FROM THE **CHAIR**

On behalf of our faculty and students, we are pleased to bring you the latest news and happenings from the Department of Civil and Environmental Engineering at the University of Nebraska! This issue of CEE@Nebraska highlights important new research conducted by CEE faculty and profiles students making a difference in their communities.

In 2023, we were pleased to learn that the Mid-America Transportation Center was renewed for the fifth time. The center, led by CEE faculty member Aemal Khattak, will conduct important research to improve transportation safety and equity and contribute to transportation workforce development in the region.

Over the past two years, our department has been fortunate to welcome four new faculty members: Nathan Hyunh, director of the Nebraska Transportation Center; Jamilla Teixeira, assistant professor in materials; Nirupam Aich, associate professor in environmental engineering; and Kaycie Lane, assistant professor of practice in environmental engineering. They are each making an immediate positive impact on our educational and research programs. Of note, Aich was awarded a prestigious NSF CAREER award in 2022 to investigate filters to remove PFAS, also known as forever chemicals, from water.

We hope that you enjoy this newsletter and catch up on the latest news from the department.

Dr. Shannon Bartelt-Hunt
Chair, Department of Civil and Environmental Engineering

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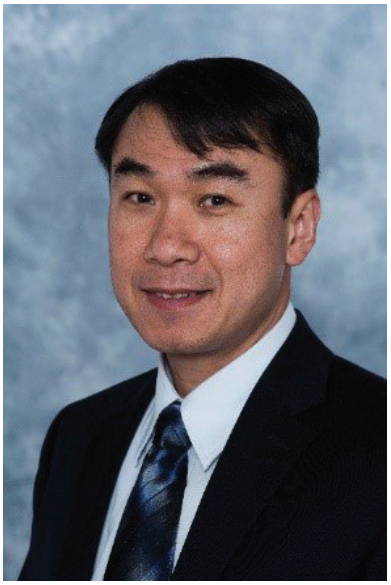
New Faculty 2023-24



Nathan Huynh received his Ph.D. and M.S. from the University of Texas at Austin in civil engineering. He has a B.S. in civil engineering from Temple University. His areas of research and professional interests include supply chain and logistics, intermodal freight terminal design and operations, connected and coordinated multimodal systems, infrastructure resiliency, transportation equity, pavement management systems, and traffic safety.

Nathan Huynh, Ph.D.

PROFESSOR, Transportation Systems Engineering
DIRECTOR, Nebraska Transportation Center

Jamilla Teixeira holds a Ph.D. and a M.Sc. in civil engineering from the University of Nebraska-Lincoln. She received her B.Sc. in civil engineering from Federal University of Ceara. Her areas of research and professional interests include experimental characterization of infrastructure materials, modeling and design of flexible pavement and materials, multiscale microstructure modeling of composites, viscoelasticity and fracture damage, development of sustainable infrastructure and solutions, and teaching and learning in engineering education.

Jamilla Teixeira, Ph.D.

ASSISTANT PROFESSOR
Geotechnical & Materials Engineering

Kaycie Lane received her Ph.D. from Dalhousie University in water and resource engineering. She has a B.Sc. in engineering physics from the Colorado School of Mines. Her research and professional interests focus on improving access to safe drinking water and sanitation services in rural communities, helping small communities assess and manage risks in their water and wastewater infrastructure, and educating students on the importance of sustainable design as well as the socio-cultural factors that impact long-term engineering design.

Kaycie Lane, Ph.D.

ASSISTANT PROFESSOR OF PRACTICE
Environmental Engineering

Nirupam Aich holds a Ph.D. in civil engineering from University of Texas at Austin, M.S. in civil engineering from the University of South Carolina, and a B.Sc. in chemical engineering from Bangladesh University of Engineering & Technology. His overall research goal is to protect public health through water quality engineering and physical-chemical treatment of drinking water and wastewater. His research focuses on the mitigation of emerging water pollution and resources recovery through the design and development of advanced materials, membranes, and manufacturing.

Nirupam Aich, Ph.D.

ASSOCIATE PROFESSOR
Environmental Engineering

Fellowships & Scholarship Awards

DONALD E. & MARJORIE WILES STUDENT SUPPORT FUND
Jacob Zambreno

DR. DEWEY ANDERSON MEMORIAL SCHOLARSHIP
Hunter Gray
Mia Toigo
Kevin Torres

G. C. “JERRY” AND FLORENCE M STROBEL SCHOLARSHIP
Christopher Moore

JOHN AND MINNIE BECKER MEMORIAL SCHOLARSHIP
Cate Huse

JOHN E. OLSSON CIVIL ENGINEERING SCHOLARSHIP
Jordan Jurgens
Sadie Khalil

JOHN E. OLSSON FAMILY FOUNDATION SCHOLARSHIP
Morgan Ferrin

JOHN W. HOSSACK ENGINEERING SCHOLARSHIP
Ryne Emanuel

LAMP RYNEARSON CIVIL ENGINEERING SCHOLARSHIP
Shikaerendra Chintamadaka
Ethan Pehrson
Eric Schmitt
Manal Suliman

MCLAUGHLIN SCHOLARSHIP
Reese Aliano
Grace Ellis
David Fanta
Cate Huse
Fernand Kasus
Raymond Tran

MILLER AND ASSOCIATES CONSULTING ENGINEERS
Mario Ybarra

NEBRASKA SECTION ASCE STUDENT SUPPORT FUND
Alison Fricke

REBENSDORF FAMILY FOUNDATION SCHOLARSHIP
Sidney Matthias
Jacob Zambreno

ROBERT A. AND BECKY REISDORF STUDENT SUPPORT FUND
Jackson Ehlers
Riley Einspahr
Charlie Fankhauser
Lauren Flickinger
Ben McGinnis
Antonia Riquelme
Anna Schuppel
Erin Stara

ROGER AND DONNA STUECKRATH SCHOLARSHIP
Colten Daake

SANFORD W. SAUNDERS MEMORIAL SCHOLARSHIP
David Fanta

SORKIN SCHOLARSHIP
Kaylee Cunning
Spencer Knight
Dominick Naegele
Noah Netzel
Grace Pelan

SWAIM FAMILY STUDENT SUPPORT FUND
Nicole Fiebiger
Brandt Walla

THOMAS T. OGEE, SR. MEMORIAL SCHOLARSHIP
Blake Manternach

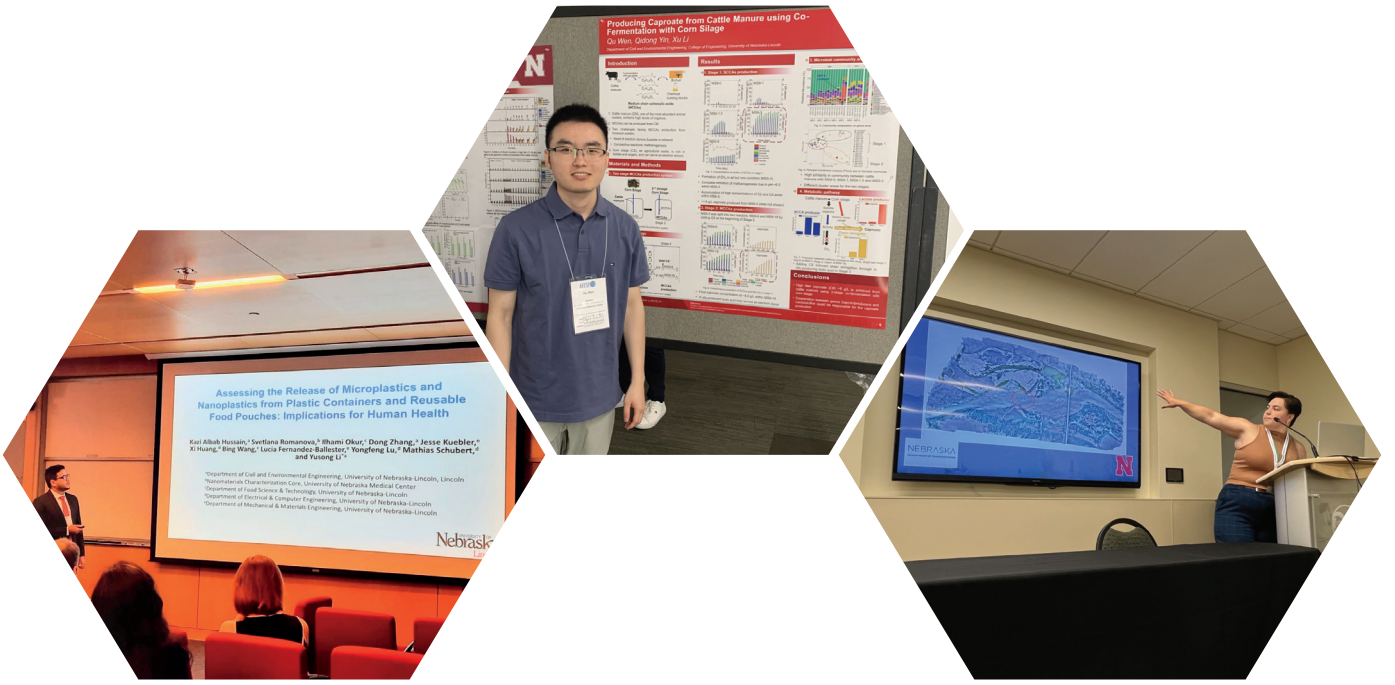
UNL CIVIL ENGINEERING SCHOLARSHIP FUND
Abigail Metschke
Carter Ross

WILLIAM AND ELDRIE BRUNZ FAMILY FARM MEMORIAL
Deven Brown

ALFRED BENESCH & COMPANY CIVIL ENGINEERING STUDENT SUPPORT FUND
Khalilullah Sultani

DR. DEWEY ANDERSON MEMORIAL FELLOWSHIP
Khalid Alkady

Celebrating the impact of scholarships: enhancing graduate students' professional development



CEE is fortunate to have a community of dedicated alumni and donors who understand the transformative power of education. With 15 dedicated scholarship or fellowships funds, CEE provides additional financial support to over 50 undergraduate and graduate students. These scholarships help support our student body and recognizing their achievements. The list of student winners of each scholarship is provided on pages 4-5.

The department provided additional support to graduate students through the James Jirsa Professional Development Award. Jirsa, an emeriti faculty member at the University of Texas at Austin, is a proud CEE alumnus, having received a B.S. in Civil Engineering in 1960. Through his generosity, Jirsa has established an endowed fund aimed at supporting the professional development of CEE graduate students. This fund has not only offered invaluable financial assistance but has also opened doors to new opportunities for CEE students.

This year, six exceptional students were selected as recipients of the James Jirsa scholarship. These scholars were granted funding to present their research at national and international conferences, enabling them to engage with the wider engineering community and showcase their expertise.

Qu Wen, a current Ph.D. student, received the James Jirsa scholarship to travel to the Association of Environmental Engineering and Science Professors Conference in Boston. He presented his work on "Producing Caproate from Cattle Manure Using Co-Fermentation with Corn Silage," co-authored with Qidong Yin and Professor Xu Li.

Reflecting on his experience, Qu noted, "Presenting at the conference offered a valuable platform to engage with other researchers, scholars, and industry professionals. I had the opportunity to exchange ideas and gain new insights about this field. It also improved my communication and presentation skills and provided potential collaborations from peers and experts in the field."

Kazi Albab Hussain, a current Ph.D. student, was also awarded the James Jirsa scholarship to travel to the same conference to present his work on “Assessing the Release of Microplastics and Nanoplastics from Plastic Containers and Reusable Food Pouches: Implications for Human Health.” This research, co-authored with Professor Yusong Li and several other collaborators from UNL and UNMC, addresses a pressing environmental concern that has been featured nationally and internationally, including in a Nature Research Highlight.

Hussain expressed his gratitude, stating, “Attending the AEESP conference provided me with the opportunity to share my research with a wider audience and exchange views. Additionally, it allowed me to learn about the research conducted by other researchers and establish connections. The workshop sessions were also highly beneficial.”

Another recipient, **Chi Zhang**, an M.S. student, used the scholarship to attend the 2023 Hydraulic Measurements & Experimental Methods Conference in Fort Collins, Colorado. Chi presented her research on “Energy Dissipation Optimization for Circular Culverts,” which she co-authored with Professor David Admiraal.

Reflecting on her experience, Zhang emphasized the impact of the conference, saying, “The conference helped me learn the cutting-edge research of my field. I got to network with many people that I would have never had the chance to connect with.”

Molly Likins, also a current M.S. student, used the James Jirsa scholarship to attend the same conference. Her presentation was on “Using a Hydrodynamic Model and UAS Measurements to Better Predict Short-Term and Long-Term Channel Adjustments,” co-authored with Professors Richard Wood, Tirthankar Roy, and David Admiraal, demonstrated her expertise in the field of hydraulic measurements.

Likins emphasized the profound impact of the conference on her development as a graduate student, stating, “The HMEM Conference impacted my development by allowing me to learn from other graduate students and professors, pushing me to think of other ways I can improve my methods and project. The presentation has impacted me as an engineer by developing professionalism skills and networking with professionals in the water resources engineering field.”

The achievements of these four CEE graduate students underscore the importance of scholarships and their profound influence on graduate students’ professional development. Thanks to our alumni’s generosity, these scholars have been afforded opportunities to make substantial contributions to their respective fields.

Mid-America Transportation Center receives $15 million grant

The Mid-America Transportation Center at UNL has won a five-year, $15 million grant to remain the transportation research and workforce development hub for the U.S. Department of Transportation Region 7. This competitive grant is administered by the U.S. Department of Transportation through its University Transportation Centers program, which advances transportation research and technology, and develops the next generation of transportation professionals. The congressionally mandated program has been in place since 1987; the Mid-America Transportation Center first won the competition in 1995 and again in 2006, 2011 and 2016.

The center will receive $3 million per year for the next five years to improve transportation safety and equity. Other partner institutions are Nebraska Indian Community College, Missouri University of Science and Technology, the University of Iowa, University of Kansas and University of Missouri-St. Louis.

Aemal Khattak, the center's director and professor of civil and environmental engineering, said the grant title reflects not only a focus on transportation safety issues, but on equity in transportation safety.

"The Mid-America Transportation Center for Transportation Safety and Equity shows our emphasis on equity-related safety issues," Khattak said. "It reflects our recognition that different population groups may be impacted in various ways by transportation safety improvements. We are going to focus on equity issues in transportation safety, but also look at issues that affect Region 7 in unique ways, such as climate change and supply chain vulnerability."

The grant will allow the center to expand its outreach and education programs, including a new safe driver academy in conjunction with Nebraska Indian Community College. Providing free training to the college's students for the operation of both personal and commercial vehicles, Khattak said, will improve safety on the roadways and provide employment opportunities to the trainees.

Other Mid-America Transportation Center programs, some of which have been in place for more than a decade, include Sovereign Native Youth STEM Leadership Academy, MATC Scholars Program, and Roads, Rails and Race Cars after-school program.

Additionally, Khattak said, the grant will help support the MATC Intern Program, which includes other Region 7 members. At Nebraska, employers in Lincoln and Omaha provide experiences in transportation to Husker undergraduate students, many of whom are in the College of Engineering.

"I feel this is a major win for UNL, the College of Engineering and MATC because it allows us to continue these programs, none of which receive state funding," Khattak said. "All of these activities improve the educational opportunities of young students and, ultimately, also address the workforce needs of Nebraska and the nation in transportation and STEM fields."

Major DoE grants help engineering teams expand innovative energy research

More than $1.4 million in funding from the U.S. Department of Energy (DOE) will allow two College of Engineering teams to expand innovative energy-related research in partnership with national laboratories. The DOE recently announced $21 million in funding for 29 new projects through Established Program to Stimulate Competitive Research (EPSCoR). The University of Nebraska-Lincoln is one of only four institutions to have two projects chosen for this funding program:

Jongwan Eun, associate professor of civil and environmental engineering; Seunghee Kim, assistant professor of civil and environmental engineering; and Yuris Dzenis, R. Vernon McBroom Professor in mechanical and materials engineering, received $675,000 over three years to investigate how the use of inorganic microfibers can make a more resilient barrier material to improve the long-term storage capabilities of vessels that contain high-level nuclear waste and spent nuclear fuel (SNF).

Peter Sutter, professor of electrical and computer engineering, and Eli Sutter, professor of mechanical and materials engineering, received $747,387 over three years to study new classes of semiconductors for use in photovoltaics and information processing. In a previous DOE-funded project, Eun and Kim worked with researchers at Sandia National Laboratories to find materials to make the deep geologic disposal and storage of SNF safer.

By adding microfibers to bentonite, a more durable material can be created to minimize cracking that is caused by the high heat of the SNF inside the canister drying the material on the outside. The new study, they said, strives to understand the mechanical properties of the material as a foundation for developing new and improved barrier materials, especially with extreme soil conditions such as drought. “We know that dry soil is not favorable to contain these materials, which have to be stored safely for 10,000 years or so,” Eun said. “Cracks can lead to leaking, and that is dangerous. That’s why we need to understand the interactions of multiple elements, like the mechanical characteristics of fiber bentonite mixture and the surface energy between bentonite clay particles and the fibers, and that will lead to developing better materials.”

“We are the first group to add this inorganic fiber to reinforce the bentonite, and we found a good outcome - it can lead to less cracking,” Kim said. “We know Nebraska and the United States depend highly on fossil fuels to produce electricity. This grant is very much aligned with the Grand Challenges set by the university, especially in finding more resiliency in our energy systems and working toward decarbonization and a smaller carbon footprint.”

Nebraska study finds billions of nanoplastics released when microwaving containers

Article by Scott Schrage/ Photo Credit Craig Chandler

Experiments have shown that microwaving plastic baby food containers available on the shelves of U.S. stores can release huge numbers of plastic particles — in some cases, more than 2 billion nanoplastics and 4 million microplastics for every square centimeter of container.

Though the health effects of consuming micro- and nanoplastics remain unclear, the Nebraska team further found that three-quarters of cultured embryonic kidney cells had died after two days of being introduced to those same particles. A 2022 report from the World Health Organization recommended limiting exposure to such particles.

“It is really important to know how many micro- and nanoplastics we are taking in,” said Kazi Albab Hussain, the study’s lead author and a doctoral student in civil and environmental engineering.

“Just as we understand the impact of calories and nutrients on our health, knowing the extent of plastic particle ingestion is crucial in understanding the potential harm they may cause. Many studies, including ours, are demonstrating that the toxicity of micro- and nanoplastics is highly linked to the level of exposure.”

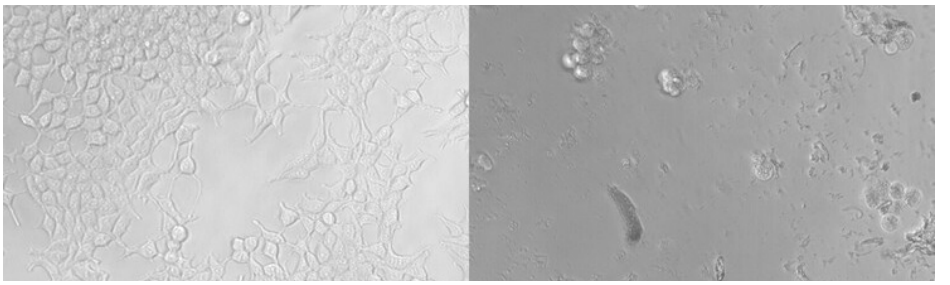
The team embarked on its study in 2021, the same year Hussain became a father. While prior research had investigated the release of plastic particles from baby bottles, the team realized that no studies had examined the sorts of plastic containers and pouches that Hussain found himself shopping for, and that millions of other parents regularly do, too.

The team decided to conduct experiments with two baby food containers made from polypropylene and a reusable pouch made of polyethylene, both plastics approved by the U.S. Food and Drug Administration. In one experiment, the researchers filled the containers with either deionized water or 3% acetic acid — the latter intended to simulate dairy products, fruits, vegetables and other relatively acidic consumables — then heated them at full power for three minutes in a 1,000-watt microwave. Afterward, they analyzed the liquids for evidence of micro- and nanoplastics: the micro being particles at least 1/1,000th of a millimeter in diameter, the nano any particles smaller.

The actual number of each particle released by the microwaving depended on multiple factors, including the plastic container and the liquid within it. Based on a model that factored in particle release, body weight, and per-capita ingestion of various food and drink, the team estimated that infants drinking products with microwaved water and toddlers consuming microwaved dairy products are taking in the greatest relative concentrations of plastic. Experiments designed to simulate the refrigeration and room-temperature storage of food or drink over a six-month span also suggested that both could lead to the release of micro- and nanoplastics.

“For my baby, I was unable to completely avoid the use of plastic,” Hussain said. “But I was able to avoid those (scenarios) which were causing more of the release of micro- and nanoplastics. People also deserve to know those, and they should choose wisely.”

With the help of Svetlana Romanova from the University of Nebraska Medical Center, the team then cultured and exposed embryonic kidney cells to the actual plastic particles released from the containers — a first, as far as Hussain can tell. Rather than introduce just the number of particles released by one container, the researchers instead exposed the cells to particle concentrations that infants and toddlers might accumulate over days or from multiple sources.



A side-by-side comparison of embryonic kidney cells left untreated (left) versus those treated with micro- and nanoplastics (right) for 72 hours.

After two days, just 23% of kidney cells exposed to the highest concentrations had managed to survive — a much higher mortality rate than that observed in earlier studies of micro- and nanoplastic toxicity. The team suspects that kidney cells might be more susceptible to the particles than are other cell types examined in prior research. But those earlier studies also tended to examine the effects of larger polypropylene particles, some of them potentially too large to penetrate cells. If so, the Hussain-led study could prove especially sobering: Regardless of its experimental conditions, the Husker team found that polypropylene containers and polyethylene pouches generally release about 1,000 times more nanoplastics than microplastics.

The question of cell infiltration is just one among many that will require answers, Hussain said, before determining the true risks of consuming micro- and nanoplastics. But to the extent that they do pose a health threat — and that plastics remain a go-to for baby food storage — parents would have a vested interest in seeing that the companies manufacturing plastic containers seek out viable alternatives, he said.

“We need to find the polymers which release fewer (particles),” Hussain said. “Probably, researchers will be able to develop plastics that do not release any micro- or nanoplastics — or, if they do, the release would be negligible. “I am hopeful that a day will come when these products display labels that read ‘microplastics-free’ or ‘nanoplastics-free.’”

The team reported its findings in the journal Environmental Science & Technology. Hussain and Romanova authored the study with the University of Nebraska–Lincoln’s Yusong Li, Mathias Schubert, Yongfeng Lu, Lucía Fernández-Ballester, Bing Wang, Xi Huang, Jesse Kuebler, Dong Zhang and Ilhami Okur. The researchers received support from the National Science Foundation and the Buffett Early Childhood Institute.

Aich seeks innovative ways to clear ‘forever chemicals’ from water

Article by Karl Vogel

Nebraska’s Nirupam Aich is developing ways to limit the dangerous impacts of “forever chemicals” on the world.

Aich, who joined the College of Engineering in January as associate professor of civil and environmental engineering, has gained international attention for his research using nanomaterials in water treatment processes that could remove per- and poly-fluoroalkyl substances that don’t degrade easily.

In 2022, at the State University of New York at Buffalo, Aich was awarded a National Science Foundation Early Career Development Program grant for $500,000 to aid in developing a filtration system for treating water contaminated by PFAS — which are commonly found in Teflon, non-stick cooking pans, electronics, plastic food packaging, firefighting foams and many hydrophobic coatings. That research is continuing at Nebraska.

“My research mainly focuses on advanced materials and advanced nanomaterials for water treatment. We look at different emerging contaminants, particularly PFAS, and how to remove them using nanotechnology and nanomaterials,” he said. “For environmental solutions, we want to make sure these nanomaterials don’t become a problem later, so that’s why we are making safer-by-design nanomaterials for water treatment and environmental limitation.”

Nanomaterials have been researched for water treatment for decades but, Aich said, the challenge is nanomaterials manufacturable for water treatment and effective for PFAS treatment.

“The problem with PFAS is that they are very difficult to degrade in the natural environment or by microorganisms,” Aich said. “They have strong carbon fluorine bonds, and breaking them is important, which is why we are using 3D-printed nanomaterials to break these bonds. “And with the unique water filtration device we are developing, we will be able to take PFAS from water and break them into non-toxic forms.”

The range of toxic effects that PFAS pose to humans is broad, ranging from myriad diseases — including cancers (particularly thyroid cancer) — as well as fertility issues among men and neurodevelopmental disorders in children. The Environmental Protection Agency designated PFAS as a national priority pollutant and in March 2023 announced a regulatory limit for the two most prevalent types of PFAS to ensure drinking water safety.

Reaching the EPA’s goals for PFAS limits requires innovative technologies because the current technologies either are cost-prohibitive or in-effective, Aich said. His group is working on several nanotechnologies that can effectively destroy PFAS from water and wastewater and those projects are currently supported by funding from NSF, National Institute of Health and the Department of Defense.

Aich’s research efforts on important environmental pollution issues and nanotechnology have not gone unnoticed. Recently, Aich received an invitation to participate in an oral history interview with the Science History Institute. The institute is a library, museum and center for scholarship dedicated to promoting historical understanding of the sciences.

The institute’s Center for Oral History has a mission to preserve the history of science and engineering by recording interviews that feature the thoughts, memories and perspectives “of individuals central to the modern scientific endeavor.” The collection includes more than 700 interviews that include Nobel laureates, National Academy members, National Medal recipients and other researchers whose work has impacted the scientific community.

The center is also highlighting experiences and contributions of immigrant scientists through its “Oral Histories of Immigration and Innovation” project. Aich said the center has expressed interest in talking about his experiences growing up in Bangladesh and his work to protect public health through water quality engineering and physical-chemical treatment of drinking water and wastewater.

“In the College of Engineering, we are in a very exciting time of growth, and that’s why I’m here,” Aich said. “I’m excited about working with my environmental engineering colleagues, who are doing extraordinary research in many different aspects of environmental pollution and public-health protection, and my work fits in.

“We can help Nebraska in first understanding this emerging contaminant pollution, then fighting this pollution even before it happens. Then if we develop those technologies and a resilient infrastructure, that can help the world, too, because it’s a global problem.”

Research to explore how transportation officials use social media in emergencies

Christine Wittich, assistant professor of civil and environmental engineering, is leading a national effort to gather information on how state departments of transportation use social media during emergencies, with an eye toward developing best practices to improve crisis communications.

The research focuses on social media use during emergencies ranging from natural disasters to civil unrest to large traffic jams. It's being funded by $45,000 from the National Cooperative Highway Research Program through the National Academy of Sciences.

Departments of transportation have a variety of policies and protocols for dealing with emergencies, but there's considerable variability in how they might use social media at these key times, Wittich said. It can be essential in detection of emergencies, damage assessment and evacuation plans.

"Different states leverage it in different ways," said Wittich, whose research focuses on analysis and design of structures to improve resilience to natural hazards and extreme events. "There's so much opportunity there, but there's sort of a mismatched approach across the country and even within states. We're getting a lay of the land of what departments of transportation are currently doing, what they would like to do and what are some barriers."

"There's a two-way street with social media during emergencies. There is getting information out to the public. There are a lot of states that are excellent at that. But we are also looking at how agencies are looking at what's coming in from social media — harvesting and leveraging the social media data." That might include vetting such information for accuracy, then figuring out how to use it so it's useful to the public, she said.

Wittich's project will document the social media practices of departments of transportation during emergencies across the country. Information the researchers are looking for includes:

- Types of emergency scenarios for which social media data is being leveraged, including natural disasters, hazmat incidents and civil unrest.
- Types of social media data monitored and captured, including Twitter, Facebook, Nextdoor and LinkedIn.
- Use of data before, during and after emergency events, including capturing, reviewing, internal and external sharing, and messaging and decision making.
- Processes and training for filtering and vetting data for accuracy, relevance and actionability.
- Barriers to collecting and using data, such as privacy issues, infrastructure, access restrictions and agency policy.
- Departments of transportation documented policies regarding use of social media data.
- Departments of transportation metrics for measuring effectiveness of collecting and using social media data.

Wittich hopes to use the information gathered this year for a future project to develop best practices for departments of transportation.

UNL Midwest Roadside Safety Facility launches fifth project for DOD

Article by Dan Moser

Researchers from the University of Nebraska–Lincoln (UNL) College of Engineering are continuing development of a modified guardrail system for U.S. Transportation Command through a new $800,000 contract award.

Facilitated through the National Strategic Research Institute (NSRI) at the University of Nebraska, the project leverages the one-of-a-kind installation and full-scale testing capabilities of the UNL Midwest Roadside Safety Facility (MwRSF). The new contract builds upon four previous projects, bringing the total funding for this work to $5 million since 2015.

“We are pleased to contribute to the DOD using our specialized skills and facilities,” said Dr. Cody Stolle, assistant director for MwRSF. “This is a tremendous opportunity to protect warfighters domestically and internationally. What we learn here can not only help keep our military bases safe but also enhance our research for civilian safety as well. Our research will contribute to life-saving, cost-effective protection systems to shield critical facilities.”

In 2016 and 2017, the MwRSF team designed and full-scale tested a non-proprietary version of an anti-ram barrier based on its Midwest Guardrail System (MGS), the most widely used roadside barrier in the U.S. The anti-ram barrier successfully captured a flatbed single-unit truck as well as a low-profile, heavy sedan, when impacting at 30 mph and at a perpendicular angle. The tested barrier was accepted by the Military Surface Deployment and Distribution Command, Transportation Engineering Agency and the U.S. Army Corps of Engineers Protective Design Center.

Through this new award, the research team will further develop the anti-ram barrier to resist harder, more difficult and more strenuous impacts while maintaining the non-proprietary design requirement.

The culmination of the project will be the ability of the new barrier to absorb a 15,000-pound truck impacting at 50 miles per hour at a perpendicular angle. Only a limited number of laboratories in the country can perform this kind of work and UNL is one of them, Dr. Stolle said.

In addition to Dr. Stolle, the project team includes:

- Dr. Ronald Faller, Director and co-founder of the MwRSF team
- Dr. Joshua Steelman, who specializes in structural engineering and bridge design
- Weston Kelly, a graduate student in mechanical engineering
- Andrew Loken, a graduate student in civil engineering

“This work highlights what we prioritize here at NSRI — protecting those who protect us all,” said Maj. Gen., USAF (Ret.) Rick Evans, NSRI executive director. “It also showcases the use of Nebraska’s unique, leading facilities and the opportunities these projects can provide to students. I appreciate Dr. Stolle’s leadership, and I look forward to seeing how the work progresses over the next several months.”

Ph.D. student Sutton chosen to Voices for Science fellow cohort

Meredith Sutton

Meredith Sutton, a doctoral student in environmental engineering, has been chosen for the American Geophysical Union (AGU) Voices for Science (VFS) fellow cohort, a one-year program whose participants conduct outreach activities in their local communities with the goal of educating general audiences about science and engineering.

VFS, launched in 2018, focuses on helping scientists and researchers to better communicate the value of their work to decision makers, journalists and public audiences through two tracks: policy or communications.

Sutton, who received an environmental engineering master's degree in 2022 from Nebraska, will be engaged in the policy track, focusing on working with government and industry officials who have influence over programs and policies that affect all areas of science.

Recently, Nebraska Engineering interviewed Sutton about VFS and how it meshes with her vision for her engineering career.

What is the Voices for Science program and what does it mean to you?
The American Geographical Union is a broad-level professional society for earth science and space science. I present my research at their conferences every year. AGU and Voices for Science are pretty heavily involved in working with scientists to spread what they're doing with their research much more broadly than just the academic community.

"I think it's really important that we take the time to sit down and consider how we are doing our research and how the results of that research are getting out to the broader community, because at the end of the day, our research is to help benefit the communities we are working in.

What inspired you to apply to be part of VFS?
My research has always been very community-focused and making sure (it) has been very accessible has always been really important. With Voices for Science, we receive workshops and training on how to communicate our research with different audiences, which we use to develop outreach projects. The projects are ours (fellows) to design, so you can pursue topics important to you and related to your research, and the AGU staff help you develop them. One idea I'm thinking about right now involves our citizen science project volunteers. Creating a follow-up process to make sure they know that they can reach out to their local NRD if they have any concerns about the quality of water in their well or nearby creek that they sampled through our project. I do a lot of water quality research with a focus on nitrate and microplastics, which are an emerging contaminant. A lot of that involves informing the groups that I'm working with about what I'm looking for, the issues that these pollutants might cause, and where we think they're coming from. In our citizen-science water-quality project we work with volunteers to educate them about different ways to monitor water quality for common pollutants, like nitrate and phosphate, and then ask participants to take measurements and send the data back to us. This is important, because it not only helps empower and educate these communities on local water-quality issues, but it also helps researchers get a much wider spread of data (from) across Nebraska, especially in rural areas where it might otherwise be difficult to collect.

Why did you decide on the policy track of VFS? How do you see it helping with your future?
I am interested in learning about working with policymakers – Congress, local government agencies, community members and journalists – and how I would need to present my work to them, so it can be used to make policy. The AGU workshop (in April) was about making connections – how to work with national-level policymakers, how meetings with them go, and developing a handout that most Congressional staff expect if you meet with them.

I got to meet Mike Flood (the U.S. representative from Nebraska's District 1), and I talked to his staffer about my research with citizen scientists, the importance of making sure that it's funded, and all the good that UNL research does in the agricultural community here in Nebraska. Those types of meetings put issues important to you on their radar. Anyone can call, send emails, or go talk to your representative about issues. One of the larger goals for the policy track is making sure we (scientists) are aware of that and that we're comfortable being able to have these important discussions with our representatives.

Have you decided on a path for after you complete your doctoral degree?
Not really, but this program provides a great opportunity for me to try something new. I've been exploring different career options, because the academic job market can be very competitive, and this seems like a great option for me since I really enjoy making sure that research is accessible to everyone. I'm a first-generation college student, so I've spent the entire time I've been in college (communicating) what I'm doing in language that's accessible to my family and the community I grew up with. Plus, we (researchers) are getting funding from the government to do this research, and to work with these different communities, so we need to make sure that communities are also benefiting from this research because that's the goal at the end of the day.

Examining climate resiliency through soil

Article by Dan Moser

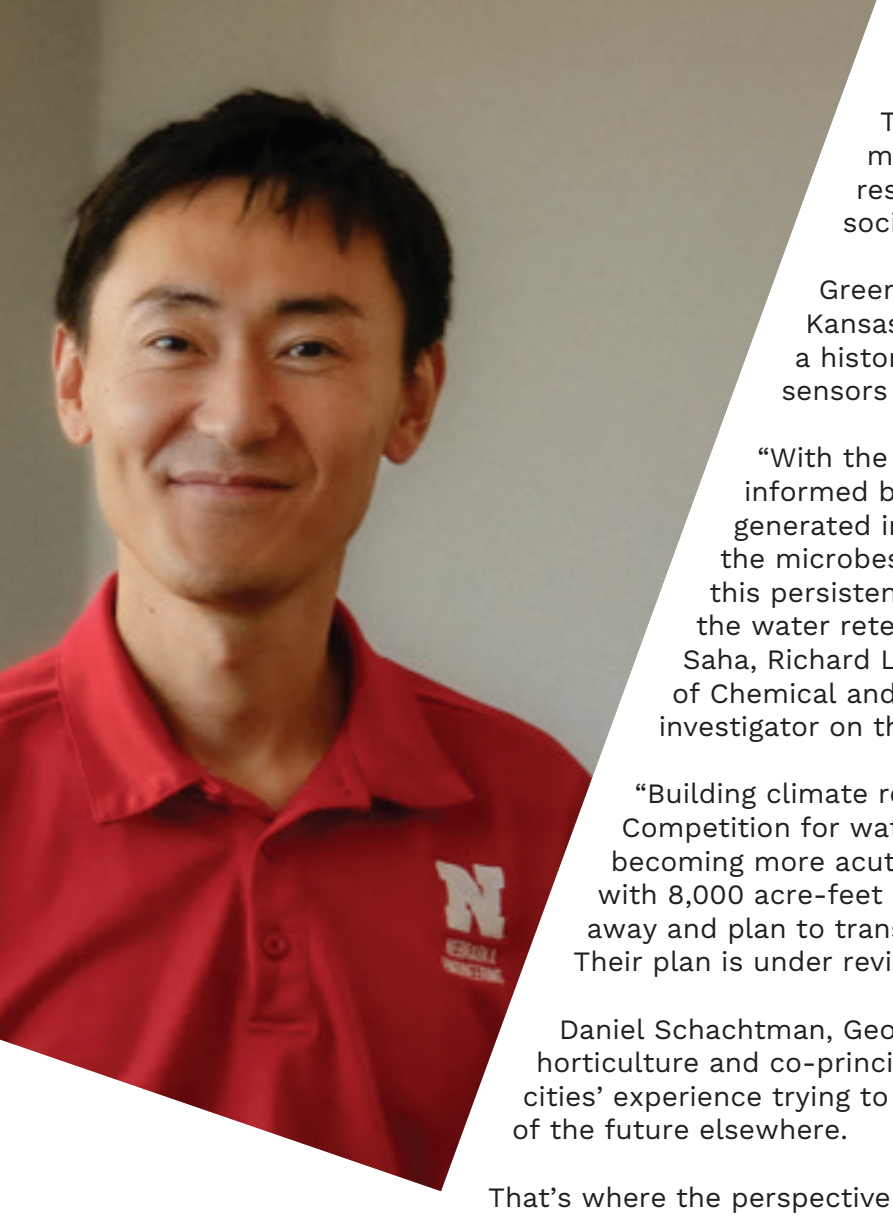
Water stress in the High Plains threatens agriculture and rural communities, and it's expected to worsen with climate change. University of Nebraska–Lincoln researchers are joining with colleagues at two other universities to find ways to improve preservation of soil moisture in farm fields and help rural areas become more climate resilient.

The interdisciplinary team from Nebraska, Kansas State University and Langston University in Oklahoma will focus on three states where water stress is especially acute. As of October 2022, 100% of Oklahoma and Nebraska and 98.5% of Kansas were in drought. As drought conditions persist because of climate change, it's expected farmers will have to irrigate more, and even with more irrigation, yields are expected to drop

"In regions with irrigation, more water will be needed under the hotter and drier conditions," said Seunghee Kim, associate professor of civil engineering and the project's lead investigator. "Preservation of soil moisture will therefore be a critical objective under rainfed and irrigated conditions."

The MICRA project — microbial innovations for climate-resilient agriculture — brings together engineers, mathematicians, soil and agricultural scientists, social scientists and agricultural economists to conduct research, education and outreach. It is funded by a four-year, $6 million grant from the National Science Foundation, $2.1 million of which will come to Nebraska.

Researchers will experiment with soil amendments — soil-wetting bacteria — and biochar — charcoal produced from plant matter — to measure their impact on soil water-holding capacity.



The team also will combine research in soil moisture sensing, microbial communities, plants' response to drought, irrigation technologies and socio-economic analyses.

Greenhouse, lab and field testing will occur at Kansas State and UNL, while students from Langston, a historically Black university, will implement soil sensors at the sites.

"With the application of computational modeling informed by machine learning, based on the data to be generated in the project, we will have a better idea how the microbes living in the soil behave differently with this persistent drought condition and how that impacts the water retention capability of the soil," said Rajib Saha, Richard L. and Carol S. McNeel Associate Professor of Chemical and Biomolecular Engineering and co-principal investigator on the project.

"Building climate resilience in rural America is critical," Kim said. Competition for water between rural communities and irrigators is becoming more acute. Hays and Russell, Kansas, bought ranchland with 8,000 acre-feet of water rights to an aquifer dozens of miles away and plan to transport water about 70 miles for municipal use. Their plan is under review, with court action likely.

Daniel Schachtman, George Holmes Professor of agronomy and horticulture and co-principal investigator on the project, said these cities' experience trying to guarantee access water could be a harbinger of the future elsewhere.

That's where the perspective of economists and social scientists becomes crucial.

"If we can slow down depletion of the aquifer, that has important economic implications," said Taro Mieno, associate professor of agricultural economics.

In four years, researchers hope to "have a much better understanding of the types of microbes and the types of biochar materials that can help make better use of water in agriculture production and also better use of nutrients," said irrigation engineer Saleh Taghvaeian, associate professor of biological systems engineering.

Taghvaeian said researchers hope to have a clear cost-benefit analysis of the strategies and to be able to convey those findings to farmers who ultimately must be convinced to implement solutions in their fields. The project will include surveys and focus groups regarding irrigators' perceptions about novel technologies.

Nine graduate and 13 undergraduate students are expected to be on the MICRA team with 15 faculty from the three institutions.

Honors students impact community by leading after-school club

Article by Avni Srivastav

Throughout the school year, Nebraska Honors students host semester-long after-school clubs in the community. Through the program, undergraduate students get paid, experiential learning opportunities that help them develop specific skills while meeting a community need.

University Communication and Marketing talked with Spencer Knight, a civil engineering major from North Liberty, Iowa, and Rohan Tatineni, a biochemistry major from Winter Haven, Florida, who lead a STEM club at a local elementary school.

How would you explain Honors Afterschool Clubs to someone that's never heard of it?

Knight: Honors Afterschool Clubs are part of a program at UNL that promotes experiential learning at the university. Essentially, students are assigned to an elementary, middle or high school near Lincoln and are given the opportunity to lead a club about any topic they are passionate about.

Tatineni: Afterschool Clubs are an amazing way to demonstrate your interest in a particular topic and get to share that joy with others. Through the Honors Program, anyone can get matched with an underserved school site near UNL. They can then lead a club over virtually any topic they want for a semester with a partner.

Talk about why you decided to apply to Nebraska, and specifically go into STEM.

Knight: During my college search, it often felt as though the institutions I researched had a "you need us" attitude. But with Nebraska, I got the sense that they wanted me. When I came for a college visit, everyone I interacted with was incredibly kind, answered all my questions, and encouraged me to seek out different opportunities on campus if I chose to attend. I chose to be a STEM major because I want to make a difference in the world, and to actively work to improve the lives of others.

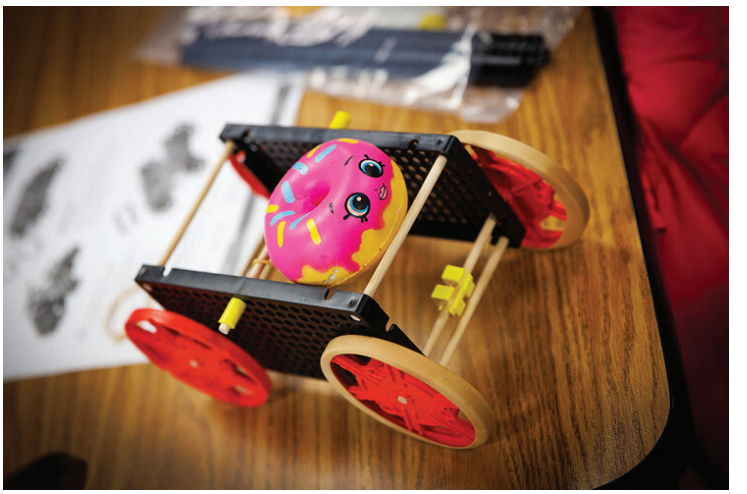
Tatineni: I applied to UNL because I was already quite familiar with Lincoln as I have been here since I was in kindergarten. My parents are already here, and the tuition was low compared to other out-of-state schools. In addition, I knew that UNL had a solid biochemistry program, so coming here was an easy decision. I have always been fascinated by science growing up, especially the weather and biology. This interest has led me to challenge myself further through difficult courses in high school and even major in biochemistry.

What is your favorite part about participating in Honors Afterschool Clubs?
Knight: So far, my favorite part about our STEM Club is seeing the awe on students' faces when we demonstrate a concept in our activities. I love seeing their faces light up when they see something cool happen.

Tatineni: My favorite part about participating Honors Afterschool Clubs is the planning and execution of the lesson plans. Having so much flexibility with what we can teach our students allows for so much fun while planning. In addition, leading a lesson plan can be scary, but it is so rewarding. Allowing kids to experience the fun of STEM, while hopefully sparking a lifelong interest in STEM makes participating in Honors Afterschool Club worth it. For instance, seeing how excited our students get when they participate in an experiment such as Pepsi and mentos or walking water makes it all worth it.

Explain the process you went through to create the curriculum for your club.
Knight: During the first few weeks of the semester, Rohan and I met up to discuss what we wanted from the club and what sort of activities we would want to do. Rohan was interested in teaching science, but I was excited to teach engineering topics. We decided to split our club up into two halves. First, we would focus on science, then after fall break, we would switch over to engineering. After about a week of brainstorming, we narrowed our list down to 10 activities, then put them in an order that made sense with our club schedule. Lastly, we prepare a detailed lesson plan for each individual club session in the week beforehand.

Tatineni: Spencer and I were assigned as partners. We both had different ideas for our club that were quite similar. We discussed possible plans for the clubs and decided to focus on a STEM club with two distinct halves in our club. Science would be during the first half and would consist of various fun experiments that apply various science concepts. We would also focus on the scientific method and thinking like a scientist. The second half would be over engineering and utilize a Makerspace kit with fun activities like rubber band racers. After making this plan, we came up with experiments for the science part and Makerspace activities for the engineering part. Then we focused on creating a PowerPoint to aid in teaching our students concepts behind the experiment or activity.



What impact do you hope to make on the students you're working with?
Knight: Young students don't often get the opportunity to learn about engineering topics in their classrooms. I hope to teach our club members about some engineering-specific topics and show them how much fun engineering can be.

Tatineni: I hope our students get to see how fascinating STEM can be. I understand that they will likely not remember the finer details of each lesson; however, I hope that they can experience the joys of science and use that to develop a lifelong love for STEM.

What or who inspires or motivates you?

Knight: There are a lot of things that motivate me to do my best in every aspect of my life, but the common denominator has always been my parents. Ever since I was young, they have encouraged me to work hard, give nothing but my best, and try new things. I look up to them, and I know that if I continue to work hard, it will pay off in the long run.

Tatineni: My parents have instilled a hard-working mentality that keeps me going. In addition, my family's support has always been vital in pushing me forward. Also, the ability to make an impact keeps me going as I know that through hard work, I can make a difference.

Who has impacted your time at Nebraska?

Knight: The biggest impact on my life here in Nebraska has been through all of the connections I have made with fellow students. I am an out-of-state student, and I was worried I would feel out of place. But after one year of meeting new people and making new friends, UNL feels like a second home.

Tatineni: Virtually everyone I met at UNL. I have made so many different connections with other students and faculty that have made an impact on my time at UNL. All these interactions have helped me follow the path I am currently on and keep me going.

How will your involvement in teaching youth about STEM topics help you in the future?

Knight: There are quite a few skills that I have developed over the course of this semester as a result of our STEM Club. First and foremost, my presentation skills have improved greatly. It is important to know your audience, especially when working with young students (who have very short attention spans). Secondly, I have gotten a lot better at improvising and thinking on my feet. Sometimes, lessons don't go according to plan, so we have to come up with different ways to keep students engaged. Lastly, I have learned a lot about planning things and coordinating with other people. I have had to communicate with Rohan, our site coordinator, our club coordinator, and even the Community Learning Center in order for this club to be successful.

Tatineni: I would say I tend to be more introverted. As a result, putting myself in this position to lead a club of students is daunting. However, participating in Honors Afterschool Clubs has been a rewarding experience. I have learned the importance of patience, improvisation and confidence. These skills will help me as I go on to my future schooling/career. For instance, having patience is a vital skill, especially when working with others. Improvisation will always be a useful trait to have. Finally, confidence will help me engage with others better. All these traits I have learned through this experience will be vital to success in the future.

What is one piece of advice you would give a student looking to give back to their community?
Knight: You get out what you put in. Community service looks great on a resume, but the true rewards come when you dedicate yourself to the betterment of those around you. You can form connections with people outside your usual cliques, gain unique experiences, and learn to see from new perspectives.

Tatineni: I would first brainstorm different ways you could give back to the community or ask advisers and check out the weekly emails from your major (ex. Biochemistry Mid-Week Update) for opportunities. It is important to find something you are interested in because if you feel forced to give back, then you will never have fun or be truly invested in it. Then I would go for it. If you don't like the opportunity, you can always leave. If you never try, then you will never know its potential.

What is something you've learned that will stick with you after you graduate?
Knight: Be nice to everyone, because you never know when you will see them again. At this point in my life, I know many different groups of people from many different walks of life. While I may not see most of them anymore, I can be satisfied knowing that I made a positive impact in their life.

Tatineni: How many ways that you make an impact. There are simple ways such as holding open a door for someone or complimenting someone or you could do something like Honors Afterschool Clubs to directly make an impact on someone's life. Through UNL, I have truly learned the power of making an impact and this will stick with me forever.

What do you hope to do after you graduate?
Knight: After I graduate, I hope to find my place in the world. I don't have any specific companies I would like to work for, and I don't even know where I want to settle down. My only hope is that wherever I am and whatever I end up doing, I am happy and have no regrets.

Tatineni: I hope to attend medical school and eventually become a doctor. I have always been fascinated by the human body and health care. As of now, I am unsure of what type of doctor I want to be.

Faculty Retirements: Dr. Gary Krause and Dr. Massoum Moussavi

The Department of Civil and Environmental Engineering recently bid farewell to two remarkable faculty members who made extensive contributions to the department's teaching endeavors. Professor Gary Krause and Professor Massoum Moussavi retired from their academic careers in May 2022 and August 2023, respectively.

Krause, who retired in May 2022, dedicated 32 years to the department, leaving an indelible mark on generations of students. He taught classes at the undergraduate and graduate level in structural engineering, most recently including introductory courses in Mechanics and Structural Analysis as well as advanced graduate-level courses in Steel Design. Krause's commitment to teaching excellence earned him numerous accolades, including awards at the department, college, and university levels. His influence extended beyond campus, as he served as a mentor and course instructor for the American Society of Civil Engineers' ExCEEd Teaching Workshop for several years.

Moussavi's retirement in August 2023 marked the end of a 39-year academic career, with 36 of those years dedicated to CEE at UNL. In his own words, he is "finally graduating." During his time at UNL, he taught a wide range of courses in transportation engineering at the undergraduate and graduate levels, most recently including courses in highway engineering, highway design, urban transportation planning, traffic engineering, and airport planning and design. Moussavi received several awards for teaching and mentoring excellence over the course of his career.

As we celebrate the exceptional careers of Professor Moussavi and Professor Krause, we also express our deepest gratitude for their commitment to the department's mission. Both educators left an indelible impact on the students who have gone through this program and on the department.

Four CEE Students Earn Prestigious National Graduate Fellowships

Four students have been awarded highly esteemed national fellowships for their dedication to research and academic excellence from the National Science Foundation (NSF) and the United States Department of Transportation (USDOT).

Stephanie Perez of South Sioux City was recently awarded the NSF Graduate Research Fellowship, a distinction that recognizes and supports exceptional graduate students in the fields of science, technology, engineering, and mathematics who are pursuing research-based masters and doctoral degrees at U.S. institutions. Perez earned her bachelor's degree in environmental engineering in Spring 2023 and was an undergraduate researcher in the Environmental Quality and Communities Research Lab led by Professor Shannon Bartelt-Hunt. Perez was an active member of the Society of Hispanic Professional Engineers and Engineers Without Borders during her time at UNL. She plans to pursue a doctoral degree in environmental engineering at Carnegie Mellon University, where she will research air pollution in Africa.

An additional three CEE students - Aaron Lechtenberger, Andrew Loken and Russell Masterson - were awarded the Dwight D. Eisenhower Transportation Fellowship from the USDOT. Loken, a doctoral student in civil engineering, along with Lechtenberger and Masterson, who are pursuing master's degrees in civil engineering, have been recognized for their dedication to advancing transportation research. The Eisenhower Transportation Fellowship Program plays a crucial role in funding graduate students' research and encourages them to present their findings at the Transportation Research Board annual meeting in Washington, D.C., fostering the development of the next generation of transportation professionals.

These prestigious fellowships underscore the hard work and dedication of student researchers in CEE. We applaud the dedication and achievements of Stephanie Perez, Aaron Lechtenberger, Andrew Loken, and Russell Masterson, and look forward to following their careers.

Celebrating Diversity: Sadie Khalil

In the College of Engineering, all are welcome. To better share the stories of how our faculty, staff, students and alumni are diverse in their many varying forms, various heritage and other nationally recognized months are celebrated and individuals featured.

Describe a bit about your personal and/or professional background.
I am currently a sophomore majoring in Civil Engineering with a double minor in Environmental Engineering and Mathematics. I am originally from Gilbert, AZ and moved to Nebraska two years ago to become a student athlete at the collegiate level and attend UNL College of Engineering.

What is your role in the College of Engineering – and what do you enjoy (love!) about what you are doing?
As a Civil Engineering major, I have found a real passion for serving my community and that is why I love being a Civil Engineering student. I am looking forward to getting more involved in Environmental Engineering because I would like to work within that concentration in the future.

As a student in the College of Engineering, I love getting involved in programs and clubs with my peers. I am proud to be apart of the Multicultural Engineering Program where I get to interact with other diverse engineering students that have the same aspirations that I do. I am also on the Diversity and Inclusion Committee for the CEE Department where I get to be hands on in trying to improve the diversity and inclusion within the college as a voice for fellow students.

Why is it important to celebrate one's heritage?
It is important to celebrate one's heritage because it embodies who you are and where you come from. Personally, being part Lebanese is important to me and my family because it encapsulates who we are as a family. My family celebrates our heritage through Middle Eastern cuisine that has been passed through generations of my father's side of the family. Specifically, my dad and I love to make Dolmas (grape leaves) and Kibbeh.

How do you bring your own unique background to your role/responsibilities in the college or your professional life?
As a diverse student within the College of Engineering, I love getting involved in programs and clubs with my peers. I am proud to be apart of the Multicultural Engineering Program where I get to interact with other diverse engineering students that have the same aspirations that I do. I am also on the Diversity and Inclusion Committee for the CEE Department where I get to be hands on in trying to improve the diversity and inclusion within the college as a voice for fellow students.

Celebrating Diversity: Sidney Matthias

Describe a bit about your personal and/or professional background.
I am a fourth year Civil Engineering major, with an emphasis on water resources. I actually chose to major in engineering on an impulse decision. My friends in high school were majoring in engineering, and I figured since we like a lot of the same things, I would like it, too. I picked civil engineering while filling out college applications without knowing anything about the field. When I got to CIVE 112: Introduction to Civil Engineering, I learned about environmental and water resources engineering. I have always been passionate about sustainability, but now that I have moved through my college career, I am most passionate about clean water access throughout the world. I'm really fortunate that the major I picked in a spontaneous college application moment was the one for me! This summer, I participated in the college's Partners in Pollution Prevention Program with Dr. Bruce Dvorak and Dr. Robert Williams. I was assigned to work at Becton Dickinson and Company in Columbus, Nebraska. As an intern, I worked on recycling streams, solar panel installation, and wastewater treatment projects. Working in sustainable technology has been both exciting and rewarding to me.

What is your role in the College of Engineering – and what do you enjoy (love!) about what you are doing?
Last year I worked as a Women in Engineering Pathway Program mentor. The Women in Engineering Pathway is a scholarship and mentorship program to create community within a cohort of freshmen women in the college. I worked both as a student teaching assistant for ENGR 10: Freshmen Seminar and a peer mentor. I loved guiding those women through their transition into college and seeing where their freshmen year took them. I also have worked as an Engineering Readiness Academy Peer Coach for another group of incoming students. We toured campus, talked about possible classes they would have, and learned a lot about student organizations. I loved seeing them find things to look forward to within their college careers. In both peer mentorship positions, the most rewarding thing was that I was able to celebrate with them throughout the year as they passed classes, were accepted into research, or elected to leadership positions. The biggest role I play on campus is within the college's Engineering Student Advisory Board (eSAB). I've had too many great opportunities within this organization to name them all. Some of them include going to the Regional Midwest National Student Engineering Council Conference at the University of Notre Dame my freshman year. UNL won the 'Best in the Midwest' award at that conference! I also worked as the Outreach Committee Chair this past year. Upcoming next semester, I will be Vice President of Membership on the Executive Leadership Team in eSAB.

How do you bring your own unique background to your role/responsibilities in the college or your professional life?
Most of the roles I play in the College of Engineering are about creating community and uplifting the people around me. I think this kind of skill is intrinsic to all LGBTQIA+ people. There haven't always been guarantees that the places or situations I go into will be accepting to me as a lesbian. When this happened, I had to work to find like-minded people. Making connections and fostering relationships like that is what all LGBTQIA+ communities have done throughout history.

How can others be allies to you and others in the LGBTQIA+ community?
To be an ally, the most important thing you can do is spread acceptance. Something to remember about celebrating Pride is that we wouldn't have Pride if the treatment of LGBTQIA+ people in this country has been great throughout history. On campus, using people's correct pronouns, going to the Women's and LGBTQIA+ Center's events, and showing support for community-based student clubs like oSTEM establish positive relationships. Some of the college's greatest assets are the Recognized Student Organizations (RSOs). These RSOs have a variety of purposes: some are design teams, some are research-based, and others are community-based. Community-based clubs are especially important as they celebrate the diversity of the students in engineering, as well as find a place to meet people who are going through similar college experiences. Other RSOs can follow in the example of creating a more accepting space for all kinds of students. To be an ally, focus on welcoming people from all types of backgrounds. An increase in diversity and inclusion efforts lead to more positive student experiences!

Martinez works to inspire others to pursue their dreams

Article by Katie Black

How did you choose your major?

Since I was young, I was fascinated with building anything I could get my hands on, such as Legos and Lincoln Logs. Although I was always interested in my STEM courses in high school, I didn't know I wanted to major in civil engineering until my senior year of high school. It was at that point that I had a strong support system that inspired and motivated me to pursue a career in civil engineering. I became intentional about learning more about engineering to understand the design process for vertical and horizontal construction. The most satisfying part about civil engineering for me is seeing a project throughout the various phases and delivering a reliable project to the community. I am passionate about learning more about civil engineering practices, and I look forward to applying my knowledge to real-life projects.

You're really involved on campus — from the Multicultural Engineering Program to the American Society of Civil Engineers — and are in leadership positions for Latinos in STEM and Engineering Living Learning Community. Why was getting involved important for you and what have you gained from these experiences?

From the moment I stepped foot on campus, I wanted to become involved in student organizations to create a greater sense of community and support. Throughout my past two years, my involvement has led me to assume more leadership roles. It has allowed me to create a close bond with my peers and I have genuinely enjoyed my time as president for the Engineering Living Learning Community and vice resident of communications for Latinos in STEM. I have gained experience managing large groups of people, creating events and improving my non-technical skills. Additionally, other groups such as the American Society of Civil Engineers and the Concrete Canoe team has allowed me to expand my technical knowledge about engineering. More importantly, I have made numerous valuable friendships.

Were you intentional about joining groups like LSTEM and the Multicultural Engineering Program?

As a Mexican American engineering student, I knew I would not be able to relate to some of my peers from a cultural perspective; therefore, I was intentional about joining groups that shared similar backgrounds as myself. Latinos in STEM and the Multicultural Engineering Program are organizations that strive to engage underrepresented groups in engineering. They have helped me form friendships with people from different cultures and allowed me to engage with my own roots and traditions. Having the opportunity to help lead LSTEM has allowed me to continue promoting it as an inclusive and welcoming organization, regardless of cultural background. I have enjoyed organizing events that reflect my own traditions and informing others about their importance.

Talk about your experience as a Buffett-Thompson Scholar. How has being part of this community changed your college experience?
As a first-generation college student, the college process and experience were completely new and intimidating. I did not know what to expect from college or if I would ever become comfortable away from my family. Fortunately, the college transition was easier with the help of the Buffett-Thompson Community. Throughout my time at college, I enjoy interacting with the community because there are things and experiences only a particular group can relate to. I have received overwhelming support from this program, which contributes to my attitude, character and continued success. I am extremely grateful to be part of such a healthy and supportive community.

Is there anything you hope to accomplish in your lifetime?
There are many things I want to accomplish but there is one goal that encompasses many smaller ones — I want to inspire others to find their passion and pursue their dreams. Everyone deserves to live their life doing something they love, and I want to help others reach that point. I enjoy helping others and I hope to be a role model for others in the future.

What or who inspires you?
I owe my success to many people including high school teachers, friends and family but my main inspiration are my parents. They have taught me everything I know today, and they have shaped my values and morals. I look up to them because they have sacrificed their life for my sister and me — that is something I will never be able to pay back but I will try. They help me push through obstacles and I work hard to make their sacrifices worth it.

What is your advice to other students looking to make an impact on campus?
My biggest piece of advice to students willing to make an impact on their community is to not be afraid of initiation. It can be uncomfortable or scary to seek new adventures, but it is only in these situations where you will grow as a person and as a leader. As a first-generation student, initiation in college was difficult but it is attainable and will put you in a better position to achieve your goals. It will open doors to opportunities and allow you to view other peoples' perspectives. Equally important, you will be able to connect with people on a personal level and engage in work that will positively affect your community.

Yackley aiming for impacts through civil engineering

Article by Katie Black

What draws you to engineering?
I was never the kid who knew what I wanted to be when I grew up. By the time I was transitioning to college, that became a huge burden on my shoulders. I wanted to help people, that's what I knew, but I had no idea how I would get there. I asked for help in finding a path, and with the help of my academic advisor, I gained the assistance of Career Services. I decided to pursue a major in civil engineering. I want to build a new foundation for community expectations, starting with structural sustainability and wastewater system design to cultivate environmental safety.

I love the career path I found. It is full of never-ending opportunities to grow and change. As a future engineer, I realize how vital my role will be in creating real change that will have an impact on the lives of so many. That is my favorite part of engineering. It is all about a life of using your creativity and skill to cultivate real change in and for those around you.

Talk a little about being a woman in STEM.
As a woman in a male-dominated field, I have a different viewpoint than 80% of my classmates, and this comes with both challenges and opportunities. As an engineering student, I recognize the responsibility that is in my hands to make a better future, and as a future female engineer, I have an added responsibility to the women of this field as well. I want to show future generations that just because you look a certain way, it in no way determines how successful you will be, in no way changes how much of an impact you will have on a project, and in no way makes your ideas lesser than the majority sitting around you. The proof will be the projects I am a part of throughout my career.

Why did you join the UNL Society of Women Engineers? How has it helped shape your engineering experience or empowered other women in the field?
I joined the Society of Women Engineers (SWE) for a support system of strong individuals who know the added challenges of being a woman in STEM. This group has grown my sense of belonging in the College of Engineering and has allowed me an opportunity to grow through my leadership skills. SWE has allowed me to step into who I am as a future engineer in a very authentic way. These individuals, whether it's an exec member I have known for a long time or a new member I just met, take me as I am, encourage me to grow further, are excited about my wins, and help me still grow through difficult situations. SWE was a huge reason I wanted to represent the college as a senator in ASUN. Giving women in STEM a voice in student government and creating an environment where underrepresented genders feel empowered to succeed and pursue something they are interested in and excited about was an amazing opportunity.

You've been highly involved on campus. What has being involved taught you?
Getting involved on campus has been my way to give back to the UNL community and an amazing opportunity to get to know so many individuals I might not have had the chance to even meet. In NSE, I was able to help new students find a sense of belonging at UNL during a pandemic. ASUN gave me the opportunity to advocate for women in STEM with a booth in fall of 2020. I worked on removing the stigmatization of mental health concerns with the Green Bandana Project in spring of 2021. I spoke about SWE before. Being a part of the Husker family is about investing in the community that helped build you.

What do you hope to accomplish in your lifetime?
I hope to build a better tomorrow. Since high school, I have always answered that question like this: What I anticipate tomorrow to look like changes every time I learn something new or grow as an individual, and that's OK. I hope to always be a lifelong learner, allowing my perspectives to grow and education to continue to refine how I envision what a "better tomorrow" is. At the end of each day, I want to leave this world better than it was yesterday.

What or who inspires you?
I have been inspired by so many people. My family, none of whom are engineers, have taught me to be true to who I am. They have demonstrated that diligence and integrity provide the fuel for success and the ability to persevere when things don't go perfectly to plan. The UNL advising professionals have given me the tools to figure out what's next and help me determine my path to my goals. I truly enjoy what I'm studying and, for the most part, that is due to the enthusiasm and professionalism of the professors I took classes from and whose classes I am in now. I have also been blessed with great professional mentors in the engineering internships I have had. I am currently interning at Olsson and have had the opportunity to learn so much from their professional engineers, and they have certainly helped me know exactly the kind of engineer I want to be in the future.

What is your advice to other students looking to make an impact?
Get involved. Being active helped me find my own sense of belonging on campus. Going into college, someone suggested getting involved with two things: one social and one major-related. It's a good way to meet upperclass student and people not in your field. You can change your involvement to match your time and interests. What you are involved with as a freshman might not be what you are doing as a senior. Keep an open mind to ideas and people. I met people I might never have run into if I had not gotten involved. Taking the time to find the organizations I am deeply passionate about has helped me find the meaning of being a Husker within myself. Be a Husker: Believe in yourself, go after your goals, and leave a mark; that is how you can make an impact.

What are your post-graduation plans?
As an out-of-state student, I didn't know what opportunities I would have in Lincoln after graduation. The university was so helpful in the job application process from obtaining internship opportunities to securing full time employment. My junior year I met with my advisor to discuss the type of engineering work I was interested in. He helped me narrow down what areas in civil engineering I was most passionate about. I utilized Engineering Student Services (ESS) throughout the entirety of my interview process. I had my resume reviewed, practiced my interviewing skills, and even had my thank you emails proofread. These are just a few of the services they offer to students. I cannot thank the College of Engineering and Civil & Environmental Engineering department enough for allowing me to feel prepared stepping into the work force.

I am so excited to share I have accepted a full-time position with Olsson in Lincoln, Nebraska. I will be staying with the same Water/Wastewater team I spent the last year and a half interning with but transitioning into a full time assistant engineer role focusing on water projects.

I am so thankful for the opportunities I have had with Olsson. Looking back to freshman year at UNL, I knew I wanted to work for Olsson because of their mission, "Working to leave the world better than we found it". I believe that perfectly encapsulates the reason I wanted to become an engineer, and I am so looking forward to all the continued opportunities of growth yet to come!

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INVEST IN THE DEPARTMENT

We invite you to invest in the department's future. The Department of Civil and Environmental Engineering is grateful for the financial support of alumni, corporations, foundations and friends to help enhance our programs, facilities and technology to benefit our students. The following priorities have been determined by the department for funding. Several established funds are also available for donor participation. You can make a donation online: **go.unl.edu/cee-alumni-friends**

CREATE YOUR OWN FUND

Establishing your own fund is the ultimate way to make a difference in the college. Your gift enables the college to stay on top of the constantly changing field of engineering and provide the best possible education for future engineers and community leaders. Your support enables the college to enhance students' experiences through relevant and challenging educational programs, leading edge research and the transfer of knowledge, which helps prepare competent and intelligent graduates who are ready for the fast-paced challenges of a career in engineering.

STUDENT SCHOLARSHIPS

Lots of gifted young people dream of going to college, but not everyone has the financial resources to make that dream a reality. That's where scholarships come in. A gift supporting undergraduate scholarships supports aspiring engineers within the Civil & Environmental Engineering Department by increasing financial aid opportunities for deserving students enrolled on campus. With the help of scholarships, students are not only realizing the dream of higher education, they are discovering their boundless potential.

Whether collaborating with faculty on research, or teaching and mentoring undergraduates, graduate students are crucial to the strength and integrity of the university. The advances these students make in the field of civil engineering while at NEBRASKA greatly enhance its reputation as a leader in education and scientific research. Private support for graduate fellowships ensures that the university will continue to attract the top minds as graduate students, and also the faculty who want to work with these bright, hard-working students.

FACULTY SUPPORT

The Civil and Environmental Engineering Department utilizes a high standard in teaching and development of our students. The quality of a program is measured by the quality of the faculty, who equip students with the necessary skills to succeed in an ever-changing world. Endowed and expendable faculty support assists the department achieve a high level of excellence by allowing the department to respond to faculty development opportunities and equipment maintenance needs.

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