon says.

She introduced the concept of "frontline designers" with the aim of having community members be co-creators in the process. To bring this concept to life, Gordon is exploring models of community engagement that amplify the power of local voices. In the future, she envisions creating pathways for community members to become an integral part of the engineering design process, compensating them for their insights and contributions through fellowship programs.

Gordon hopes that more engineers will integrate the principle of reflexivity, which she defines as "understanding what your experiences and your identity have to do with the ways in which you take in knowledge, make meaning of it, and then make decisions and interact with communities based on that knowledge."

In her role within the Construction, Energy, and Sustainable Infrastructure (CESI) research group, Gordon is involved in projects that utilize her multifaceted approach to research. Her graduate students explore a range of issues, from stormwater infrastructure to the implications of modern slavery in construction.

Although she is in the early stages of her research within CEE, Gordon's perspective has been a valuable addition as the department works toward its strategic plan, including the Grand Challenge of engineering for socioeconomic and environmental justice. Her work underscores the idea that the soundness of our structures lies not just in physical strength but in the community voice and inclusivity that they embody.

From uniforms to Huskies:

Military leaders forge new paths pursuing graduate degrees in CEE

By Julia Davis

Every year, more than 100 students begin their graduate studies in the CEE department. For a select few, starting this academic journey marks the first time in years that they've experienced civilian life as they pursue graduate degrees that will advance their military careers.

Sam Lee (MSCE '19), a Commander in the U.S. Navy Civil Engineering Corps, even chose to have his promotion ceremony at Husky Stadium after his experience attending UW for his master's degree.

In the military, civil engineers play essential roles in constructing, maintaining and managing the infrastructure that supports military operations. Their responsibilities range from facilities management on military bases to active construction projects where they are building infrastructure in challenging environments, often from the ground up.

The military sends some engineers to civilian schools because of the specialization that is required at higher levels of the profession.

"The graduate education opportunities that the Navy offers don't really focus on the technical skills and sub-specialties that we require in the civil engineering trade," says Trey Sweet, a Lieutenant in the U.S. Navy Civil Engineering Corps who began his master's degree last fall.

Ashlyn Aldridge, a First Lieutenant in the U.S. Air Force and current CEE graduate student, emphasizes the importance of the military staying current with civilian engineering practices as one of the driving factors for pursuing an advanced degree.

"The main reason the Air Force sends us to civilian schools is to gain expertise in a specific field to apply to the military once we return," she says. "Our civil engineers take a broad approach to problem solving, which leads us to rely on subject matter experts, so by receiving a graduate education, we become much more valuable to the force."

The flexibility of the CEE master's degrees is a big draw for military officers because students can shape their degrees and choose classes that they know they will use. In the military, this is particularly helpful for officers who will be doing projects in many different realms of civil engineering.

"My goal is to take the technical expertise that I've gained in my master's degree and apply that to heavy construction in the military," says Aldridge, who is doing her thesis on carbon emissions from airfield paving projects.

Lee has continued to advance in his naval career since finishing his degree with the department four years ago.

"I use what I learned at the UW every day in the jobs that I've been doing. Some of it is technical skills, some of it is the ability to better analyze and work through complex problems, and some is the communications skills that I need to work with people from all different sectors," he says.

Sam Lee (MSCE '19) was promoted to the rank of Commander at a ceremony held in the end zone at Alaska Airlines Field at Husky Stadium in September of 2023.

Beyond the blueprint

In the early spring mists of March in Seattle, a group of students equipped with hard hats and high-visibility safety vests gathered at the Federal Way Link Extension project site.

Led by the contractor Kiewit, the field trip offered an up-close view of a section of one of the most ambitious infrastructure projects in the Seattle area. The focus of the visit was to learn about the Federal Way Link Extension project, a $1.4 billion initiative to extend light rail from Angle Lake to Federal Way in King County, Washington. The project encompasses a range of critical infrastructure elements, including three new stations, eight bridges and a tunnel. The work is expected to be completed in 2026. During the tour, the students learned about a balanced cantilever bridge that is being built across Star Lake, an example of the engineering challenges and solutions inherent in such an extensive project.

"There's nothing better than a construction site tour where you get to walk out on a cool bridge that's under construction," says Professor Steve Muench, who organized the site visit. "When we go on these trips, I want the students to be able to get as close to the most interesting work as possible while remaining safe."

Most of the students on the field trip were enrolled in CEE 307, a construction engineering course taught by Muench. Before the field trip, alumnus Ryan Anderson (BSCE '08), who now works at Kiewit, spoke to the class about his experience working on the project. The excursion was possible because of collaborations with industry leaders like Kiewit and support from organizations such as The Beavers.

The feedback from students was overwhelmingly positive. Many appreciated the chance to talk to engineers involved in various parts of the project and see different engineering disciplines working together on one project.

"These kinds of trips are great because they help students form that complete picture of all the jibber jabber that we talk about in class," Muench says. "Getting to see the concepts in action just brings everything together and gives you a more holistic view of what it is you're actually studying."

RAPID center receives NIH grant to enhance disaster response and public health research

The Natural Hazard and Disaster Reconnaissance Facility (RAPID) has been awarded a substantial grant by the National Institutes of Health (NIH). The grant, amounting to $1.5 million annually, marks a new chapter in the center's efforts to integrate engineering and public health research in the aftermath of natural disasters.

CEE Professor Joseph Wartman, Director of RAPID, expressed excitement about the grant, highlighting its potential to change our understanding of the impacts of natural disasters on public health.

The new NIH grant effectively doubles RAPID's budget, allowing for the acquisition of more sophisticated equipment and the addition of two new staff positions. It also paves the way for new kinds of research into the long-term health outcomes for communities affected by disasters. Such initiatives have been challenging in the past due to a lack of integration between engineering data and public health impacts.

One critical area of focus will be the aftermath of wildfires, a frequent and devastating hazard with far-reaching effects on environmental and public health. The RAPID team, in collaboration with public health researchers, plans to study groundwater contamination, smoke inhalation effects and other health-related consequences of such disasters.

Wartman says that covering countless natural disasters with the center made him reflect on some of their less obvious effects.

"As I've observed the aftermath of disasters, the profound impact on communities through health lenses became undeniable," he says. "It highlighted a vital aspect we were missing in our research scope. This grant is a significant step towards bridging that gap."

A researcher uses RAPID monitoring technology to collect data in the aftermath of Washington's Bolt Creek wildfire in 2022. Photo courtesy of RAPID center

Lidar helps map a path to safe ground after Oso landslide

To commemorate the 10th anniversary of the tragic Oso, Washington, landslide, the Natural Hazard and Disaster Reconnaissance Facility (RAPID) revisited and surveyed the site using lidar mapping technology. Lidar, which stands for Light Detection and Ranging, uses millions of tiny light pulses to map the ground in extraordinary detail. These pulses reflect off the surface, allowing researchers to create a three-dimensional map of the terrain. This technology is especially valuable in areas like Oso, where vegetation can obscure ground details necessary for understanding landslide risks.

The project, supported by the Cascadia Coastlines and Peoples Hazards Research Hub, is focused on enhancing algorithms used for analyzing historical landslide data. The urgency of this research is magnified by the growing risks associated with landslides, driven by climate change and the unique tectonic activities of the Pacific Northwest region.

The initiative is a direct response to calls from coastal communities for a unified research agenda that can address their vulnerability to natural disasters, including landslides, earthquakes and tsunamis. By revisiting the Oso site, the team hopes to gather data that can lead to future mitigation strategies and more resilient communities.

Two RAPID researchers look over the scarred hillside where the 2014 Oso landslide occurred. Photo courtesy of RAPID center

Photo courtesy of Urban Freight Lab.

Urban Freight Lab expands impact beyond Seattle

By Katie Ward

Since launching in 2016, the Urban Freight Lab has been at the forefront of testing innovative solutions within Seattle's urban environment. With the support of the City of Seattle Department of Transportation (SDOT) and private sector members across various industries, the Urban Freight Lab (UFL) has led groundbreaking initiatives aimed at addressing curb management, congestion and improving safety and equity on city streets. From installing underground sensor technology in parking locations to spearheading the Seattle Neighborhood Delivery Hub, Seattle has served as the UFL's testing ground. Now, UFL is breaking new ground and extending its impact beyond Seattle.

A strategic partnership between SDOT, the Open Mobility Foundation (OMF), and the UFL has been awarded a $2 million grant from the U.S. Department of Transportation's SMART (Strengthening Mobility and Revolutionizing Transportation) program. This funding will launch the Last-Mile Freight Curb Access Program, an initiative designed to digitize the critical last mile of urban goods delivery. Leveraging sensor-based technology solutions, the program aims to expedite commercial deliveries, improve safety and reduce vehicle emissions, fostering more efficient and sustainable urban logistics operations.

Building on this momentum, UFL is now joining OMF and the eight SMART grant recipient cities to establish the Smart Curb Collaborative. The collaborative brings together the cities of Seattle, Los Angeles, Miami-Dade County, Minneapolis, Philadelphia, Portland, San Francisco and San Jose.

As the collaborative's research partner, the UFL will lead a comprehensive comparative analysis, leveraging its expertise in urban freight research to compare infrastructure, policy frameworks and demand across the member cities. This analysis will provide actionable insights aimed at advancing curb management practices on a global scale.

"UFL is thrilled to expand our reach beyond Seattle and collaborate with other U.S. cities to address these pressing urban logistics challenges," says UFL Director Kelly Rula. "The Smart Curb Collaborative represents a significant milestone in moving toward smarter, more efficient urban logistics, and we are looking forward to contributing our expertise."

PacTrans Wins 2024 CUTC Technology Transfer Leadership Award

In January, the Pacific Northwest Transportation Consortium (PacTrans) was honored with the 2024 Technology Transfer Leadership Award by the Council of University Transportation Centers (CUTC) during the CUTC Winter Awards Banquet in Washington, D.C. The award celebrates PacTrans' exceptional contributions to technology transfer within the transportation sector. This award acknowledges PacTrans' dedication to creating a state-of-the-art transportation system through collaborative research and education.

CUTC consists of university transportation research centers from around the country and exists to promote university-led advancements in transportation, emphasizing research, education and technology transfer as cornerstones of the nation's infrastructure.

PacTrans Director Yinhai Wang (center) receiving the 2024 CUTC Technology Transfer Leadership Award. Photo courtesy of PacTrans

MO MALAKOUTIAN:

Expanding the circle of his impact

By Julia Davis

In the world of civil and environmental engineering, the leap to politics isn't a common one. But for Mo Malakoutian, CEE affiliate assistant professor and city council member of Bellevue, Washington, this unconventional path demonstrates how engineering principles can shape a successful political career.

In addition to serving on the city council, Malakoutian was recently elected to be the city's Deputy Mayor by his fellow council members. After obtaining his Ph.D. from CEE in 2012, Malakoutian has continued teaching in the department for over a decade, covering courses from structural dynamics to accounting and finance for construction.

What motivated you to transition from engineering and academia into public service and politics?

I always wanted to give back — to increase the circle of my impact in my community. When it comes to making the world a better place, I feel like it starts with making a difference in your own life, then moves on to helping out family and friends, and eventually leads to having an impact on the community around you.

My journey into local government started when I learned of a major remodeling project that my condo association was planning. Despite the HOA board's dedication, they lacked construction knowledge, prompting me to join and offer my expertise. That experience showed me the impact of having technical knowledge in community decision-making. From there I participated in the Bellevue Essentials program, an 11-week introduction to civic leadership. Subsequently, I served on the Bellevue Planning Commission, where I furthered my involvement in local government for six years before running for city council.

Why do you think politics would benefit from more engineers?

Engineers want to solve problems; we're pragmatic. We have a code of conduct, so we know about integrity and ethics, and I think everyone [in politics] should have that. We also have the skills to solve problems systematically and methodically: we know data, we are project managers, we know how budgets work and how to manage stakeholders — everything we do as engineers is related to politics or regulation.

How do you think an engineering education benefits those who pursue careers outside of traditional engineering fields?

Having a solid foundation in engineering really does allow you to do whatever you want. If you get your bachelor's in civil engineering first, the doors to you are open. You can work for the government, work in corporate America, go into politics, go into academics, and I am an example of that. But engineering education is the foundation that shapes you and makes you a critical thinker, collaborator and problem solver.

Read the full interview: ce.uw.edu/circle-of-impact

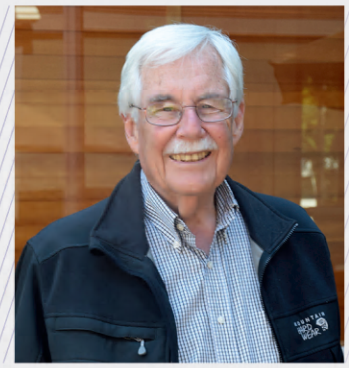
Liao family honored with 2024 Diamond Award

In March, the College of Engineering announced that CEE alumnus Paul Bao-Ho Liao (Ph.D. '72), and his wife, Mei-Yea Chiou Liao, had been honored with a Diamond Award for their family's commitment to the engineering community and educational impact across generations.

When Paul and Mei-Yea arrived in the U.S. from Taiwan in 1967, they dedicated themselves to community support, notably through the Taiwanese church in Seattle. Their philanthropy has focused on creating educational opportunities for others, including the establishment of a Regental Fellowship in CEE that fosters academic exchanges with National Cheng Kung University in Taiwan.

Their legacy continues through Mei-Yea's ongoing community support and the creation of educational opportunities that have made a lasting impact. This award recognizes the enduring influence of the Liao family on both the engineering field and the broader community.

Mei-Yea Liao (left) and daughters Darlene (center) and Dahlia (right) at the 2024 Diamond Awards.



Neil Hawkins awarded ACI Foundation's Building the Future Award

Neil Hawkins, former CEE chair and professor, has been honored with the Building the Future Award by the ACI Foundation's Concrete Innovation Council. This recognition is awarded annually to an outstanding volunteer who has demonstrated exceptional dedication and impact on the foundation or its mission work.

After his 23-year tenure as a faculty member in CEE, Hawkins and his wife Ann have remained closely connected to the Seattle area and the department. Their contributions include the endowment of the Hawkins Prize, which honors graduating seniors for their achievements in scholarship, leadership and communication.

The Building the Future Award was established in 2019 by the ACI Foundation to recognize individuals who have been pivotal in advocating for and supporting the foundation's initiatives. Hawkins was chosen for the award because of his significant role in enhancing the ACI's student scholarship program through proactive involvement and stewardship, exemplifying the qualities of an individual dedicated to building the future of the ACI Foundation.

Remembering Nancy Evans: A legacy of civic engagement and support

Nancy Evans, spouse of alumnus Dan Evans (BSCE '48, MSCE '49), passed away in January 2024 at age 90. Nancy was a vibrant presence within the CEE community, particularly known for her enthusiasm for the department's Daniel L. and Irma Evans Lecture series. Established through the generosity of the Evans family, this series embodies their belief in the vital intersection between civil engineering and the public good. Her commitment to civic engagement and her role in motivating others toward public service endeavors have and will continue to influence the UW community for years to come.

THE BRIDGE

SPRING / 2024

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ENJOY THE VIDEOS:
BURGES AND EVANS LECTURES

Steve and Sylvia Burges Endowed Lecture
November 2023

CEE Professor Julian Marshall presented a talk titled "Anti-racist Air Quality Modeling," which discussed how people of color face higher air pollution exposure than white Americans. He underscored the critical need for advanced research and innovative modeling to address and dismantle these systemic inequalities. The lecture also emphasized the power of data and scientific inquiry as tools for social justice and advocated for targeted solutions that can lead to healthier communities and a more equitable society.

Daniel L. and Irma Evans Endowed Lecture
May 2024

Brown University Professor Laurence C. Smith presented a talk titled "Rivers of Power: How an Ancient Force Rules Us Still." The lecture explored the multifaceted roles rivers have played in shaping human civilization throughout history. Smith's discussion highlighted five fundamental benefits that rivers provide — access, natural capital, territory, well-being and a means of projecting power — and how these benefits have remained critical across centuries despite the evolving ways that societies interact with waterways.

Enjoy the Burges and Evans lecture videos at **ce.uw.edu/news/video**