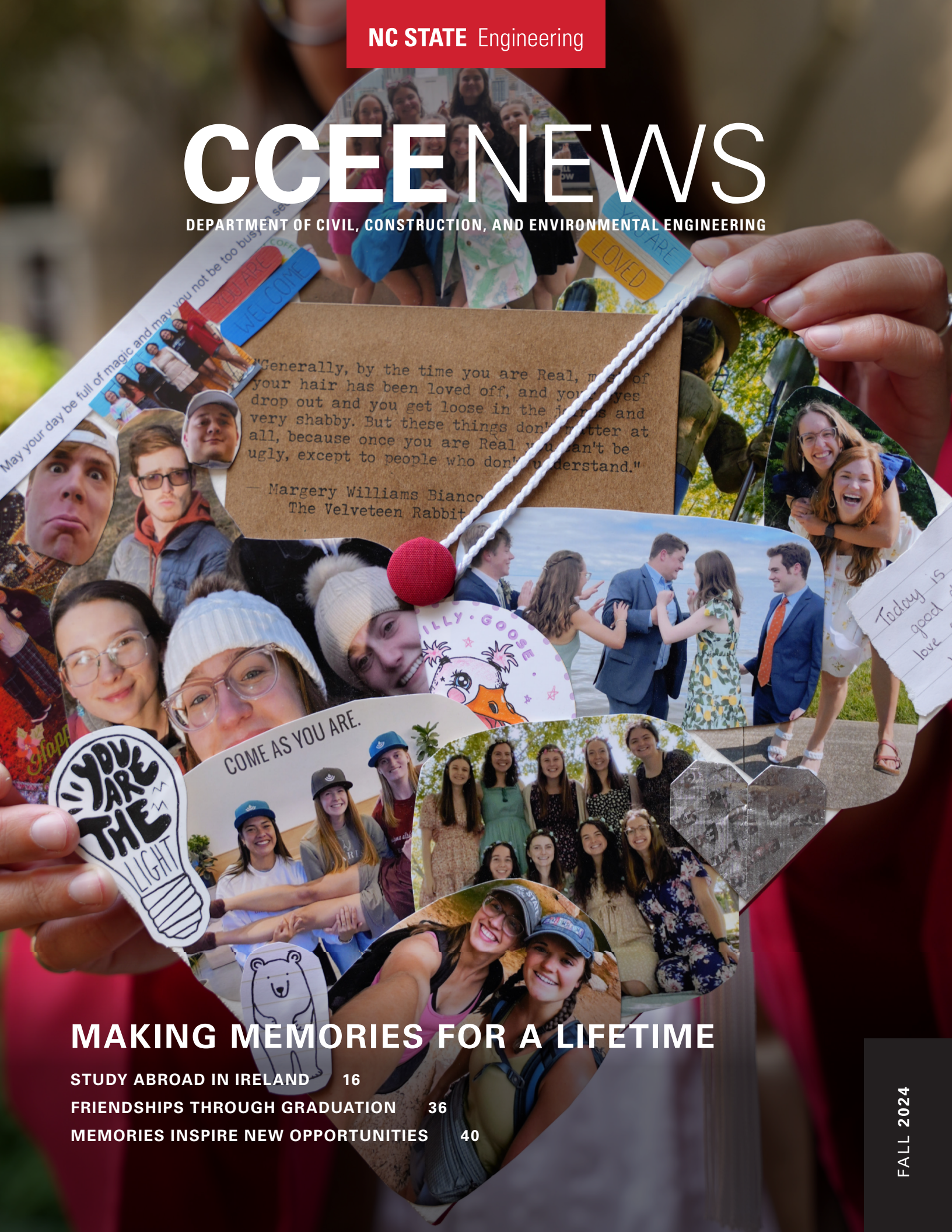


# CCEENNEWS

DEPARTMENT OF CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING



"Generally, by the time you are Real, most of your hair has been loved off, and your eyes drop out and you get loose in the joints and very shabby. But these things don't matter at all, because once you are Real you can't be ugly, except to people who don't understand."  
— Margery Williams Bianco  
The Velveteen Rabbit

## MAKING MEMORIES FOR A LIFETIME

- STUDY ABROAD IN IRELAND 16
- FRIENDSHIPS THROUGH GRADUATION 36
- MEMORIES INSPIRE NEW OPPORTUNITIES 40

# IN THIS ISSUE



02

## DEPARTMENT NEWS

RESEARCH UPDATES 02

NEW RESEARCH PROJECTS 05

AWARDS AND HONORS 22



10

## STUDENT NEWS

PICTURE THIS 10

STUDENT SPOTLIGHTS 26

STUDENT GROUPS 30



33

## COMMUNITY NEWS

FACES OF CCEE 33

ALUMNI BRIEFS 41

CORPORATE DONORS 43

### ABOUT THE COVER

A spring 2024 graduate covered their graduation cap with photos and mementos from their time in the CCEE department.

### EDITOR

Taylor Wanbaugh

### CCEE PUBLICITY COMMITTEE

Michael Auchter (Development Editor), Danjue Chen (Research News Editor), Casey Dietrich (Chair), Jeremiah Johnson (New Projects Editor), Kumar Mahinthakumar (Web Editor), Rudolf Seracino (Research News Editor)

### OTHER CONTRIBUTORS TO THIS ISSUE

Emily Berglund, Cassie Castorena, Daniel Findley, Mo Gabr, Kevin Han, Steve Welton

### PRODUCTION STAFF

Danielle Herman, Jie Sun, Candice Kimble Wallace

CCEE News is published by the Department of Civil, Construction, and Environmental Engineering to share information among faculty members, staff, students, alumni and friends of the department.



## LETTER FROM THE DEPARTMENT HEAD

"Do what you love, and you'll never work a day in your life." This phrase resonates with me every day as I walk into Fitts-Woolard Hall. Being the department head brings many privileges, but the most rewarding is hearing from students and alumni about how their time with the Department of Civil, Construction, and Environmental Engineering (CCEE) has opened doors and created lifelong memories. Their stories highlight the profound impact our department has in shaping lives and careers. This issue of the newsletter features several inspiring examples:

- **Study Abroad in Ireland** (page 16): This summer, 13 CCEE undergraduate students spent five weeks at University College Cork, Ireland, completing two CCEE courses and learning about Irish engineering and culture. For some, it was their first experience traveling outside the United States.
- **Lifelong Friendships** (page 36): Alumnae Tana Harris and Zoe Smith, class of 2024, met as high school students at NC State's engineering summer camp and later became college roommates. Through navigating COVID-19 challenges, holding joint study sessions and engaging together in student organizations, they built a friendship that promises to last a lifetime.
- **Lifelong Career Impact** (page 40): Alumnus Dan Pleasant credits his CCEE education for his rise to president of Dewberry, one of the nation's leading engineering design firms.
- **Winning Awards** (page 41): Alumna Morgan DiCarlo is just one of several CCEE alumni achieving significant recognition, being featured as one of the American Society of Civil Engineers' 2024 New Faces of Civil Engineering.

These transformative experiences are made possible by the dedication of CCEE's outstanding faculty. I am pleased to introduce our newest faculty members, **Meredith Martinez** and **Nadine Kotlarz**. Dr. Martinez, profiled on page 46, joined us as assistant teaching professor and coordinator of undergraduate advising this summer. She returns to her alma mater, having earned her BSCE from CCEE before completing her Ph.D. at Virginia Tech. Dr. Kotlarz, profiled on page 47, joined CCEE in March as an assistant professor, bringing experience from her Ph.D. in civil and environmental engineering from the University of Michigan and a post-doc at NC State's Center for Human Health and the Environment.

Our current faculty also continue to earn national and international accolades. Highlights in this issue (pages 22-25) include **Mo Gabr** being named a lifetime member of the American Society of Civil Engineers, **Detlef Knappe** receiving the 2024 Frederick George Pohland Medal from the Association of Environmental Engineering and Science Professors and the American Academy of Environmental Engineers and Scientists, and **Fernando Garcia Menendez** being appointed as a Fulbright Canada Distinguished Chair in Environmental Science. Additionally, **Greg Lucier** was named Educator of the Year by the Precast/Prestressed Concrete Institute.

Support for the life-changing opportunities CCEE provides to students is possible thanks to the generous financial support from our alumni and other donors. Philanthropy plays a vital role in hiring and retaining exceptional faculty, because state funding alone is insufficient in today's competitive global knowledge economy. For example, philanthropic support enabled us to hire Martinez, one of our most outstanding young alumni, as our newest faculty member. It also allows us to recognize and retain our top senior faculty, such as **Detlef Knappe**, S. James Ellen Distinguished Professor, and **Mo Gabr**, Alumni Association Distinguished Professor, both recently honored with national engineering awards. If you are interested in exploring opportunities for philanthropic support, please contact me ([jmacdon@ncsu.edu](mailto:jmacdon@ncsu.edu)) or **Michael Auchter**, director of philanthropy ([mrauchte@ncsu.edu](mailto:mrauchte@ncsu.edu)).

I must also share the sad news of the passing of former CCEE Department Head **Downey Brill**. Dr. Brill's 17-year leadership, from 1988 to 2005, was instrumental in expanding student enrollment and enhancing faculty support (see pages 48-49). Even after stepping down as department head, he continued to serve as a faculty member until his retirement in 2019. He left an indelible mark by mentoring many of our current faculty. I am personally grateful for his behind-the-scenes guidance and wisdom from his time as department head. His absence is deeply felt, reminding us daily to embrace each opportunity life offers.

As always, if you plan to visit Raleigh, please let us know. Welcoming alumni, supporters, prospective students and friends to Fitts-Woolard Hall is one of the greatest privileges of my role.



**Jackie MacDonald Gibson**

CCEE Department Head



Ph.D. student Brent Vizanko

## How did the changes in population behaviors due to COVID-19 affect water resources and infrastructure?

During the pandemic, water utilities had to pivot quickly to implement staggered shifts to allow social distancing, improve information and communication technology and smart systems to support working from home, and boost chlorine doses to mitigate stagnated water in pipe systems. CCEE researchers developed a model to plan responses and improve water quality for unexpected shifts in water demands that are associated with pandemics, other hazards and changes in infrastructure and technology.

Professor **Emily Berglund** and collaborators from Technion – Israel Institute of Technology obtained funding from the U.S.-Israel Binational Science Foundation to develop new tools for utility managers to respond to pandemics and other hazards. This research grew out of interactions with professors, students and practitioners who research water resources, including a forum that reported the ways that water systems were affected by the pandemic, from cleaner surface water systems to increased residential demands. The researchers used a public dataset reporting the results of a survey conducted in April 2020 across 11 countries that tested risk perceptions and social distancing behaviors during the pandemic.

Ph.D. student **Brent Vizanko** analyzed the dataset to train statistical models that predict protective behaviors such as eating out less, working from home, washing hands more often and wearing a face mask. This research found that trust in information sources (such as scientists and government) and having friends and family sick with COVID-19 were important predictors for protective behaviors.

“We were able to realistically model behaviors by using survey data collected during the first couple of weeks of the pandemic,” Vizanko said. “This helped us understand how people were making decisions to social distance, and we were able to use this data to build a predictive model.”

The team developed models to predict how residential water demands changed due to people working from home, using hourly water demand data from a collaborating city in California. Analysis conducted by Ph.D. students **Faisal Alghamdi** and **Jorge Pesantez** demonstrated that households changed the way they used water as people bathed, cooked and used washing machines and dishwashers during what would be typical working hours. Finally, models that capture social distancing behaviors, changes in demands and disease transmission were applied in an integrated modeling framework to simulate how demands changed as coronavirus infections spread in a community.

“Integrating a set of very different models into a comprehensive framework was challenging and rewarding,” Vizanko said. “Each model represents one facet of reality, and when we combined the models, we could see the whole picture from disease transmission to water flows in a network.”

The modeling framework can be used by utilities for future planning and response. A paper based on this research, “Social Distancing, water demand changes, and quality of drinking water during the COVID-19 pandemic,” was published in *Sustainable Cities and Society*. ■

## Can we support marine renewable energy devices in the deep ocean with micropiles?

Wind turbines and wave machines are used increasingly for offshore renewable energy. In shallow waters, they can be held in place by massive steel structures called monopiles, but in deeper waters, there is a need for remote and efficient anchoring solutions. CCEE researchers are exploring the performance of micropiles as an anchoring solution for marine renewable energy (MRE) devices.

“Micropiles present a compelling alternative with advantages tailored for offshore installation,” said Professor **Mo Gabr**, who leads the project with Professor **Roy Bordan** and Ph.D. students **Neda Jamaledin** and **Kelly Flanagan**. “Micropiles meet the needs for smaller, lighter equipment for installation, the elimination of hammer driving, reduced environment impact, built-in redundancy in case of individual failures and versatility in anchoring.”

Micropiles are installed in large clusters to use their collective resilience. In a project supported by the Department of Energy, ARPA-E program, CCEE researchers are exploring how micropiles will perform under the demanding loads imposed by MRE devices. The researchers are partnering with Makai Ocean Engineering, the developer of autonomously installed micropile groups in water depths of 50 to 1000 meters.

Flanagan focuses on developing seawater-friendly grout for micropile construction and characterizing the intricate interfaces between this grout and the surrounding geomaterial media under various loading conditions. Deep

water micropile installation introduces a variety of engineering challenges, including the infeasibility of preliminary exploratory holes and greatly reduced scope of verification capacity testing.

“The results from the laboratory-scale testing will lead to the estimation of grout-rock shear resistance, and therefore the needed micropile length per given loading, through monitoring drilling parameters while drilling,” Flanagan said.

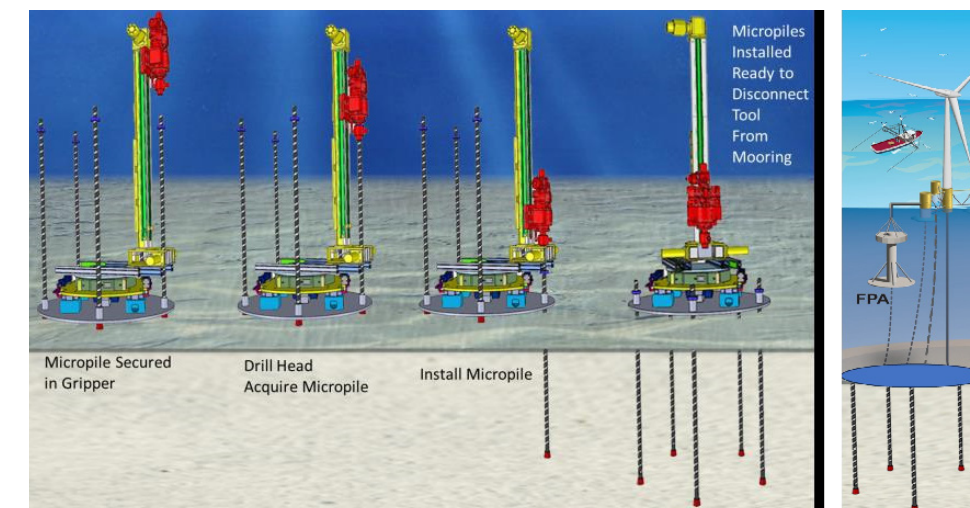
The research team is also performing mechanical tests on grout prepared at variable water contents, using seawater versus freshwater for mixing the cement, and cured at variable temperatures to explore potential cost saving opportunities throughout the various stages of offshore construction and installation.

Concurrently, Jamaledin focuses on estimating the load demand from the floating MRE devices through hydrodynamic modeling and optimizing micropiles for maximum load capacity with minimal installation locations — and material usage — analyzing how factors influence the strength and stability of micropile groups.

“From our findings, we have developed closed-form solutions and models to predict the capacities of these systems,” Jamaledin said. “We believe these models can be effectively integrated into offshore anchoring and mooring standards, serving as practical design tools for subsea installation of micropile groups.”

These research findings were documented in a journal manuscript, “Numerical study on micropile group behavior supporting fixed bottom marine hydrokinetic devices in sandy seabed,” published earlier this year in *Ocean Engineering*. A second manuscript, “Multiline anchoring of floating offshore wind turbines utilizing micropile group in rocky seabed,” is under review for publication. ■

Steps of installation of micropiles on ocean bed using Makai’s autonomous rig.



## How much asphalt binder in reclaimed asphalt pavement is effective when recycled?

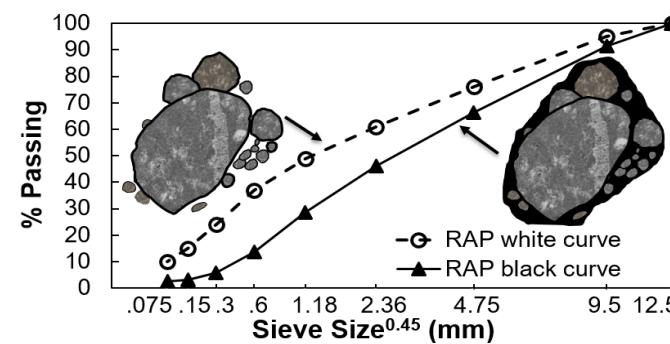
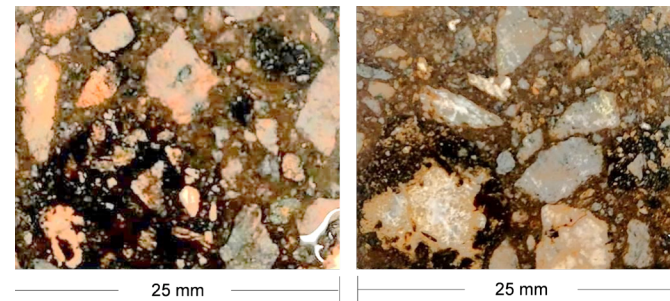
Asphalt pavements are among the most recycled materials in the United States. Reclaimed asphalt pavement (RAP) consists of pavement that has been removed and reprocessed, containing asphalt binder and aggregates. RAP is mixed with new asphalt and aggregate to produce new asphalt mixtures. However, it can be difficult to know how much of the recycled binder in the RAP can blend with the new asphalt binder in the mixture, termed the recycled binder availability. Higher availability means more recycled binder contributes to the mixture's performance, reducing the need for new binder. Uncertainty in recycled binder availability thus leads to uncertainty in the design and performance of high RAP content asphalt mixtures. CCEE researchers are developing ways to quantify recycled binder availability.

"Agencies impose maximum limits on the RAP content of asphalt mixtures, but they are under pressure to increase the limits due to the potential economic and environmental benefits," said Professor **Cassie Castorena**, who led the study with Ph.D. students **Rafaella Fonseca da Costa**, **Douglas Mocelin** and **Mayzan Isied** and M.S. student **Maria Carolina Aparicio Alvis**. "We need a way to quantify the RAP binder availability to better understand how to design high RAP content mixtures without negatively impacting performance."

The research team started by adding a titanium tracer to the new asphalt binder, which turned it brown.

"While the virgin asphalt binder was brown, the recycled binder, lacking the tracer, remained black," said Fonseca da Costa. "This color contrast revealed agglomerations of RAP particles that did not break apart during production, even without a microscope."

The research team developed a practical method to quantify the recycled binder availability of RAP using sieve analysis. The method quantifies the extent of agglomeration in RAP stockpiles, and in turn, recycled binder availability, by comparing the particle size distribution of the RAP (termed the 'black curve') to the recovered RAP aggregate (termed the 'white curve'). The method can be implemented by adding a washed sieve analysis of RAP to current agency and contractor practices, which requires minimal training and no new equipment.



Top: Microscopy samples showing RAP agglomerations (black) preventing recycled binder from blending with new asphalt binder (brown); Bottom: Comparison of the black and white gradations of the rap stockpile.

The researchers evaluated the recycled binder availability of 15 RAP stockpiles from four states. Measurements of recycled binder concentrations in the virgin binder matrix of asphalt mixtures were used to validate the sieve analysis approach.

"The measured values ranged from 44-85%, indicating that the conventional assumption that all recycled binder is available that serves as the basis for the majority of state highway agency mixture design procedures today is erroneous," Castorena said. "Consequently, asphalt mixtures designed under current practices may lack sufficient virgin asphalt and be prone to cracking."

The researchers demonstrated that adjusting asphalt mixture design procedures to consider partial binder availability improves asphalt mixture cracking performance without impairing the resistance to permanent deformation. This research was supported by the National Cooperative Highway Research Program for Innovative Ideas Deserving Exploratory Analysis (NCHRP IDEA). ■

## FEDERAL GRANTS

**George List**, professor, working with **Tongchuan Wei**, assistant research professor, will lead a study supported by the Argonne National Laboratory and the U.S. Department of Energy to examine shifting truck traffic to rail at the national level to reduce energy consumption and carbon emissions. The purpose of this project is to assess the potential impacts of such a shift. Four tasks are involved: 1) reviewing past evidence using national data of the willingness of shippers and receivers to shift to rail, 2) doing a sensitivity assessment of the impacts of shifting significant portions of existing national truck traffic to rail, 3) surveying current shippers and receivers to see what qualities rail would need to attract a significant diversion and 4) revisiting the findings from prior studies by NC State and others that aimed to predict the impacts.

**In the second half of 2024, CCEE launched new research projects with funding from federal and state agencies, foundations and industry sponsors. This support will enable CCEE faculty members, their research teams and their collaborators to address problems in infrastructure and the environment in North Carolina and around the world.**

**Eleni Bardaka**, associate professor, will lead a study supported by the National Science Foundation (NSF) to investigate the socioeconomic impacts of urban rail transit projects, particularly focusing on commercial and residential gentrification and displacement. This study will leverage advanced AI technologies to extract and integrate data from diverse sources, including street-view images, online reviews, real estate platforms and historical business and household microdata. This research is in collaboration with Dongkuan Xu, assistant professor in the Department of Computer Science.

**Kevin Han**, associate professor and Edward I. Weisiger Distinguished Scholar, and **Abhinav Gupta**, professor, are developing a comprehensive approach to quantify the uncertainties in virtual inspection and monitoring of nuclear energy facilities. Their research will help the U.S. Nuclear Regulatory Commission

## NEW RESEARCH PROJECTS

(USNRC) understand the fundamental basis of technologies used for virtual inspection and monitoring, characterize their accuracy and consistency, and clearly identify their limitations. This project is supported by the USNRC.

**Brina Montoya**, professor; Celso Castro Bolinaga, associate professor in the Department of Biological and Agricultural Engineering; and **Mo Gabr**, Distinguished Professor, along with their colleague Alejandra Ortiz, assistant professor of environmental studies at Colby College, will lead a study supported by the U.S. Department of Transportation to identify and synthesize existing in situ subsurface characterization methods, including geophysical approaches, for assessing soil and rock resistance to scour and erosion at bridge sites. The study will focus on evaluating the advantages, limitations and applicability of each approach, assessing their suitability for specific geologic formations, and analyzing the potential accuracy utilizing data from these approaches for erosion and scour predictions at bridge sites. The team will develop recommendations to address knowledge gaps and research needs related to erodibility assessment and prediction methods.

**Anderson de Queiroz**, associate professor; **Ghadir Haikal**, associate professor; **George Bonner**, director of the North Carolina Renewable Ocean Energy Program (NCROEP); Michael Dickey, Camille and Henry Dreyfus Distinguished Professor; Gabr; and Wesley Williams, associate professor of mechanical engineering technology at UNC-Charlotte, will lead a study supported by the Department of Energy through the Atlantic Marine

Energy Center. This study focuses on anchoring and mooring marine renewable energy devices, as well as investigating scenarios related to risk-averse offshore energy portfolios and their techno-economic potential. The project also aims to develop innovative and cost-effective anchoring and mooring systems for floating marine renewable energy (MRE) devices, and will include device manufacturing, experimental and analytical studies, and wave, ocean current and tidal energy resource assessment.

**Shane Underwood**, professor, is participating on a project funded by the National Cooperative Highway Research Program and led by Applied Pavement Technology to study the long-term impacts of flooding on pavements. Flooding can weaken pavement foundations, which shorten their life and increases their overall cost and environmental impact. Underwood's research will build on advanced models developed over the past decade by **Richard Kim**, Distinguished Professor, and **Murthy Guddati**, professor, to quantify the effects of flooding in order to develop design and maintenance strategies that improve the resilience of the transportation network.

**Dan Obenour**, associate professor; **Casey Dietrich**, professor; and Natalie Nelson, associate professor in the Department of Biological and Agricultural Engineering, will participate in the North Carolina Center for Coastal Algae, People and Environment, which will bring together researchers from five colleges at NC State and is funded by NSF and the National Institute of Environmental Health Sciences. CCEE researchers will focus on the development of

models to predict the dynamics of cyanotoxins — toxins produced by cyanobacteria harmful algal blooms — in coastal environments. Researchers will evaluate where and when cyanotoxins are likely to accumulate in recreational waters and shellfish. They will also evaluate scenarios of future climate, such as how changes in temperature, river flow and sea level may affect the production and transport of cyanotoxins.

Guddati received a four-year renewal of his ongoing funding from National Institutes of Health (NIH) to develop new computational methods to better quantify the stiffening of human carotid arteries using noninvasive medical ultrasound. He will work with Dr. Matthew Urban and his team at the Mayo Clinic. While the original cycle focused on characterizing elasticity of the arterial wall and its effects on cardiovascular health, the new cycle is aimed at characterizing the viscosity of the arterial wall, given its role in controlling pulsative flow to the brain and its impact on long-term brain function.

**Mervyn Kowalsky**, Distinguished Professor, and **Ashly Cabas**, associate professor, received funding from the National Academies through the National Cooperative Highway Research Program, which is a joint effort with researchers around the country. Their project will examine new analysis methods for predicting bridge deformation during earthquakes. Current methods deployed by engineers have been shown to under-predict deformation, which can lead to bridges that suffer more damage than expected during earthquakes.

## STATE

**Andy Zicarelli**, assistant professor; **Tarek Aziz**, associate professor; and **Moe Pourghaz**, professor, received funding from the North Carolina Department of Transportation (NCDOT) to study corrosion of steel bridge piles. The team will actively monitor water quality and environmental conditions at bridges located throughout North Carolina in order to identify the conditions which lead to accelerated corrosion. The results of the study will lead to improved provisions for corrosion protection in bridge structures.

**Cassie Castorena**, professor, received funding from NCDOT to revise asphalt binder specifications in the state. The formulation, manufacturing and modification of asphalt has evolved considerably since the development of the current specifications, rendering them less effective at capturing the performance of today's asphalts. The project will evaluate alternative measures to better address rutting and cracking.

**Giorgio Proestos**, assistant professor, with **Rudolf Seracino**, Paul and Dora Zia Distinguished Professor, and **Gregory Lucier**, associate research professor, will lead a study funded by the NCDOT to develop new design and assessment methodologies for disturbed regions in concrete structures that utilize internal fiber reinforced polymer (FRP) reinforcement. The research aims to address challenges in the design of substructure components in bridge structures for extreme loading events and service conditions. In addition to numerical modeling, large-scale experiments on FRP reinforced deep beams monitored with full field-of-view digital image correlation equipment will be conducted at the Constructed Facilities Laboratory.

## NEW RESEARCH PROJECTS

Lucier and Gabr will lead a study supported by NCDOT to procure sensors and equip one of the NCDOT drill rigs for collecting subsurface soil data while drilling through soil and rock materials. The scope includes performing a series of tests and verification steps to ensure that the sensors are functioning properly and to monitor drilling parameters (such as torque and vibration) at several test sites within the North Carolina geologic regions to identify trends, patterns and correlations between the monitored drilling parameters and geotechnical properties.

Underwood and Castorena received funding from the NCDOT to evaluate pavement friction and texture characteristics. Poor skid resistance in pavements can lead to increased vehicle collision rates. When this occurs, engineers must decide how to effectively improve the surface characteristics. However, making the best decision requires considering many factors. This project aims to provide new insights into these factors and will develop a tool to help DOT engineers identify effective mitigation strategies.

Pourghaz, Gabr and Lucier received funding from NCDOT to develop software for estimating the service life of pipes based on exposure and loading conditions. The software will assist in selecting pipes and gaskets and provide recommendations on repair and mitigation strategies. Although tailored for North Carolina, this software can be adapted for other states by updating the GIS data, making it a valuable tool for broader infrastructure planning.

**Emily Berglund**, professor, and Aziz

## NEW RESEARCH PROJECTS

are teaming up with Whit Wheeler, director of Raleigh Water, to explore potable water reuse programs for Raleigh. Potable reuse provides purified water that can be applied for all purposes, rather than irrigation and toilet flushing alone, to effectively reduce demands on freshwater resources. This funding provides a unique opportunity to assess water quality standards, requirements for new infrastructure and regulatory frameworks that support potable reuse. The long-term vision of the project is to develop new data and insight for designing a potable reuse pilot program for Raleigh.

de Queiroz, with Chris Vermillion from the University of Michigan, will lead a study supported by the NCROEP. This project aims to develop a centralized techno-economic modeling and combined device and portfolio optimization tool for hybrid marine energy networks. The proposed project will first focus on developing a centralized database of power generation technology designs and components from the NCROEP portfolio, drawing upon published data and face-to-face meetings with other project PIs to build models for capital cost, operational cost, availability and annual energy production. These techno-economic models will be utilized by a centralized portfolio optimization framework, which combines site selection and device design optimization.

de Queiroz and Gabr, with collaborators from Western Carolina University and National Yang Ming Chiao Tung University, will lead a study supported by the NCROEP to create a design adaptation of a wave energy converter to the wave spectrum of the North

Carolina coast. They will develop a 1/3 scale model of the RM3 system, making it suitable for deployment at North Carolina wave sites. The project will focus on maximizing power generation through innovative power take-off and mooring configurations that optimize the resonance between the wave loading and the motion of the wave energy converter.

Underwood received funding from the Arizona Department of Transportation to study the vulnerability of transportation infrastructure in Arizona to climate change. The research team, which includes postdoctoral scholar **Deepika Karanam**, will evaluate the implications of climate change models on the long-term performance of asphalt concrete pavements and also examine how extreme events like wildfires, flooding and extreme low temperatures can impact pavement life. The results of this study will be used by the Arizona DOT to improve long-term planning of its pavement network.

Pourghaz and Kowalsky received funding from the Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) to assess the feasibility of developing electric energy-storing and self-sensing reinforced concrete elements, with an emphasis on bridge structure components. Electric energy storage in concrete infrastructure can have significant economic and environmental benefits, potentially reducing our dependence on fossil fuels and nuclear power and integrating well with solar and wind energy production.

Kowalsky received funding from the Alaska DOT&PF for projects related to earthquake engineering and seismic design of bridge structures. One project

will lead toward the development of new guidelines for the accurate estimation of damage in bridge structures during earthquakes and will include 10 scaled shake table tests of bridge piers at the Constructed Facilities Laboratory on the NC State Centennial Campus. The second project studies the connection between composite steel/concrete foundations typically encountered in earthquake prone regions with soft soils.

Kowalsky received funding from the California DOT for projects related to the use of high strength steel reinforcement in earthquake prone regions. One project studies the use of mechanical couplers for high strength steel, while the other project studies the dynamic behavior of bridges reinforced with high strength steel, including a series of six shake table tests.

## INDUSTRY

**Doug Call**, associate professor, and **Detlef Knappe**, Distinguished Professor, are studying an electrochemical approach to remove metals from high-strength waters and wastewaters. They are focusing on how to operate the technology so that selective removal of certain metals is realized. Removing the metals will improve the operation and lifetime of downstream technologies that further process the waters. This project is supported by BASF. Lucier and **Khaled Al-**

## FOUNDATION AND NON-PROFIT

**Sakaji**, M.S. student, were awarded a Daniel Jenny Fellowship from the Precast / Prestressed Concrete Institute to investigate the structural performance of composite ultra-high performance concrete (UHPC) decked beams subjected to heavy podium loading. The research aims to optimize and implement a 12-foot-wide composite UHPC beam spanning over 70 feet. The use of UHPC enables the large beams to efficiently span long distances without intermediate columns. Two full-scale pilot beams will be manufactured by precast concrete producers and then transported to the Constructed Facilities Laboratory, where they will be loaded to failure in flexure and in shear. The project will develop design recommendations and guidelines for designers and precasters to safely and efficiently implement the system.

Castorena and Underwood will collaborate with the Virginia Transportation Research Council to study the extent to which reclaimed asphalt pavement (RAP) blends with virgin asphalt in recycled mixtures. The project will also evaluate the ability of recycling agent additives to promote recycled binder activity. Additionally, the research will assess how integrating blending considerations into asphalt mixture design affects performance. The outcomes are expected to enable the design of mixtures with RAP contents above those currently allowed that meet performance requirements.

Gupta, with Han and Lucier, will lead a study funded by the Nuclear Safety Inspectorate to study the safety of electrical and digital control equipment

## NEW RESEARCH PROJECTS

in nuclear power plants due to high frequency shaking induced by external hazards such as an airplane impact and earthquake ground motions. Continued functionality and operability of such digital equipment is essential for safety of nuclear plants during and after a major external hazard.

Gupta and Han received support from the Electric Power Research Institute to build a laboratory based prototype as an actual physical demonstration of an AI-enabled digital twin for piping systems in nuclear power plants. The demonstration is intended to accurately diagnose the locations of degradation and predict the degree of degradation in such systems.

## INTERNAL

Dietrich, Haikal and **Jorge San Juan Blanco**, assistant professor, received funding from the NC State Office of Global Engagement for a collaborative seed grant with researchers from Nagoya University. The research team will exchange visits and collaborate on a project related to ship impacts to bridges in coastal regions, including an exploratory model inspired by the *Dali* crash near Baltimore in March 2024. The research team will also develop a proposal for an external grant for follow-on funding. ■

# PICTURE THIS



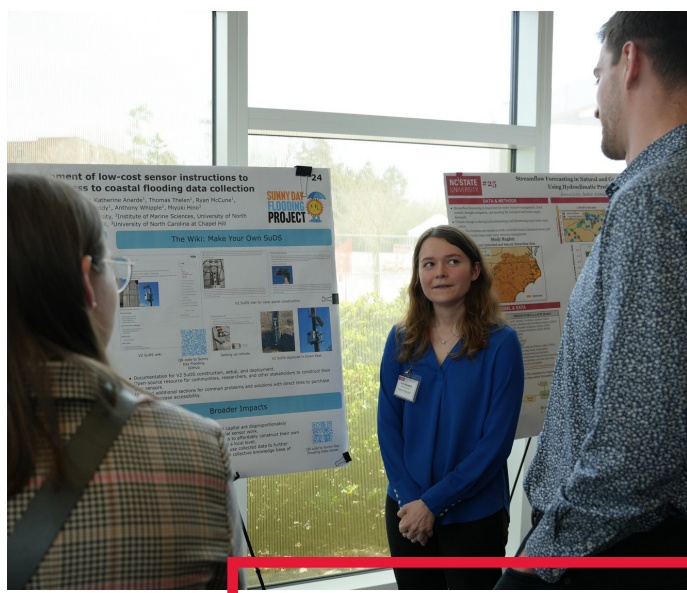
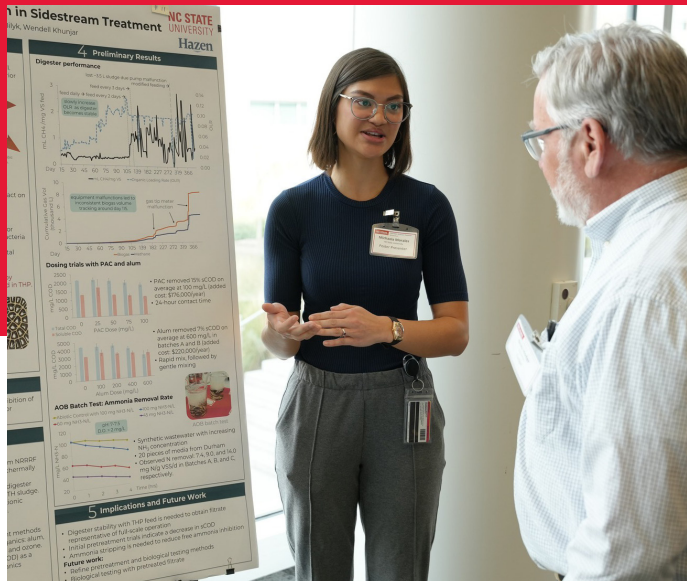
CCEE hosted the Autonomous Vehicle Symposium in the World of Artificial Intelligence: Enhancing Autonomous Vehicle Use and Development in April, gathering students, faculty and industry experts. ■

**Nehemiah Mabry** (pictured left), founder and CEO of STEMedia and 2015 Ph.D. alumnus, took a virtual audience on a tour of the Constructed Facilities Laboratory and showcased CCEE faculty research as part of PBS NOVA's *Building Stuff* show on Twitch. Watch here: [go.ncsu.edu/nova](https://go.ncsu.edu/nova). ■



CCEE faculty members were hard at work at the end of the spring semester brainstorming during a day-long retreat. Faculty discussed best practices for the department, collaborated and shared ideas on how to make our great department even greater. ■

# PICTURE THIS



About 120 students, faculty members and guests gathered in Duke Energy Hall at Hunt Library to discuss pressing issues and innovative research at the 2024 Environmental, Water Resources, and Coastal Engineering (EWC) Graduate Research Symposium on March 8. The annual student-organized symposium highlights the current research conducted by CCEE's EWC group, providing an opportunity for graduate students to gain experience in preparing and delivering 30 posters and 15 oral presentations of their research. ■

Now in its 22nd year, the department hosted its annual CCEE Golf Tournament, attracting 128 players made up of alumni, friends, contractors and vendors to NC State's Lonnie Poole Golf Course on May 10. A team representing heavy civil construction and materials firm Allen Myers took home the gold. "The tournament was established in 2002 to provide alumni and friends of CCEE with an opportunity to return to NC State and meet and enjoy the company of NC State and CCEE stakeholders, all while raising a net surplus utilized to support student programs such as graduation and student trips," said CCEE Lecturer **Roberto Nuñez**, who organizes the event. ■



# PICTURE THIS

In May, the department celebrated its graduating seniors with its inaugural CCEE Senior Breakfast, hosting students for brunch and yard games. ■



About 166 undergraduate and graduate students, along with more than 1,000 friends and family members, gathered in the McKimmon Center on Friday, May 3, for the Spring 2024 Commencement Ceremony. CCEE alum and advisory board member **Ryan White** (BSCE 2000) delivered the baccalaureate address. White works for Stantec Consulting as the Raleigh office leader and as the design services growth leader, Southeast transportation. He talked about his experience as a U.S. Army Engineer Officer and how it has played into his focus on environmental justice community engagement. ■

# CCEE students gain civil engineering skills, global knowledge through Irish study abroad experience



The group visited Cobh, Ireland, and explored St. Colman's Cathedral.



The group went glamping on Bere Island, where they went hiking and swimming in the freezing water.

Thirteen CCEE students spent five weeks this summer soaking up European culture and civil engineering knowledge on the southwestern shores of Ireland in Cork, the country's second-biggest city that is also dubbed its food capital.

In addition to taking CCEE courses CE 305, Traffic Engineering, and CE 426, Structural Steel Design, on the University College Cork campus, students visited Irish and engineering hotspots including the Ring of Kerry, the Staigue Stone Fort, the Valentia Transatlantic Cable Station, the Blarney Castle and the River Lee Hydroelectric Scheme. The trip was overseen by Teaching Professor **Steve Welton** and Adjunct Assistant Professor **Daniel Findley**, who also serves as associate director at NC State's Institute for Transportation Research and Education.

The department's study abroad program was previously hosted in Dublin in 2024 and Cork in 2019.

"This time, we reached out to a local tour guide," Welton said. "And that really made for some incredible experiences. Our guide, Maire, took us to some of the non-touristy places. And we really had some phenomenal experiences — just outstanding."

Civil engineering student **Alysha Jarvis** said that the experience of studying abroad in a city that dates back to the tenth century is "incomparable."

"The various modes of transportation, old stone bridges and ruins along the sides of the road, historical sites, beautiful views of the Atlantic and more, all alongside professors who are passionate and available to answer questions you have, whether it is related to the course material or not — all this ties together to foster an environment to grow, both as an individual and a student," Jarvis said. "Coming back to the States, I have a stronger understanding of how people create different identities based on where they come from, and feel more inspired to continue my studies."

Civil engineering student **Laiya Davis** said the trip was her first time traveling abroad. Though she didn't know what to expect at first, she describes her time in Ireland as an "indispensable opportunity" that she feels grateful for.

"I was able to take some classes in a smaller class setting, which I always preferred, and get to meet amazing people as well," she said. "I was also able to learn some differences between Ireland and North Carolina through their construction

and culture. I believe this program is important because you get the chance to see your life from a different perspective."

Civil engineering student **Dakota Grosz** said she enjoyed "every minute of the experience."

"There are not enough words to put into perspective how amazing this study abroad experience was," she said. "The professors were extremely passionate about the classes they taught, the sights and views in Ireland were breathtaking, and I never had a bad meal while I was there. Classes were long and packed with information but getting the work done and being able to enjoy the excursions that we went on was peaceful. The people in Cork, Ireland, were so very kind and welcoming."

View more photos from the trip on our Facebook page: [facebook.com/ccee.ncsu](https://facebook.com/ccee.ncsu). ■



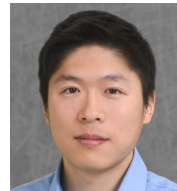
"The highlight of the trip was a day where we explored the River Lee," said civil engineering student Alysha Jarvis. "We started by stopping at Inniscarra Dam and learning about how the dam was built, along with trekking to the top to see the engineering of the gates that control the water flow."

The group tested out the clapper bridge at The Stepping Stones located in Ballygeary, Ireland.



## CCEE professors work with Catalyst program to spark STEM interest in young engineers

A group of high school students gather in the lofty Construction Automation and Robotics Lab in Fitts-Woolard Hall, surrounded by futuristic-looking robotic and computer equipment used to make construction projects more efficient and safe. The teenagers are learning how to program a small construction robotics computing unit, used to process a stream of video frames in real-time for localizing the camera positions and creating a map of the surroundings. Their computer screens are filled with code as a graduate student shows off example images from a real-life construction site where the unit is being used. The students look on, enraptured and excited.



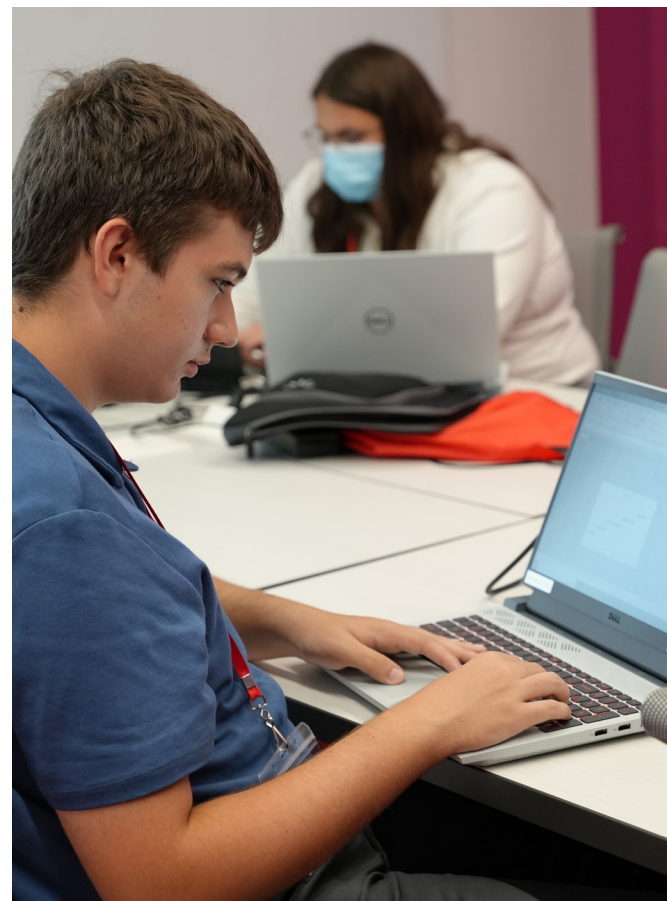
Kevin Han

This taste of the construction engineering industry was made possible by a partnership between CCEE Associate Professor **Kevin Han** and Catalyst, a program through NC State's Science House. Catalyst creates free science, technology, engineering and math (STEM) opportunities for high

school students with disabilities. Students are given the chance to participate in paid, weeklong STEM internships that will help prepare them for college or the workforce. The program is funded by North Carolina Vocational Rehabilitation and is free for qualified students.

Joann Blumenfeld, who serves as program director of Catalyst, said she was inspired to start the organization after her decades-long career as a special education teacher.

"There's more than 220,000 kids in North Carolina, kindergarten through 12th grade, with disabilities," she said. "I came across a statistic that nobody's talking about: About 80% of people with disabilities, age 18 to 64, are unemployed in the U.S. So I thought, 'Oh my God, why aren't we talking about this in the education system?'"



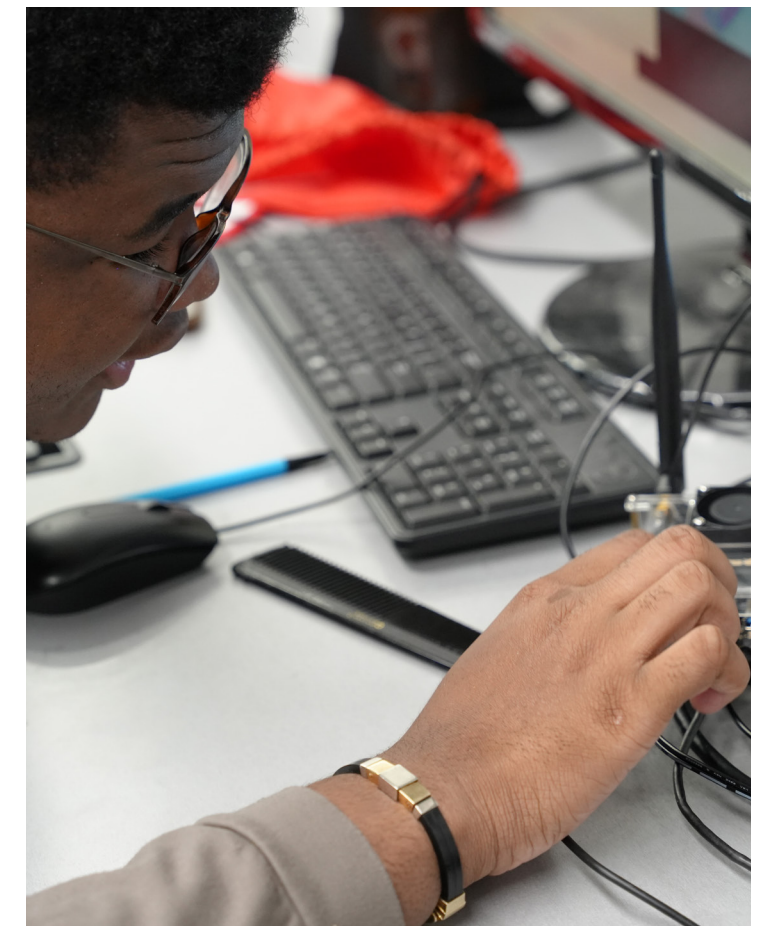
Blumenfeld explained that one of the main issues with STEM education in the public school system is that a lot of it is text-based learning.

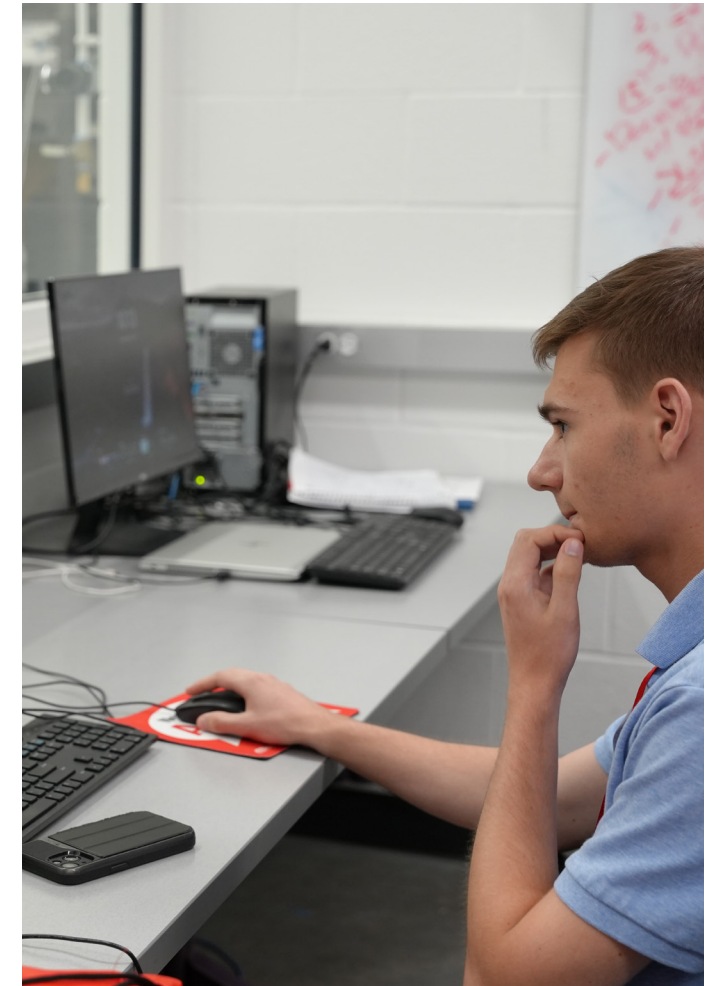
"There's very little hands-on learning," she said. "You have special education teachers who don't know STEM, and you have science teachers that don't know how to make things accessible [since many] have big class sizes, [lack of materials and lack of access to labs]."

Catalyst prepares students for the future through teaching STEM content and skills programming through hands-on labs, engineering design, research, computer programming and more. Students also have the opportunity to participate in STEM field trips and engage in workforce and college readiness skills training. One of the most important aspects, Blumenfeld said, is through the internship opportunities with faculty and STEM professionals.

That's where college professors like Han come in. Han has volunteered for the program for three years, bringing Catalyst students into the lab to explore construction robotics research.

Han's research focuses on creating and validating new computer vision and machine-learning analytics that leverage emerging and often already





existing visual data and BIM for effective construction project controls, enhancing site-to-office and office-to-site communications, safety and hazard recognition and safety training and monitoring. He said he always tries to look for ways to be engaged with the younger generation in “hope of fostering them to be future innovators.”

“When I was in high school, I never was exposed to a program like Catalyst nor had a mentor who showed me different fields of STEM,” Han said. “I feel rewarded when I provide a new experience to these students and help them make informed decisions about their career. I hope this experience broadens their views of how innovation in STEM can change the world and they can be part of driving these changes.”

Professor **George List**, whose research focuses on traffic network operations modeling and control, freight network planning and asset management, also hosted a group of Catalyst students this summer. It is his second year participating in the program. Under his mentorship, students worked on software development projects and other engineering problem skills.

List said the internship helped students gain an understanding of Excel-based analysis tools and improved their programming skills. He participated in the program

because he wants to help high school students “ascertain what they want to do in college and beyond.”

“I really enjoy working with high school students,” List said. “Both years, it has given me new ideas about ways to advance my research and given me an ability to experiment with new ideas.”

Although the engineering skills Catalyst students gain during the internships are extremely valuable, Blumenfeld said, even more importantly, the participants gain self worth and confidence.

“One of the first students we paired with George was visually impaired,” Blumenfeld said. “His accessibility technology wasn't really working, but George really worked with that kid to get him to be able to participate, and that student wants to be an engineer. So really, it's just the kindness — the skills gained are good — but the kindness is also nice.

“It has such a big impact. Kids also need exposure to fields they don't know. ... If you have people that all think the same, you get all the same. And people with disabilities, some people look at that as a deficit, but they're very innovative. We want different people, because otherwise we get the same ideas and the same solutions, and it reduces innovation, right?” ■



# AWARDS & HONORS



Mort Barlaz Downey Brill Ashly Cabas Cassie Castorena Francis de los Reyes



Mo Gabr Fernando Garcia Menendez Ali Hajbabaie Kevin Han Detlef Knappe

**Mort Barlaz**, former department head and Distinguished University Professor, was among eight scholars inducted as Lifetime Members of the Association of Environmental Engineering and Science Professors (AEESP) in 2024. Lifetime Membership is conferred upon a member who either has retired with more than 20 years of continuous membership in AEESP or achieves 35 years of continuous membership in AEESP. Barlaz has been a member of AEESP for 36 years.

**Downey Brill**, former department head, was selected for the 2024 Seminal Paper Award by the American Society of Civil Engineers (ASCE)'s Environmental & Water Resources Institute (EWRI) *Journal of Water Resources Planning and Management*. The paper, which Brill co-authored, is titled "Battle of the Network Models: Epilogue," and examines different models that can be used to optimally size water distribution pipes.

**Ashly Cabas**, associate professor, won the NC State Outstanding Global Engagement Award, which recognizes outstanding accomplishments in globally engaged teaching, student support, research, extension and outreach, and economic development by faculty and professional staff members at NC State. Recipients receive a plaque, \$1,000 to advance their global work, and are recognized each year at the Global Engagement Honors and Awards Luncheon.

**Cassie Castorena**, professor, received the Alumni Distinguished Undergraduate Professor Award as part of the

NC State 2023-24 University Teaching Awards ceremony. The award, sponsored by the NC State Alumni Association, is one of the most prestigious awards given on campus to recognize excellence in undergraduate education. Up to six recipients receive this recognition each year and retain the title for the duration of their career as an NC State faculty member. Each recipient also receives a cash award.

**Francis de los Reyes**, Glenn E. and Phyllis J. Futrell Distinguished Professor #2, won the 2024 R.J. Reynolds Tobacco Company Award for Excellence in Teaching, Research and Extension. The awards are administered by the North Carolina Engineering Foundation and are made in recognition of scientific and educational achievement in engineering. De los Reyes will present a public seminar later this semester.

**Mo Gabr**, Distinguished Professor, was named a Life Member of the American Society of Civil Engineers. A life member has made a lifetime commitment to ASCE and the civil engineering profession by remaining a member for the full length of their professional career. Gabr became a member of ASCE in 1988 and an ASCE Fellow in 2000.

**Fernando Garcia Menendez**, associate professor, was named the Fulbright Canada Distinguished Chair in Environmental Science at Carleton University for 2024-25 by the U.S. Department of State and the Fulbright Program. He will be at Carleton University's Institute for Environmental and Interdisciplinary Sciences in Ottawa, Canada, from August

# AWARDS & HONORS



Greg Lucier Jason Patrick Sami Rizkalla Shane Underwood Chunyang Ji

2024 through March 2025, leading a project to study the impacts of air pollution from wildfires and explore solutions to this challenge.

**Ali Hajbabaie**, associate professor, was named to the 2024-25 class of Provost's Faculty Fellows by the Office of the Executive Vice Chancellor and Provost and the Office for Faculty Excellence. The Provost's Faculty Fellows Program supports talented faculty in the exploration of academic leadership roles at the university's highest levels. Hajbabaie will work in a team of three as part of the University Leadership Track to address an assigned theme or issue relating to higher education leadership.

**Kevin Han**, associate professor and Edward I. Weisiger Distinguished Scholar, won the 2024 Daniel W. Halpin Award for Scholarship in Construction from the ASCE Construction Institute. This award was established to recognize individuals with outstanding scholarship that advances construction engineering as a science. Han was selected for his innovative contribution to advances in construction automation and robotics, teaching innovations and service to the academic community.

**Detlef Knappe**, S. James Ellen Distinguished Professor, received the 2024 Frederick George Pohland Medal from AEESP and American Academy of Environmental Engineers and Scientists (AAEES). The award honors individuals who have made sustained and outstanding efforts to bridge environmental engineering research, education and practice.

**Greg Lucier**, research associate professor and manager of the Constructed Facilities Laboratory, was named 2024 Precast/Prestressed Concrete Institute (PCI) Educator of the Year. The award was presented in early February at the PCI Annual Membership Meeting and Luncheon during the PCI Convention in Denver, Colorado. The award recognizes Lucier's

"fundamental commitment to fostering innovative education and his ability to facilitate creative exploration among his undergraduate and graduate students," according to a release from PCI.

**Jason Patrick**, assistant professor, was selected as a university-level recipient of the NC State 2023-24 Outstanding Teacher Award and will become a member of the Academy of Outstanding Teachers. The award recognizes excellence in teaching at all levels. Patrick joined CCEE's faculty in 2017 and teaches CE 325 Structural Analysis, CE 525 Advanced Structural Analysis and CE 594 Special Topics: Multifunctional Composites.

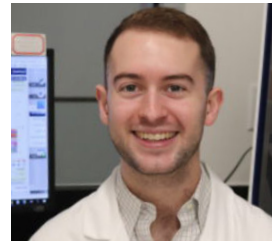
**Sami Rizkalla**, Distinguished Professor Emeritus, won the PCI Titan Award, the highest honor bestowed upon PCI members. PCI Titans are nominated and honored every 10 years on the anniversary of the Precast/Prestressed Concrete Institute. The Titans of the Industry are dedicated individuals who have provided exceptional contributions, have demonstrated outstanding leadership and service in innovation and in advancing the growth of the precast concrete industry.

**Shane Underwood**, professor and associate head of undergraduate programs, was named to NC State's 2023-24 class of University Faculty Scholars. Underwood was one of 22 early- and mid-career faculty to receive this designation in recognition of their outstanding academic achievements and contributions to NC State through their teaching, scholarship and service to the university and beyond.

**Chunyang Ji**, postdoctoral researcher, received the Paul Andrew Spudich Travel Grant from the Seismological Society of America. The grant is offered exclusively to early-career and student members whose research focuses on earthquake source physics or ground motion prediction. Ji used her \$2,000 grant toward travel to the 8th International Conference on Earthquake Geotechnical Engineering in Osaka, Japan in May.



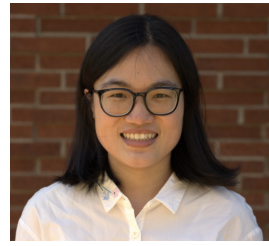
Will Ashe



Benjamin Clark



Aakriti Khadka



Liannian Wang



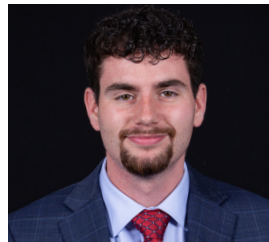
Mila (Liudmyla) Yutskevych



Nathan Herman



Seth Enzor



Aaron Spivey



Cooper Emory



Truman Phipps



Carolina Agamez-Davila



Grace Abdo

**Will Ashe**, M.S. student, was selected for the University Nuclear Leadership Program Fellowship by the Department of Energy (DOE). The graduate fellowship program provides \$169,000 over three years to support graduate research relevant to nuclear energy and includes a summer internship at a DOE national laboratory or approved facility.

**Benjamin Clark**, Ph.D. student, was named to the 2024-25 cohort of NC State's Global One Health Fellows. He was one of five students selected from a highly competitive pool of more than 60 applicants from across ten academic colleges. The fellows will broaden their knowledge in multiple domains of One Health while learning from peers and mentors to bring new perspectives that facilitate a deeper understanding in their field of study.

**Aakriti Khadka**, Ph.D. student, was selected for the JoAnne K. & Cecil L. Jones Carolinas Fellowship from the American Concrete Institute (ACI) Foundation. All fellowship recipients receive a \$10,000 educational stipend; paid travel expenses and attendance fees to two ACI conventions; and assistance in finding an industry mentor. Khadka, who is advised by CCEE

assistant professor **Giorgio Proestos**, was one of 29 students across 35 institutions to receive a fellowship.

**Liannian Wang**, Ph.D. candidate, was selected for a Chishiki-AI in Civil Engineering Graduate Fellowship from the University of Texas at Austin. Chishiki-AI is collaborating with Strengthening the Cyberinfrastructure Professionals Ecosystem (SCIPE) to focus on artificial intelligence in civil engineering. The initiative is supported by National Science Foundation funding and is dedicated to fostering the next generation of experts in this dynamic field.

**Mila (Liudmyla) Yutskevych**, Ph.D. student, won second place in the Outstanding Student Poster Competition at The International Society of Indoor Air Quality and Climate Conference Indoor Air 2024 in Hawaii. Yutskevych's poster, titled "Sick Building Syndrome, Indoor Air Quality and Related Health Effects: A Systematic Literature Review," looks at concerns that public health agencies in the United Arab Emirates (UAE) had about sick building syndrome (SBS) due to public complaints and the rapid transformation of the built environment that has occurred over the past quarter century.

Six CCEE students were included in the 100 new students joining the Goodnight Scholars Program in its traditional and transfer cohorts. The Class of 2028 includes CCEE students **Nathan Herman** and **Seth Enzor**. The Transfer Class of 2027 includes **Aaron Spivey**, **Cooper Emory**, **Truman Phipps** and **Carolina Agamez-Davila**.

**Grace Abdo**, civil engineering student, was one of 11 students who were awarded a 2024 Carolinas Associated General Contractors Foundation Scholarship. The scholarship assists individuals studying for careers in the construction industry and those wishing to advance their skills and knowledge to further their careers.



Timber bridge team

## CCEE TEAM ADVANCES TO FINAL PHASE OF HISTORIC TIMBER BRIDGE COMPETITION

A team of five CCEE students advanced to Phase 3 of the Association for Preservation Technology (APT) Preservation Engineering Technical Committee Student Timber Bridge Design-Build Competition. The group, advised by Teaching Professor **Steve Welton**, will present their work and assemble their bridge design at the APT Conference in Montreal, Quebec, in November.

This year's competition challenged teams to focus on a timber bridge similar to one that would have been constructed between 1840 and 1890, highlighting the intricacies of timber construction and the technologies used for their preservation. Teams were tasked with studying an existing timber bridge and designing a scale timber bridge of their own, evaluating the bridge's structural performance, creating construction drawings and devising a preservation plan that would allow these structures to withstand the test of time.

The CCEE team — which includes undergraduate students **Anthony Rurka**, **Christopher Lee** and **Laney Hunt**; Ph.D. student **Taylor Brodbeck**; and master's student **Hunter Bowman** — selected the Bunker Hill Covered Bridge in Catawba County, North Carolina. The bridge was constructed in 1895 and restored in 1994.

The Bunker Hill Bridge is one of only two remaining covered bridges in North Carolina and is the world's sole

remaining example of General Herman Haupt's 1839 patented "Improved Lattice Truss" design, according to the American Society of Civil Engineers.

"Our strategy has been to leverage our strengths while also venturing out of our comfort zones to learn some new things. We had to use some older manuals and codes for analysis, create a comprehensive preservation plan, and document the current status and design of the bridge — all of this combined into a Phase 2 report that the team is exceptionally proud of," said Bowman.

It is the first time that CCEE students have participated in the competition.

Bowman said the competition is the perfect chance to leverage a broad range of expertise within the CCEE department, with aspects of environmental preservation, construction, and of course timber design.

"The AISC Steel Bridge Competition is fantastic and helps build leadership skills while also providing the opportunity for some more hands-on experience with structural design. This competition is extremely similar in that regard, but it also allows for a broader range of experiences to shine through. Instead of designing a 20-foot steel bridge, we analyze an existing one from the 19th century and scale it down." ■



STEPHANIE PARSONS

**Stephanie Parsons** is a sixth-year Ph.D. student with a concentration in air quality, and she is advised by **Andy Grieshop**, professor. Parsons grew up in Auburn, Alabama, and is involved in NC State's chapter of the Air and Waste Management Association, with previous terms as both secretary and president, to educate and spread awareness of the importance of global clean air.

*What influenced you to go into engineering?*

PARSONS (P): My mom. In high school, I was really good at math, but I never considered engineering as an option. My mom suggested I take one of my high school's engineering classes, and I loved it. I ended up majoring in mechanical engineering in undergrad because I couldn't decide which engineering discipline to pick, and it felt the most well rounded.

*What problem(s) are you trying to solve? Why was NC State / CCEE a good fit for you?*

P: My research focuses on household air pollution, specifically the use of polluting fuels for cooking in sub-Saharan Africa. I am investigating alternative cooking stoves that are cleaner burning than traditional stoves (wood/open fires, charcoal), but still affordable and accessible. During my Ph.D., I traveled to Zambia twice and Nepal to complete field measurements of air pollution in local homes and of household cooks. I have traveled to 15 countries on five continents, seven of which were for research or community outreach projects.

NC State and CCEE were a good fit for me because I found the research my advisor was doing very impactful. He was passionate about his work and I wanted to make a contribution to society that could directly help people. When I visited and met my future labmates and other CCEE grad students, everyone was so welcoming and friendly, I knew this was where I was meant to go to grad school.

*Where did your passion for this particular focus come from?*

P: I first became interested in global health research in undergrad when I worked on water projects in Rwanda and Bolivia through Engineers Without Borders, which is actually how I met my current advisor. I had no experience with air quality before, but then I learned it was the leading environmental risk factor (higher than unsafe water) for premature death globally. This really motivated me to focus on air pollution, particularly in communities that are often overlooked, such as the Global South.

*Where do you see yourself in five years?*

P: After graduation, I have a job as an air quality research scientist at the U.S. Environmental Protection Agency. In five years, I hope to still be researching, measuring and improving air quality to keep striving toward clean air for all.

**Our research and teaching are only possible with the assistance of our nearly 300 graduate students, each of whom has a strong personal history and a promising future. We shine a spotlight on a few students.**



ZACH PHILLIPS

**Zach Phillips** is a fourth-year Ph.D. student in civil engineering, and he is advised by **Jason Patrick**, associate professor, in the Multifunctional Composites Group. Phillips grew up in Jacksonville, North Carolina, and his research is focused on structural polymers capable of repeated self-sensing and self-healing of internal fracture.

*What influenced you to go into engineering?*

PHILLIPS (P): Growing up, I was always drawn to math and science classes, but I originally planned to study medicine. My introduction to engineering was actually due to a last-minute scheduling error in high school that switched me into an engineering course. While originally hesitant, I quickly felt at home and wanted to follow the engineering career path.

*What problem(s) are you trying to solve?*

P: My work looks to improve the reliability of structural polymers with embedded optical fibers that allow us to detect internal damage. I then use the fractured optical fiber to cure a light-activated adhesive delivered from internal micro-channels. The cured material restores both mechanical properties of the polymer and light transmission of the optical fiber, allowing for multiple cycles of self-sensing and self-healing.

*Where did your passion for this particular focus come from?*

P: Initially, I completed a Research Experience Undergraduate (REU) program under Dr. Patrick during my undergraduate at NC State. I helped previous grad students with an initial concept of this project, and it was exciting to see it take shape with each incremental success. I enjoy the multidisciplinary approach this project requires, as it allows me to constantly expand my skill set.

*Where do you see yourself in five years?*

P: I'd like to use the research skills I've built here at NC State in a national laboratory.



ZARIN TASNIM

Zarin Tasnim is a second-year Ph.D. student with a concentration in environmental engineering, and she is advised by **Detlef Knappe**, S. James Ellen Distinguished Professor. Tasnim grew up in a small town called Naogaon in northern Bangladesh, and she has been appointed as a trainee in Project 4 at the Center for Environmental and Health Effects of PFAS at NC State.

*What influenced you to go into engineering?*

**TASNIM (T):** Bangladesh is a small country in Asia where poor drinking water quality has always been a challenge in ensuring public health safety. I decided to major in environmental engineering with a focus on studying the emerging contaminants in water to contribute to identifying and solving this crisis.

*What problem(s) are you trying to solve? Why was NC State / CCEE a good fit for you?*

**T:** My research particularly focuses on studying the kinetic parameters for the adsorption of PFAS (per and polyfluoroalkyl substances) on granular activated carbon. NC State CCEE was a great fit for me as my research interest and previous research experience of studying the presence and removal of surfactants in water perfectly aligned with what Dr. Knappe's group has been working on (PFAS, a similar emerging contaminant as surfactants).

*Where did your passion for this particular focus come from?*

**T:** The International Agency for Research on Cancer has classified perfluorooctanoic acid as "carcinogenic to humans" (Group 1) and perfluorooctanesulfonic acid as "possibly carcinogenic to humans" (Group 2B) in November 2023. People are knowingly or unknowingly being exposed to PFAS from water, soil and daily-use products like nonstick cookware, rainproof jackets, stain-proof carpets, makeup, etc., with drinking water being a major source of exposure.

*Where do you see yourself in five years?*

**T:** I want to continue working as a researcher after my Ph.D. and work on studying the removal mechanisms of different emerging contaminants to ensure safe drinking water for everyone.



LIANNIAN WANG

*What influenced you to go into engineering?*

**WANG (W):** The excitement of seeing a building rise from nothing inspired me to pursue engineering. I'm passionate about using engineering to turn ideas into reality and solve challenging problems. Contributing to the creation of lasting and impactful projects fulfills that passion.

*What problem(s) are you trying to solve? Why was NC State / CCEE a good fit for you?*

**W:** My current Ph.D. research aims to enhance requirements management for construction projects. Specifically, my research topic is to develop a comprehensive framework that can be used to assist project stakeholders in organizing, identifying and inspecting construction requirements by integrating 4D BIM and generative AI. I'm addressing the issue of inefficient manual management in construction requirements, aiming to improve construction performance by analyzing document data. CCEE's construction group, which emphasizes innovative practices in integrating advanced technologies, offers a great platform to develop AI-driven solutions for better decision-making and project outcomes.

*Where did your passion for this particular focus come from?*

**W:** In my hands-on experience in the construction industry, I encountered many challenges and inefficiencies. Seeing these issues firsthand made me realize the amazing potential of advanced technologies. That's why I'm pursuing a Ph.D. — to become a researcher focused on driving innovation and solving real-world problems. My big goal is to harness the power of generative AI to make intelligence a universal asset in the construction sector.

*Where do you see yourself in five years?*

**W:** In five years, I hope to work in academia, using my knowledge of AI and construction engineering to contribute to research and help educate future engineers. ■

**Liannian Wang** is a fourth-year Ph.D. student with a concentration in construction engineering, and she is advised by **Kevin Han**, associate professor and Edward I. Weisiger Distinguished Scholar, and **Abhinav Gupta**, professor. Liannian grew up in China and is a part of the Center for Nuclear Energy Facilities and Structures.

There are more than a dozen chapters of professional organizations available for CCEE students. Membership is a way to meet peers, make industry connections, strengthen leadership skills and engage in community service. Participation offers the chance to attend conferences, compete against peers from other institutions, learn outside of the classroom and interact with professional engineers.



**American Society of Civil Engineers (ASCE)**

The NC State student chapter of American Society of Civil Engineers (ASCE) traveled to the University of North Carolina at Charlotte in April to compete at the 2024 ASCE Carolinas Student Symposium. The 31 students participated in a variety of competitions and brought back several prizes.

In the concrete canoe competition, students were challenged to design, construct and race concrete canoes. The NC State team won third place in their first competition since the pandemic.

“Students worked hard to bring it back, design and construct a canoe to transport to the conference,” said **Zoe Smith**, a recent CCEE grad and former president of the NC State ASCE chapter. “We were very excited that it survived transportation and floated at the lake.”

In the American Institute of Steel Construction (AISC)/ ASCE Student Steel Bridge Competition, the NC State team won second place. Teams were required to construct a prefabricated steel bridge in less than 45 minutes with construction constraints like a river that cannot be crossed, no members or tools touching the floor and only six builders. Bridges were also load-tested, weighed and judged on aesthetics.



The team won second place in the Sustainable Solutions Competition, which challenged students to develop a stronger understanding of sustainability and learn to incorporate sustainable solutions into everyday problems that engineers may encounter by simulating a request for proposal (RFP) that responds to a real-world challenge.

**Chi Epsilon**

The NC State team won first place in the transportation competition, in which students analyzed a real-life traffic problem and then designed, drafted and presented their designs to a panel of judges.

The team won third place in both the t-shirt competition, where they designed a shirt that incorporated the conference’s theme of “Building Rome,” and the 3D-printed bridge competition, where they designed, fabricated and assembled a non-metallic, 3D-printed bridge capable of withstanding vertical forces applied at the top.

While attending the conference, students socialized and networked with other university students, watched other competitions and explored UNC Charlotte’s campus.

“The ASCE Symposium was a great opportunity to present our projects and interact with teams from other schools,” said recent CCEE grad **Brandon Tucker**. “I personally enjoyed cheering on the concrete canoe races, and I learned a lot from the judge’s feedback at our sustainable solutions presentation.”

Nine CCEE students were inducted into the Chi Epsilon Honor Society in a May ceremony. Chi Epsilon is an American civil engineering honor society that recognizes engineering students in the United States. who have exemplified the principles of scholarship, character, practicality and sociability in the civil engineering profession.

The inducted students included **Genesis Beck, Ellen Benitez, Christopher Camporeale, Jackson Crocker, Dasier Cruz, Ellie Hannum, Tyler Moore, Fiona Reed** and **Israel Romero-Garcia**.

Reed was inducted as the new chapter president, and Benitez was inducted as the new treasurer, taking the batons from former president **Emma Hester** and former treasurer **Jordan Key**.

“I was very excited to take on the role of president of Chi Epsilon,” Reed said. “I feel very honored to take on the role and hope to be a good representation of the organization.”

Reed said Chi Epsilon is important to her because it recognizes how hard each member truly works to achieve academic excellence.

“I am excited to see the chapter grow, and I hope to see more students join and be recognized for this high achievement,” she added.





### Institute of Transportation Engineers (ITE)

The NC State student chapter of ITE won gold in the ITE Collegiate Traffic Bowl Southern District Competition on April 8-9 in Wilmington, North Carolina.

The competition involved teams of up to three students testing their knowledge of ITE, transportation planning and engineering topics and some fun categories. Schools from across the Southeast participated, including University of Louisiana at Lafayette, University of Alabama, Virginia Tech, Clemson University and Georgia Tech.

The NC State team, which includes **Adam Fleischer**, **Davin Schmidt** and **Luke Letica**, went on to compete in the Collegiate Traffic Bowl Grand Championship on July 22 at the Joint ITE International and Mid-Colonial District Annual Meeting and Exhibition in Philadelphia.

Fleischer, president of the NC State student chapter of ITE, said he "still can't quite believe" the team clinched first place.

"It's not something I went down there thinking we'd win; honestly, I was just hoping to squeeze out of the preliminary round," he said. "We could not have made it without Davin and Luke. In fact, Luke helped us clinch the win in final jeopardy. We are just transportation nerds, so we knew a lot already, but we still read through many of the guide and policy books for transportation such as the *Manual on Uniform Traffic Control Devices*."

"The victory made me feel even more confident in the education provided by the transportation faculty in the CCEE department," Letica said. "I would especially like to credit [ITRE Associate Director **Daniel**] **Findley**, whose traffic engineering and highway design classes did a tremendous job of exposing us to a wide range of design concepts and current events, many of which came up in the competition." ■

# FACES OF CCEE

Our FACES of CCEE media project celebrates outstanding alumni and illustrates to current students the varied careers available to them. In addition to the newsletter, featured alumni's bios are displayed on a monitor in Fitts-Woolard Hall. This is an ongoing project, so if you'd like to bring someone to our attention (including yourself), then please do so. We want to know what our alumni are doing. Please send an inquiry or information to **Casey Dietrich** ([jcdietrich@ncsu.edu](mailto:jcdietrich@ncsu.edu)).





**MORGAN DICARLO, PE**  
*(Ph.D. 2022)*

DiCarlo is a physical scientist at the Environmental Protection Agency in Washington, D.C., working with a \$5 billion grant program to address emerging contaminants in drinking water. She recently completed a selective Science, Policy and Technology Fellowship with the American Association for the Advancement of Science. DiCarlo is a highly involved advocate for STEM outreach, including as one of America's 10 New Faces of Civil Engineering for 2024.



**CARTER RUCKER, PE**  
*(BSCE 2018, MSCE 2020)*

Rucker is a coastal engineer at the U.S. Army Corps of Engineers — Wilmington District. He models future scenarios for coastal storm risk management civil works projects and consults for technical problems involving coastal forces that impact infrastructure, erosion, the environment, resources and safety. Rucker continues to be involved in Engineers Without Borders (EWB) and is now the president of the southeast region of EWB-USA, overseeing 36 chapters.

**SHAWNAK DOSHI**  
*(BSCE 2018)*

Doshi is a project manager with Brasfield & Gorrie in Raleigh, North Carolina. He specializes in health care and hospital construction and works regularly on cost control, site logistics, scheduling, safety and planning of construction operations. Doshi is passionate about building healing environments for the treatment and care of the community.



**RYAN WHITE, PE**  
*(BSCE 2000)*

White is the design service growth leader, transportation – U.S. South for Stantec Consulting. His primary role is to grow business for Stantec's transportation sector from Georgia to Maryland. Additionally, he focuses on progressing rail and highway projects through planning, environmental compliance, conceptual design and stakeholder engagement. White is passionate about mentoring and empowering the next generation of leaders in the industry. ■





Tana Harris, left, with Zoe Smith

## CCEE grads Tana Harris, Zoe Smith make the most of their college experience

It was a hot summer day in 2019. NC State's campus was abuzz with campers hoping to catch a glimpse of life as part of the engineering Wolfpack. High schoolers from across the country experienced life in the dorms, explored labs and classrooms, and participated in activities like constructing small-scale wooden towers, building a water purifier using basic soil components, and optimizing structures with computer simulations.

**Tana Harris** journeyed to campus all the way from Saluda, a small western North Carolina town of about 700. President of her high school's Future Farmers of America organization, she always had an interest in nature and wanted to see how civil engineering could play a part in preserving the environment.

**Zoe Smith** had a shorter drive, hailing just 20 miles south of Raleigh in Fuquay-Varina, North Carolina. From a young age, she was surrounded by NC State memorabilia and felt destined to join the Wolfpack: her dad, **Stacey Smith**, is a proud CCEE alum, having earned his BSCE in 1992 and MCE in 2004.

Little did the two high schoolers know that, on that sweltering summer day on campus, their paths would cross, solidifying a lasting friendship.

At camp, the two ended up in rooms across the hall and were two of just a few girls in the civil engineering group. As they talked, they found out they had a lot in common. Coincidentally, they both had parents and brothers who were also civil engineers.

Camp helped solidify their decision to pursue civil engineering at NC State and to become fast friends.

"One of the first things that convinced me was the great leadership from [CCEE Teaching Professor] **Steve Welton**," Harris said. "I really enjoyed having him lead the camp, and knowing he would be one of my professors was comforting. Also, it was awesome knowing that [Zoe and I] would have a friendship already in college and someone to go through things together. Knowing that the department offered such a wide breadth of things to study — I liked knowing that I had so many options going into the program and the camp highlighted that."

After graduating high school in spring of 2020, Harris and Smith reconnected and decided to live together in the dorms for their first year. But with the COVID-19 pandemic came some challenges.

"Our freshman year was fully masked," Smith explained. "We had maybe two or three weeks with in-person classes before one of our suitemates got COVID-19. So we had to quarantine, but then once we came out of quarantine, they ended up sending everyone home, and we had classes online for the rest of the year."

Isolation during the pandemic caused a large strain on mental health across the country. But the new friends had each other to get through the challenging times, having moved out of their dorm and into an apartment close to campus.

"We had each other for support through classes and other challenges," Harris said. "A lot of people struggled online because they were completely at home and didn't have a friend taking the classes with them. But we got really lucky that we were in the same apartment taking the same classes."

Both women laugh remembering a particularly challenging online physics final.

"There would be five minute breaks between the units [on the final] and so we would run out of our rooms and be like, 'Oh my god, that was awful!' Just having that quick connection to commiserate and then go back to our rooms for the next section made things better."

Although Harris and Smith bonded over their shared experience of the challenges of online classes and tests during the pandemic restrictions, they were also

there to support each other when it came to learning how to come back to campus once restrictions were lifted. But they quickly adjusted to life at NC State — with just a few bus schedule mishaps — and became involved on campus.

Harris became a team coordinator for NC State's Sustainability Stewards, co-leading the resource conservation group. She went on to lead a team in the Environmental Protection Agency's Campus Rainworks Challenge. She also led the execution of energy and water competitions in residence halls and acquired funding for various conservation projects including Campus Green



Harris and Smith at an NC State engineering camp in 2019

Havens, which added three pollinator gardens with educational components across campus.

Smith jumped at the chance to get involved in the NC State student chapter of the American Society of Civil Engineers when the program was being rebuilt after pandemic restrictions. As treasurer, she helped re-establish popular events such as the Student Steel Bridge Competition, employer presentations and attending regional conferences.

While traveling to one of their first regional conferences, the group ran into a small snafu. A few members had to drop out of attending at the last minute, and there were not enough people to compete in the conference's challenges. That's where Harris stepped in.

"I was like, 'If you need someone to go, I'll go. It sounds like fun!'" Harris said. "There were only around eight people that went to the conference that year. For comparison, this past year, we had about 30. So it was a small group and intimate. We really bonded."

That first conference lit a competitive spirit for the team. Harris joined the leadership team and helped plan future conferences as a coordinator. Smith became president of the club during her senior year. During the 2024 regional conference, the NC State team placed in the top three in several competitions including concrete canoe, steel bridge and the sustainable solutions competitions.

"It's been fun to be on the leadership team," Smith said. "It's really cool to have seen the group grow."

When they weren't participating in campus organizations, completing internships or taking classes, the two women made countless memories together throughout their college experience. From car rides home from Carowinds

amusement park taking turns reading *Twilight*, to late nights spent studying and making delirious TikToks in the library, to cheering on the Wolfpack from the bleachers, to sleeping in the ASCE "Civil Shack" during NC State's Shack-A-Thon, to earning NC State traditions medals, they will remember their four years together.

And they made a few more memories before Harris started her job at Hazen and Sawyer working in stormwater management and Smith started work as a staff engineer with Bohler Engineering in land development. After graduation, the two set off on a whirlwind, 15-day adventure in Europe.

Their advice for first-year students looking to earn a degree from CCEE? Prioritize friendships and reach out when you are in need, make sure you have a strong passion for what you are doing and take time to explore different opportunities and experiences both inside and outside of the department.

"I would not have gotten through this degree if I didn't have a strong group of friends," Harris said. "Have friends to do things with and motivate each other. Know that other people can get stressed and overwhelmed and talk them through it."

"Just try as many new things as you can," Smith said. "I worked pretty much every summer at a different internship. I touched so many different areas of civil engineering. Now I feel really confident going into my job. I've also gone to so many employer presentations just to hear them out and listen to how many niche areas are out there. It's neat to know what's out there." ■





**CCEE alumnus establishes scholarship for aspiring engineering students in North Carolina's Caswell, Person counties**

CCEE alumnus **Dan Pleasant** (BSCE 1972, MCE 1973) and his wife, Barbara, established a full-tuition scholarship to NC State for aspiring engineering students from North Carolina's rural Caswell and Person counties. Person County, with a population of 39,386, is located about 50 miles north of Raleigh, while Caswell County, population 22,614, is about 65 miles northwest of Raleigh.

Dan grew up in Caswell County and graduated from Bartlett Yancey High School, and Barbara grew up in Person County and graduated from Person County High School.

Pleasant was inducted into the CCEE Alumni Hall of Fame in 2022 and received the NC State College of Engineering Distinguished Engineering Alumnus award. He said they are driven by the desire to help students see an engineering degree as a possibility without being hampered by the cost of a four-year degree.

"I was encouraged by my math teacher, Nellie Strader, to attend engineering school because she said I was good at math," he said. "I did attend NC State and received my B.S. and master's in civil engineering. Fifty years later, I am so glad I listened to Mrs. Strader. Engineering has proven to be a rewarding experience and career."

Pleasant worked at engineering firm Dewberry for more than 40 years, beginning as manager of a startup office in Danville, Virginia, and ultimately serving as Dewberry's chief operating officer and president for 12 years. Dewberry has more than 50 locations, more than 2,000 professionals nationwide, and consistently ranks as a top 35 design firm in *Engineering News-Record's* Top 500 Design Firms.

The Pleasants continue to be active in local and regional civic and charitable organizations. Beyond the CCEE industry advisory board, Dan's activities include serving as a board member and chair of the Virginia Economic Development Partnership, as a director for the publicly traded American National Bank and Trust Company, and on the board of the Virginia Chamber of Commerce.

Applicants for the Dan and Barbara Pleasant Scholarship must be admitted to the NC State College of Engineering to be considered. Scholarship applications are submitted through NC State's scholarship application portal PackAssist and must be received by February 15 to receive priority consideration. To learn more about applying for scholarships, visit [enr.ncsu.edu/academics/undergrad/scholarships](http://enr.ncsu.edu/academics/undergrad/scholarships). To apply, visit [ncsu.academicworks.com](http://ncsu.academicworks.com).

**Brian Bradner** (BSCE 1994) was named senior vice president of Dewberry. He is a business unit manager in the firm's Danville, Virginia, office.

**Claire Brinkley** (BSCE 2005) was named vice president and strategic growth director for STV's transportation South/Central group. Based in Charlotte, North Carolina, Brinkley will work closely with clients in the Carolinas while spearheading the firm's strategic business expansion into the growing highway and transit market.

**Morgan DiCarlo** (Ph.D. 2022) was named to the American Society of Civil Engineers' 2024 New Faces of Civil Engineering list. DiCarlo works in Washington, D.C., as a science and technology policy fellow for the American Association for the Advancement of Science.

**Berry G. Jenkins, Jr.** (BSCE 1965) was named among the Carolinas Associated General Contractors Class of 2024 Hall of Fame/Legacy winners. Jenkins was honored posthumously at the 2024 Summer Summit in August.

**Dan LaMontagne** (BSEE 1996) is retiring from his role as Chatham County manager after 24 years of service in state and local government. LaMontagne, who is a licensed PE, has served in his current position since 2019.

**Qian Luo** (Ph.D. 2022) won the Air & Waste Management Association Doctoral Dissertation Award for her dissertation, "Integration of power systems and air quality models to mitigate negative health and climate impacts of electricity generation." Luo was advised by associate professors Jeremiah Johnson and Fernando Garcia Menendez and is now a postdoctoral researcher at Princeton University.

**Gunay Gina Aliyeva** (Ph.D. 2023) was recognized with an Outstanding Teaching Assistant Award from the NC State Graduate Student Association's Teaching Effectiveness Committee. The awards are the primary university-level recognition for exceptional contributions made by graduate teaching assistants to the educational excellence of the university. Aliyeva works as a structural engineer for FDH Infrastructure Services and Power.

**SHARE YOUR NEWS**

There are thousands of alumni of the Department of Civil, Construction, and Environmental Engineering working throughout the nation and around the globe. We invite you to provide us with updates about career accomplishments, awards or recognitions, as well as other news. We aspire to create a community of alumni who remain connected to the department and to each other. We also want to keep your contact info current so we can keep you up to date on department events. Send your information to Casey Dietrich at [jcdietrich@ncsu.edu](mailto:jcdietrich@ncsu.edu).

**Name, Mailing and Email Address**  
**Company Name and Address**  
**Degree, Major and Class Year**  
**Announcements**

We invite you to connect with us on social media to keep up with the latest news.

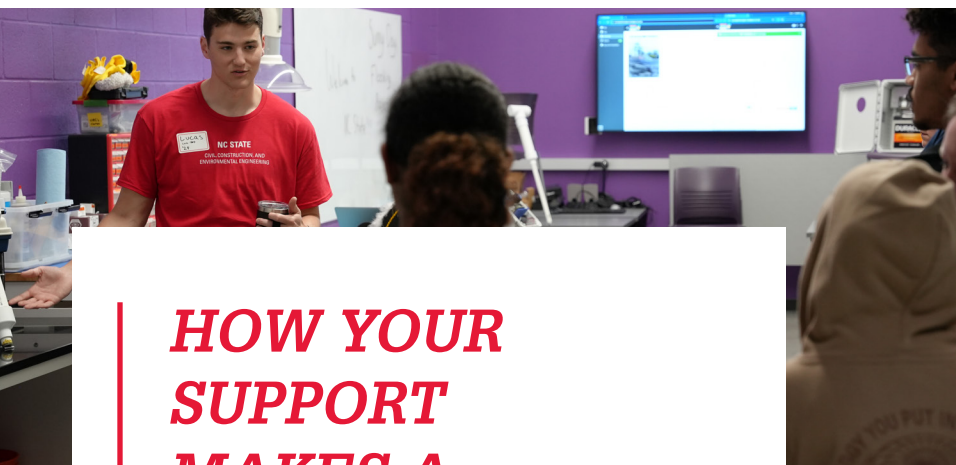
[facebook.com/ccee.ncsu](https://facebook.com/ccee.ncsu)

[@ncstateccee](https://instagram.com/ncstateccee)

[@NCStateCCEE](https://twitter.com/NCStateCCEE)

[go.ncsu.edu/cceelinked](https://go.ncsu.edu/cceelinked)

[go.ncsu.edu/cceeyoutube](https://go.ncsu.edu/cceeyoutube)



## HOW YOUR SUPPORT MAKES A DIFFERENCE

### ENDOWED FACULTY SUPPORT

The Department of Civil, Construction, and Environmental Engineering is home to more than 55 dedicated scholars and educators. Endowments and named professorships are an essential part of our effort to recruit and retain the very best faculty and then provide them with opportunities to explore new research ideas with the involvement of graduate and undergraduate research assistants. Relative to our peer institutions, the department has a low number of endowed professorships.

### ENDOWED GRADUATE FELLOWSHIPS AND AWARDS

We strive to attract the best and brightest graduate students from the U.S. and around the world. Departmental rankings, faculty recruitment, research success and undergraduate education all depend on the presence of talented graduate students. Competition for the best graduate students is intense, and finances can be a deciding factor for students when choosing a graduate program. To recruit the best students, and to create a vibrant learning environment for undergraduate students, CCEE must be able to provide competitive graduate fellowships.

### ENDOWED UNDERGRADUATE SCHOLARSHIPS

Undergraduate scholarships enable us to prepare tomorrow's leaders in civil, construction and environmental engineering. Students are drawn to NC State and CCEE by our reputation for excellence. Cost is a major consideration for students and their families. Scholarships represent a mechanism to support and reward our top students.

### CCEE ENHANCEMENT FUND

A regular gift to the CCEE Enhancement Fund makes it possible to provide students the best possible education and extracurricular experiences. The enhancement fund allows us to respond to emerging needs and exciting challenges.

One example of an initiative supported by the fund is the CCEE undergraduate ambassadors program. The carefully selected undergraduate student ambassadors come from diverse backgrounds and areas of study within the department and bring their different perspectives to the table to help guide potential students. A student ambassador's role is to be a representative of the department while maintaining a wide range of responsibilities including outreach, recruitment events and providing a student perspective while giving tours to potential students and visitors.

"Ambassadors play a key role in recruiting students, and in highlighting what the CCEE department has to offer," said Rachael Ayres, CCEE student services specialist.

Your support enables recruitment and retention of the best and brightest faculty and students, support for our student organizations, field trips to complement classroom instruction and opportunities for faculty and students to present at conferences. Our enhancement fund is critical to the department as we strive to continue to provide opportunities for students and faculty.

### RECOGNIZING OUR CORPORATE PARTNERS

Our corporate partners may opt to provide support for specific research areas, enabling faculty members to pursue a new research idea. Sponsorships are also available for this newsletter, the welcome back ice cream each fall and our graduate symposia. These symposia allow students

to prepare a poster to describe their research and make a presentation to the local engineering community. The activities of our student groups are also dependent on external financial support.

The Corporate Affiliates Partners Program recognizes corporations that have made an ongoing commitment to the department. It allows us to thank and promote our partners while educating our students about current engineering practice. Our new monitors in Fitts-Woolard Hall provide opportunities for firms to display information highlighting notable projects and other information. The program provides participating firms with name recognition for recruiting and business opportunities, demonstrates to students the ways in which they can use their degrees, and provides information on employment opportunities. ■

## 2024 CORPORATE, ORGANIZATION AND FOUNDATION DONORS

The firms listed here have provided endowments or made contributions from January through August 2024. Many on the list have supported multiple activities in the department. We extend our sincere appreciation.

AECOM	Giles Flythe Engineers, Inc.	RTI International
Allan Myers	Hardesty & Hanover, LLC	RTP Ch. of the Air & Waste Management Assn.
American Society of Civil Engineers	Hazen and Sawyer	SCS Engineers
ARCO Design/Build SE, LLC	HDR Engineering, Inc.	Shelco, LLC
Art Guild, Inc.	Highfill Infrastructure Engineering	Smith Gardner, Inc.
Atlas Engineering	Infrastructure Consulting & Engineering	Stantec Consulting Services, Inc.
Baker Roofing Company	IQ Contracting, LLC	Structural Engineers Association
Brasfield and Gorie	Jacobs Technology, Inc.	Structural Engineers Association of NC Triangle Chapter
Choate Construction	JDS Consulting	Summit Design and Engineering Services, PLLC
Clancy & Theys Construction	Kaydos-Daniels Engineers, PLLC	TerraHawk
CT Wilson Construction	Kimley-Horn & Associates, Inc.	The Curry Engineering Group, PLCC
Dewberry	Manganaro Southeast, LLC	The ECS Foundation
Duke University	McKim & Creed	Thermo Fisher Scientific
ECS Carolinas	Moffatt & Nichol	Three Oaks Engineering
EM Structural	Morris & Ritchie Associates, Inc.	Vanasse Hangen Brustlin, Inc.
Fluor Enterprises, Inc	NC Dept of Transportation	Walter P Moore
Freese & Nichols	NC Licensing Board for Gen Contractors	Westside Hauling, Inc.
Gavel & Dorn Engineering, PLLC	Nova Engineering and Environmental	WithersRavenel, Inc.
General Contractors Association of Raleigh	Nuvoda LLC	
Geosyntec Consultants	PG & E	

The department has a wide variety of programs that are made possible by private financial support. For more information on opportunities to help, please contact **Michael Auchter**, our director of philanthropy, at [mrauchte@ncsu.edu](mailto:mrauchte@ncsu.edu) or **919.515.1467**.

The following distinguished alumni and friends of the department currently serve on the CCEE Advisory Board:

**Jennifer Brandenburg**  
BSCEC 1986

**Don Curry**  
BSCE 1996  
Curry Engineering

**Glenda Gibson**  
BSCE 1987

**Skeet Gray**  
BSCEC 1983, MSCE 1993

**Tyler Highfill, Past Chair**  
BSCE 1992, MSCE 1994  
Highfill Infrastructure  
Engineering P.C.

**Jonathan Holtvedt**  
BSCE 2015, MCE 2017  
D.R. Horton

**Joey Hopkins**  
BSCE Construction Option 1989  
North Carolina Department of  
Transportation

**Street Lee**  
BSCE 1983  
McKim & Creed

**Will Letchworth, Chair Elect**  
BSCE 2002, MSCE 2004  
McAdams

**Chad Link**  
BSCE 1996  
Crowder Construction  
Company

**Mark McIntire**  
BSENE 1995, MSCE 1997  
Duke Energy Corporation

**Tonya Mills**  
BSCE / BSENE 1994  
Tri Properties Inc.

**Lisa Patterson, Secretary**  
BSCE 1989, MCE 1990  
Hazen and Sawyer

**Sandra Stepney**  
BSCE 1983  
WGI

**Gray Talley**  
BSCE 1998  
Shelco Inc.

**Steve Thomas**  
BSCE 1984, MSCE 1986  
Gannett Fleming TranSystems

**Mike Wayts, Chair**  
Freese and Nichols Inc.

**Matt West**  
BSCE 2004  
Dewberry

**Eddie Wetherill**  
BSCE 1979  
Wetherill Engineering Inc.

**Ryan White**  
BSCE 2000  
Stantec Consulting

## INVESTING IN THE DEPARTMENT

We invite you to invest in the department's future. Your gift will help to propel CCEE to new levels of excellence. You can choose an annual, endowed or one-time gift. Cash can be sent via a check payable to the NC State Engineering Foundation directly to:

**NC State Engineering Foundation**  
Campus Box 7901  
Raleigh, NC 27695-7901

Please indicate on the check, or with a note, the purpose of your gift and that it is directed to CCEE.

If you prefer to make your donation online, you can use your credit card with our online feature at [enr.ncsu.edu/alumni-and-giving/ways-to-give](http://enr.ncsu.edu/alumni-and-giving/ways-to-give). Drop-down menus allow you to direct your gift to our department.

For more information contact:  
**Michael Auchter**  
Director of Philanthropy  
Phone: 919.515.1467  
Email: [mrauchte@ncsu.edu](mailto:mrauchte@ncsu.edu)

**ANGE-THERESE AKONO**  
Mechanics and Materials, Associate Professor

**ALEX ALBERT**  
Construction, Associate Professor

**KATHERINE ANARDE**  
Coastal, Assistant Professor

**SANKAR ARUMUGAM**  
Water Resources / Computing and Systems,  
Professor and University Faculty Scholar

**TAREK AZIZ**  
Environmental, Associate Professor

**ELENI BARDAKA**  
Transportation Systems, Associate Professor

**JOHN BAUGH**  
Computing and Systems / Transportation Systems,  
Professor

**EMILY BERGLUND**  
Water Resources / Computing and Systems,  
Professor and Associate Head for Faculty  
Development

**GEORGE BONNER**  
Director of NC Renewable Ocean Energy Program

**ASHLY CABAS**  
Geotechnical / Geoenvironmental,  
Associate Professor

**DOUGLAS CALL**  
Environmental, Associate Professor

**CASSIE CASTORENA**  
Transportation Materials, Professor

**DANJUE CHEN**  
Transportation Systems,  
Associate Professor

**FRANCIS DE LOS REYES**  
Environmental, Professor, University Faculty  
Scholar and Glenn E. Futrell Distinguished  
University Professor #2

**ANDERSON DE QUEIROZ**  
Computing and Systems, Associate Professor

**JOSEPH DECAROLIS**  
Environmental / Computing and Systems,  
Professor and University Faculty Scholar

**CASEY DIETRICH**  
Coastal / Computing and Systems,  
Professor

**JOEL DUCOSTE**  
Environmental, Professor and Associate  
Dean for Faculty Advancement

**CHRIS FREY**  
Environmental, Glenn E. Futrell Distinguished  
University Professor and Associate Dean for  
Research and Infrastructure

**MOHAMMED GABR**  
Geotechnical / Geoenvironmental, Distinguished  
Professor of Civil Engineering and Construction

**FERNANDO GARCIA MENENDEZ**  
Environmental / Computing and Systems,  
Associate Professor

**ANDREW GRIESHOP**  
Environmental, Professor

**MURTHY GUDDATI**  
Structures / Computing and  
Systems / Materials, Professor

**ABHINAV GUPTA**  
Structures / Materials, Professor

**GHADIR HAIKAL**  
Structures / Materials, Associate  
Professor

**ALI HAJBABAIE**  
Transportation Systems / Computing  
and Systems, Associate Professor  
and Associate Head for Research  
and Infrastructure

**KEVIN HAN**  
Construction / Computing and Systems,  
Associate Professor and Edward I.  
Weisiger Distinguished Scholar

**ANGELA HARRIS**  
Environmental, Assistant Professor

**TASNIM HASSAN**  
Structures / Materials, Professor

**MARC HOIT**  
Structures, Professor and Vice Chancellor  
for Information Technology

**EDWARD JASELSKIS**  
Construction, E.I. Clancy Distinguished  
Professor

**JEREMIAH JOHNSON**  
Environmental, Associate Professor

**JESSICA KAMINSKY**  
Construction, Professor

**RICHARD KIM**  
Transportation Materials, Jimmy D. Clark  
Distinguished University Professor

**MEAGAN KITTLE AUTRY**  
Associate Teaching Professor and Director  
of Graduate Professional Development

**DETLEF KNAPPE**  
Environmental, S. James Ellen  
Distinguished Professor

**NADINE KOTLARZ**  
Environmental, Assistant Professor

**MERVYN KOWALSKY**  
Structures, Christopher W. Clark  
Distinguished Professor

**GEORGE LIST**  
Transportation Systems, Professor

**GREGORY LUCIER**  
Structures, Associate Research  
Professor and Constructed  
Facilities Laboratory Manager

**JACQUELINE MACDONALD GIBSON**  
Environmental, Professor  
and Department Head

**KUMAR MAHINTHAKUMAR**  
Computing and Systems, Professor

**MEREDITH MARTINEZ**  
Water Resources / Geoenvironmental  
Assistant Teaching Professor and  
Coordinator of Advising

**JONATHAN MILLER**  
Water Resources, Assistant Teaching Professor

**BRINA MONTOYA**  
Geotechnical / Geoenvironmental / Materials,  
Professor

**ROBERTO NÚÑEZ**  
Construction, Lecturer and Senior  
Construction Extension Specialist

**DAN OBENOUR**  
Water Resources / Computing and  
Systems, Associate Professor

**MARGERY OVERTON**  
Coastal, Professor and Senior Vice  
Provost for Academic Strategy

**JASON PATRICK**  
Structures / Materials, Associate Professor

**MOE POURGHAZ**  
Structures / Materials, Professor,  
Associate Head for Graduate Programs

**GIORGIO PROESTOS**  
Structures, Assistant Professor

**RANJI RANJITHAN**  
Environmental / Computing  
and Systems, Professor

**WILLIAM RASDORF**  
Construction, Professor

**JACELYN RICE-BOAYUE**  
Environmental / Water Resources,  
Assistant Professor

**JORGE SAN JUAN BLANCO**  
Coastal, Assistant Professor

**RUDOLF (RUDI) SERACINO**  
Structures, Paul and Dora Zia  
Distinguished Professor

**SHANE UNDERWOOD**  
Transportation Materials,  
Professor, University Faculty  
Scholar and Associate Head  
for Undergraduate Programs

**STEVEN WELTON**  
Structures, Teaching Professor

**BILLY WILLIAMS**  
Transportation Systems,  
Professor and Director of ITRE

**ANDREW ZICCARELLI**  
Structures / Materials,  
Assistant Professor



## MEET MEREDITH MARTINEZ

**Meredith Martinez** joined the CCEE faculty in August 2024 as an assistant teaching professor and coordinator of undergraduate advising. But Martinez was always destined to be in the Wolfpack.

Growing up in Garner, North Carolina, Martinez is a fourth-generation NC State alumna who attended football games with her family and rocked NC State onesies as a baby. Her parents are both College of Engineering alumni — her dad earned his BSCE in 1984 and MSCE in 1986 and her mom, who earned a chemical engineering degree in 1986, is a teaching professor and the director of undergraduate studies in the Department of Chemical and Biomolecular Engineering.

“I was raised to see how amazing NC State and the College of Engineering are and how many opportunities they

provide for their students,” Martinez said. “When it was time to decide where to apply for undergrad, there was really no question of where I would end up.”

Martinez, PE, earned her BSCE from CCEE in 2017 and a Ph.D. in 2022 from Virginia Tech. She still has a drawing she did as a second grader of herself in front of a chalkboard that proclaimed “When I grow up, I want to be a professor like my mom.”

“When I was in undergrad, I told the former coordinator of advising, **Tarek Aziz**, ‘I want your job. How do I get your job?’” Martinez recalled. “I’ve been working toward that goal since then.”

After graduate school, Martinez spent two years as a hydrologic engineer and hydrogeologist at Jacobs, working primarily within their hydrogeology and groundwater modeling group.

“This work involved developing analytical and numerical groundwater models for technical evaluation of water use scenarios, managed aquifer recharge, and groundwater contamination remediation using MODFLOW, MODPATH, MT3D and various Microsoft Excel-based analytical models,” she said. “I led multiple model calibration efforts including the use of parameter estimation tools and BeoPEST (parameter estimation using parallel computing processes on supercomputer clusters). I also participated in various fieldwork trips where I observed well drilling and installation and conducted aquifer field testing including data collection for geochemical analysis, aquifer characterization and water quality sampling.”

Martinez, whose Ph.D. research was primarily focused on experimental and numerical research to assess the impact of high-capacity managed aquifer recharge on the Potomac Aquifer System in eastern Virginia, is a member of the American Society of Civil Engineers’ Environmental and Water Resources Institute and serves as the current chair of the Groundwater Hydrology Committee. She is also a member of the American Water Works Association and the International Association of Hydrogeologists.

This fall, Martinez is teaching CE 214 Engineering Mechanics-Statics, and she wants to get more involved with the American Society of Engineering Education.

“In this new position, I’m most looking forward to getting to know our fantastic CCEE students and supporting them in their success,” she said. ■

**Nadine Kotlarz** joined the CCEE faculty in March 2024 as an assistant professor in the Environmental, Water Resources and Coastal Engineering group. Her research is aimed at characterizing and improving drinking water quality to protect public health, including extensive studies to assess drinking water-associated exposures of people in North Carolina.

“I wanted to work in CCEE at NC State because the department is the perfect place for my research and the societal impact I want to have,” Kotlarz said. “NC State’s focus on engaging with real problems and finding real solutions is a key reason why I wanted to build a career here. The impact that CCEE faculty have already had on public health in North Carolina is inspiring.”

Kotlarz will wear many hats in her new position. In addition to serving on the CCEE faculty, she is part of the Chancellor’s Faculty Excellence Program in Environmental Health Science, and she is also a faculty mentor in NC State’s toxicology program. Her research group will include students from CCEE and toxicology.

That interdisciplinary expertise enables Kotlarz to answer questions posed by North Carolina communities with water quality concerns. Her research focuses on assessing human exposure to emerging chemical and microbial contaminants in water, and applying bioanalytical tools to evaluate drinking water quality and support water intervention selection.

Kotlarz has received awards for her Ph.D. and postdoctoral research at the interface of engineering and environmental public health, including the Best Doctoral Dissertation from the American Water Works Association, the Outstanding Member Award from the NC State Center for Human Health and the Environment, and the Early-Stage Investigator Award from the National Institute of Environmental Health Sciences’ Environmental Health Core Center. These awards recognize her efforts to partner with stakeholders on research and communicate results to impacted community members.

“I am committed to science communication and



## MEET NADINE KOTLARZ

community-engaged research, which I hope to continue as CCEE faculty,” Kotlarz said.

Kotlarz earned a B.S. in environmental engineering from Lehigh University, an M.A. in teaching from Dominican University, and M.S. and Ph.D. degrees in environmental engineering from the University of Michigan. Recently, she was a postdoctoral researcher in the Department of Biological Sciences and then a research scholar in the Office of Research and Innovation, both at NC State. This semester, she is teaching CE 378, Environmental Chemistry and Microbiology.

“I am excited to get to know, learn from, and start productive research partnerships with my colleagues in CCEE and the toxicology program at NC State,” Kotlarz said. ■

# In Memoriam



**Earl Downey Brill, Jr.**

**Earl Downey Brill, Jr.**, beloved husband, father, grandfather, son and CCEE professor emeritus, died unexpectedly in Greenville, North Carolina, on August 6, 2024, following a fall four days earlier in Oriental, North Carolina. Brill was born on August 16, 1947, in Woodstock, Virginia, to Earl Downey Brill and Frances Jones Brill. He graduated from James Madison High School in Vienna, Virginia. He received a B.S. degree in civil engineering from Cornell University and a Ph.D. degree in environmental engineering from Johns Hopkins University. He married Eileen Weber, a Cornell classmate, in 1969; she predeceased him in 1972. In 1975, he married Anne Wentworth. His focused devotion to his family and his profession were the defining features of his remarkable life.

Brill began his academic career in 1972 at the University of Illinois Urbana-Champaign where he rose to the rank of professor in 1982. He joined NC State University in 1988 when he became department head of civil engineering for 17 years, one of the longest serving department heads at the university. During his tenure as department head, the department experienced high growth in both undergraduate and graduate programs as well as in faculty positions. He considered himself fortunate to work with amazing faculty members and students, as well as highly dedicated administrative teams who embodied wisdom, selflessness and the utmost collegiality. He also served as director of the Center for Transportation and the Environment from 2005-16 and interim director of the Institute for Transportation Research and Education from 2016-18 before retiring in 2019.

Brill's research expertise was in the development of optimization models and their application to environmental engineering systems. A distinguished researcher, he was awarded the Huber Prize in 1987 by the American Society of Civil Engineers and received the Croes Medal twice from the Environmental and Water Resources Institute for best research paper in 1993 and in 2011. From 1985-91, he was a member of the U.S. Army Science Research Board. He also served on the editorial board of several professional journals.

Fond family memories of Brill include his special love for chocolate (a major food group for him), for his three labrador retrievers, for lunches with colleagues at Mitch's for 35 years, and for the challenge of trying to fix most house and car maintenance problems before giving up and calling a professional.

Downey is survived by Anne, his wife of 49 years, his children Mary (Karim), Meredith Brierly (Frank) and Downey (Lauren); grandchildren Evan, Alex, Parker and Chase Brierly, and Samantha DiMartino; mother, Frances Brill; sister, Deborah MacDonald (David) and nephews, a niece and many cousins.

Any desired donations may be made to the North Carolina State Engineering Foundation for the benefit of the Department of Civil, Construction, and Environmental Engineering, NC State Engineering Foundation, 4220 Fitts-Wollard Hall, Box 7901, North Carolina State University, Raleigh, N.C. 27695-7901 or to the Prostate Cancer Foundation, 1250 Fourth Street, Santa Monica, CA 90401. ■

## Quotes about Downey:

"I learned so much from Downey about how to be a good faculty member and team player: how to think about building a research program, how to see the potential in students, how to look at complex problems, how to conduct yourself. Indeed, through his words of advice (often in long hallway discussions) and his actions, Downey taught me about life. He taught me to always think about the things that really matter, such as how we treat each other, and how we make a positive impact. Downey was a mentor, an adviser, a friend, a model, a wonderful human being."

**FRANCIS DE LOS REYES,**

*Glenn E. and Phyllis J. Futrell Distinguished Professor*

"I consider myself very fortunate to have had him as one of my mentors when I was starting my career, and still think of him as a great example to emulate — even keeled, thoughtful, articulate and occasionally humorous."

**MERVYN KOWALSKY,**

*Christopher W. Clark Distinguished Professor*

"Hardly a week goes by when I do not do something or say something or advise someone on something that I learned from Downey. Some of my favorite Downeyisms: (1) always consider the opportunity cost, (2) we need to optimize this complex situation in consideration of multiple constraints and (3) a good decision requires an integrated assessment across many dimensions."

**MORT BARLAZ,** *Professor Emeritus*

"Downey was an incredibly effective department head and wonderful mentor to me. An important thing I learned from him is to consider second- and third-order effects in decision-making. He had an innate ability to rapidly analyze problems and explain alternative solutions and their consequences. Also, he was a wonderful human being who deeply cared about colleagues and students."

**DETLEF KNAPPE,** *S. James Ellen Distinguished Professor*

Department of Civil, Construction, and Environmental Engineering  
NC State University  
Campus Box 7908  
Raleigh, NC 27695-7908

Check out CCEE at NC State

**f** facebook.com/ccee.ncsu

**X** @NCStateCCEE

**@** @NCStateCCEE

**in** go.ncsu.edu/cceelinked

**▶** go.ncsu.edu/cceeyoutube

700 copies of this document were printed at a cost of \$3,501.

# ENGINEERING ONLINE

*Want to earn a top-ranked  
master's degree while  
working full time?*

Join the hundreds of professional engineers who have advanced their career by taking graduate courses online. Take just a few courses to support your area of interest, or commit to earning an online master's degree.

NC State has been offering distance education opportunities in engineering for more than four decades and is consistently ranked among the top online engineering programs in the country. The CCEE department offers two degrees, Master of Civil Engineering (MCE) and Master of Environmental Engineering (MENE). *Best College Reviews* ranked our MENE online degree as No. 1 in the country and our MCE online degree as No. 2. We offer numerous graduate courses in diverse topics to enable online students to obtain a master's degree with subspecialization — such as construction, transportation, geotechnical, structures and mechanics, water resources, environmental processes, energy systems and air quality — to support each student's professional practice while they are still working full time. Students may choose to complete 10 courses to obtain our top-ranked master's degree or take any mix of our graduate courses to advance their careers. More information for prospective students is available at [go.ncsu.edu/ccee.online](http://go.ncsu.edu/ccee.online). Submit your inquiries at [go.ncsu.edu/ccee-grad-inquiries](http://go.ncsu.edu/ccee-grad-inquiries).

*Photo by Becky Kirkland.*

[engineeringonline.ncsu.edu/apply-and-enroll/enroll](http://engineeringonline.ncsu.edu/apply-and-enroll/enroll)