A Word From Our Chair

I’m writing this brief message at summer’s midway point and cannot help but think about the upcoming academic year, which is “just” around the corner. The 2017-18 academic year will be a big one for the Department of Civil Engineering, starting with our Accreditation Board for Engineering and Technology (ABET) visit in September, continuing with a number of institutional strategic planning activities across the University through the fall and into the spring, and with extensive discussions related to the civil engineering curriculum occurring throughout the year. Note that each of these items have one central focus - STUDENTS.

It just so happens that this issue of the REDLINE has a student focus. We “handed the keys” for the 2017 issue over to our students and asked them to provide THEIR University of Nebraska-Lincoln story - either a collective story associated with one of our active organizations or an individual’s story related to their experiences as a civil engineering student at the University of Nebraska-Lincoln. We received a number of great stories and hope you enjoy them along with reading other snippets of information on Department activities and successes during the summer of 2016 and 2016-2017 academic year.

Enjoy and please stop by to visit the Department when you are in Lincoln or Omaha!

Dr. Daniel Linzell, Ph.D., P.E., F.ASCE
Voelte-Keegan Professor and Chair, Department of Civil Engineering

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The National Science Foundation has funded the International Research Experience for Students (IRES) program, which allows students from the University of Nebraska Department of Civil Engineering to travel abroad and study the impacts of preferential flow paths on unsaturated hydraulic conductivity. The program consisted of an eight-week study of water and contaminant transport in the earth’s vadose zone centered in Prague, Czechoslovakia. Dr. Chittaranjan Ray is the principle investigator of the project in collaboration with Dr. Michal Snehota of the Czech Technical University (CTU).

This international research experience for students encompasses four main activities: instrumenting sites for field experimentation; extracting soil core samples for further laboratory testing; performing infiltration experiments in the lab on the extracted soil columns; and imaging analysis/numerical modeling to study the water infiltration process.

Laboratory testing was performed on soil cores collected in the Jizera Mountain Range. The goal of the laboratory experiments was to compile data from different processes and formulate a complete soil water characteristic curve. Additionally, these experiments were conducted to measure hydraulic conductivity during saturated and unsaturated flow conditions. An automated minidisk infiltrometer, developed by the faculty of CTU, was used to conduct unsaturated hydraulic conductivity measurements in the field on soils. In addition, soil imaging was performed on three undisturbed soil columns with the use of a 3-D x-ray CT scanning system. These images represent potential pathways for preferential flow and locations where flow obstructions might occur. This process helps to identify ground water flow patterns as well as basic hydrological properties including grain size distribution, porosity, and bulk density.

While working with Dr. Ray and the CTU faculty, the students acted as ambassadors for the University of Nebraska. In addition to the hydraulic research, the students experienced a true taste of Czech culture. Each student spent the eight-week study in the CTU dormitories in Prague. The research also consisted of time spent in nearby Czech cities such as Děčín, Brno, and the Šumava National Park as well as hiking and camping to reach sample sites. The research and cultural experiences were remarkable.
The Civil Engineering Department had a great turnout at the American Society of Civil Engineering (ASCE) Mid-Continent Student Conference. University of Nebraska-Lincoln students competed in the Concrete Canoe, Steel Bridge, Geowall, and Concrete Bowling events. We experienced a few “bumps” in the road as the teams traveled to Fayetteville, with both the City and Scott campus concrete canoes suffering some “bruises.” The Scott campus canoe had the biggest “bruises” but both competition teams worked together to find solutions and both canoes competed (that is what ENGINEERING is about!). It was a great opportunity for the Concrete Canoe captains to rally their teams. Lincoln took home first place for the Geowall competition and fourth place in the Steel Bridge competition, while Omaha was one of only three teams out of 14 that followed the correct concrete mix design requirements for the canoe.

Weather was a huge factor throughout the conference. A thunderstorm forced a change of location for the Concrete Canoe and Concrete Bowling competitions to an indoor arena on the University of Arkansas’ campus. Along with the Geowall and Steel Bridge competitions being held indoors, this caused even more congestion in close quarters. During this time, the captains for each team showed their leadership abilities by making sure the rest of the members were informed of the schedule. Both teams brought back experience, leadership skills, and valuable teamwork abilities. They believe that the knowledge gained at this year’s competition will benefit all of them in the future, whether that be for next year’s competition at the University of Southern Illinois-Carbondale or in the workforce or whenever teamwork is required to complete an engineering task.
Omaha students work with local nonprofits
by Matt Roth

The University of Nebraska Omaha’s Echo program is a student organization that connects Nebraska students to service learning opportunities in two main areas: STEM (Science Technology, Engineering, and Mathematics) Educational Outreach as well as Planning and Construction. Echo orchestrates service learning via long-term community partnerships, and collaborates with community organizations that share the goal of making Omaha a better place to live and learn. In pursuit of this goal, Echo has worked with Abide Omaha, a federally approved non-profit organization committed to the safety and vitality of inner city children and their families. Abide’s holistic-neighborhood approach to inner city transformation is centered on rebuilding families through their Lighthouses. A Lighthouse is a refurbished home occupied by a family that is committed to being neighborhood advocates. These advocate families coordinate positive community activities on a monthly basis.

Echo’s students completed a project that included the rehabilitation of a driveway, a retaining wall, and landscaping at an Abide Lighthouse located in Northeast Omaha. The project was completed over spring break, with additional volunteers provided from the University of Nebraska Omaha’s Seven Days of Service event. Echo Civil Engineering students gained valuable real world project experience, performing all designs and calculations. Demolition of the existing driveway began over the weekend, and preparation for the concrete pour began immediately after. Rehabilitation of an existing retaining wall and other landscaping improvements were carried on throughout the week. This project was mutually beneficial to all parties, with Abide Omaha receiving much needed improvements to one of their Lighthouses, and UNO Echo volunteers gain valuable planning, construction, and volunteering experience.
Lincoln students participate in The Big Event
by Sussan Moussavi

On Saturday April 8, 2017, more than 3,000 University of Nebraska-Lincoln students, faculty, and staff volunteered to participate in The Big Event, a day of service in which students can give back to the residents of the Lincoln community. The Big Event is entirely student run and funded by donations from the community. The University is passionate about maintaining a strong relationship with its surrounding areas, and this event helps students and faculty to improve this relationship by showing their appreciation for the community they call home.

This year, the University of Nebraska-Lincoln American Society of Civil Engineers student chapter participated in The Big Event by helping a local woman in need with yard and house work. The group raked leaves, cut rose bushes, trimmed tree branches, and painted her front porch. The students had the amazing opportunity to give back to the community that provides them so much. After the tasks at hand were completed, the group enjoyed cookies with the house owner, and could see the appreciation she had for their work.
Have you ever wondered what happens to those plastic beads found in cosmetic products or where errant garbage bags end up? Zachary Mahon, a Civil Engineering graduate student, is conducting research to find where these plastics are found after they are discarded.

Mahon, currently pursuing a Master’s Degree, is studying the abundance of microplastics in the waterways of Nebraska. Microplastics are any plastic particle smaller than 5 mm and come from a wide variety of sources. Microbeads found in a variety of personal care products, such as exfoliants and toothpaste, are one source, while any larger plastic object, such as plastic bags, can be broken down into the microplastic size range.

Microplastics can be problematic for organisms when consumed and may serve as a transport mechanism for pollutants. When organisms consume these small plastic particles, not only are they potentially exposed to chemicals on the plastic’s surface, they are also limiting the number of calories consumed as the plastic takes up room in an organism’s stomach.

Research into microplastics started in earnest the last few years and their effect on the environment is not well understood. The majority of the research into microplastics to date has occurred in marine environments, with very little study on microplastic abundance in freshwater lakes and rivers.

With the help of students in the department’s Introduction to Environmental Engineering course, soil samples collected from four lakes in the Omaha metro area and from the Missouri River were analyzed to determine the levels of microplastics. Results showed similar types and concentrations of microplastics in the freshwater samples as were published in previous research.

“The hope is that other researchers can use the data that was collected and analyzed from freshwater lakes and rivers to better define environmentally relevant concentrations and offer more information for comparison,” said Mahon. “If nothing else, we were able to show undergraduate students how the work we do as engineers can better inform science using a project they were excited about participating in.”
Jorgensen earns first place, honorable mention

Shelly Jorgensen is the latest in a long line of award-winning students to graduate from the University of Nebraska Department of Civil Engineering. Her paper, titled “The Midas Touch for Accurately Predicting the Stress-Strain Behavior of Tantalum”, was the The Minerals, Metals and Materials Society’s (TMS) undergraduate paper contest first prize winner in 2017. TMS is a professional organization that encompasses the entire range of materials and engineering, promoting the education and development of current and future professional engineers.

“Receiving this award is an honor,” said Jorgensen. “This provided a different perspective than writing an assigned research paper for a class.”

Tantalum is a biologically inert metal with an extremely high melting point. This makes it valuable in the defense, aerospace and biomedical industries. However, experimental testing in extreme environments is difficult and expensive, so engineers rely on empirical models to predict how the material will behave under extreme conditions. Jorgensen’s paper explored the use of the Lawrence Livermore National Laboratory’s Material Implementation Database and Analysis Source (MIDAS) to develop models that predicted its behavior. The models are used to determine at which temperatures and levels of deformation tantalum performs best.

“As I was applying for fellowships and Ph.D. programs, I was able to show the schools that I had background and ability to conduct research and writing scientific papers by mentioning this award,” said Jorgensen. “It will definitely enhance my applications.”

Jorgensen also received an Honorable Mention from the National Science Foundation’s Graduate Research Fellowship Program. The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based Master’s and Doctoral degrees at accredited United States institutions.

Jorgenson will be starting as a Ph.D. student at Stanford this fall. Her son is a student at the University of Nebraska-Lincoln.
The University of Nebraska Engineering Ambassador Network is a student-led initiative that promotes engineering. Student representatives visit K-12 schools throughout the state of Nebraska to deliver interactive presentations and lead hands-on activities to show the many exciting career opportunities engineering offers. Ambassadors show that engineering degrees are attainable (and enjoyable!) for anyone and involve more aspects than meets the eye.

We asked three Civil Engineering Ambassadors to share their experiences with the program.

1. Why did you want to be an Engineering Ambassador?
I wanted to be an Engineering Ambassador because I hoped to be able to reach out to the younger generations and teach them about how amazing engineering can be. If it hadn't been for my dad, who is also a Civil Engineer, I wouldn't have known about the engineering world. I want younger students to also have an introduction to the world of engineering. I love working with children, and seeing the excitement on their faces when they learn about what engineers can do is truly amazing.

2. Has it helped you with your Civil Engineering degree?
Engineering Ambassadors has taught me a lot about how to give an effective presentation to an audience, which has come in handy when giving presentations in class and even presentations related to research I am involved with. I think EA has also helped with my degree by teaching me a lot more about many different types of engineering which gives me a greater perspective on how I can use the knowledge I gain in class.

3. How have you impacted your local communities?
I have been able to reach out to many different schools in the Lincoln/Omaha area and share with younger students a tiny piece of the big impact that engineering has on the world. I like to believe that the outreach that we do introduces new ideas to younger generations and encourages students that they can do anything they set their mind to.

4. What has been your favorite Ambassador experience?
My favorite Ambassador experience was visiting an elementary school in Omaha where a very rowdy group of young students come together to work in an unexpected way. When the group was given an activity to do together, the attitude of the group changed into being very communicative, organized, and efficient team. I’m always amazed at the high expectations that the teachers I work with associate with our visits since the environment created by completing an engineering project can have a huge impact! Attending a leadership conference at Penn State, where I first learned how to give an effective presentation, was also a very good experience!
1. Why did you want to be an Engineering Ambassador?
I mainly wanted to be an EA because when I was in high school I didn't know what engineering was at all. I originally picked this major because someone told me it was a good idea and I didn't have anything else I wanted to do with my life. I wanted to be able to get people excited about engineering or at least become aware of what engineering is earlier in life!

2. Has it helped with your Civil Engineering degree?
I would say it definitely has helped, yes. It is easier to stay motivated when you’re surrounded by people that are passionate about engineering from more than a technical perspective. It has also helped me with my presentation skills and my ability to describe engineering topics to a specific audience.

3. How have you impacted your local communities?
I hope that I have impacted my community just by getting even a couple of people interested in engineering that might not have considered it before. There have been a lot of people who thank us after we talk to students and tell us that what we do is really beneficial.

4. What has been your favorite Ambassador experience?
I can't think of a specific instance, but in general I really like it when I can see kids take information that I just provided to them and find actual solutions during the activities. It's fun to watch them problem solve within their groups. They get super creative and it's like you can actually see them thinking and see the way that they approach an issue differently just in one day.

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1. Why did you want to be an Engineering Ambassador?
If you asked me what an engineer was in middle school, I probably would have answered “the person that drives the train.” I am very enthusiastic and privileged to play a role in an organization, like Engineering Ambassadors, that has the power to change how young students view engineering.

2. Has it helped you with your Civil Engineering degree?
Engineering Ambassadors has been as a constant reminder of why I entered the field of engineering. It is incredibly rewarding to watch students get excited about pursuing engineering in the future. In that sense, yes, it has motivated me exponentially to continue working hard to get my degree.

3. How have you impacted your local communities?
Similar to my own experience, many kids have no idea what a future in engineering could hold for them. I love that I get to be one of the voices that shares how engineering has impacted me and how great of a career path it could be for each of them. I think the work we do is especially impactful to kids because college students are the perfect age to offer their knowledge and experience in a relaxed environment.

4. What has been your favorite Ambassador experience?
This year, I went to one middle school in Lincoln every Tuesday for a month, so we really got to know some of the kids well. During the last week, there was a fourth grade girl who was so excited to tell me about how she had recently seen a movie about women in engineering (Hidden Figures) and how she wanted to be like them. On that last day, she also approached our group after the class had ended and thanked each one of us for the past few weeks and for how much each of us had impacted her.
Traditionally, road workers drag chains across the surface of a bridge to test for delamination, the separation of surface concrete from the underlying layers, which can cause cracks and flaking on the driving surface. This process is not only dangerous for the workers, it is also subjective. Dr. Jinying Zhu is developing a cart for the Nebraska Department of Transportation that uses metal beads and microphones to detect delamination. The sounds produced by the metal beads bouncing along the bridge surface are then analyzed using “acoustic emission” to see which areas of the bridge are suffering from delamination. The sounds can then be mapped to the bridge with GPS coordinates so that road workers can repair the area.

Dr. Junke Guo is helping lead a team of faculty working to improve the Hydraulics and Hydraulic Structures program at Kabul Polytechnic University (KPU) in Afghanistan. KPU is one of the top engineering colleges in Afghanistan and are looking to improve the education they provide based on techniques used at the University of Nebraska and other US colleges and universities. The Civil Engineering team includes Drs. David Admiraal, Tian Zhang, John Stansbury, Yusong Li, and Jiong Hu. The project funded by USAID and is led by Dr. Patrick McNamara, Director of the University of Nebraska Omaha International Studies & Programs, and Mr. Sher Jan Ahmadzai, Director of the Center for Afghanistan Studies.

The Mid-America Transportation Center (MATC), a consortium of academic institutions led by the University of Nebraska-Lincoln, is leading a five-year, $13.75 million federally funded research center to improve transportation safety in Nebraska and neighboring states, with an emphasis on challenges facing rural areas and underserved communities.

“At the end of the five-year project, our goal is to have a suite of products that promote safety and lead to measurable safety improvements in these communities,” said Dr. Laurence Rilett, Professor of Civil Engineering and Director of MATC and the Nebraska Transportation Center.
The University of Nebraska College of Engineering’s “Life in Engineering” video series highlights student and faculty engineering contributions. The goal of the series is to show potential students how they can become complete engineers who make a difference. Dr. Christopher Tuan and Dr. Shannon Bartelt-Hunt were featured and showcased their research on conductive concrete and environmental engineering, respectively. Civil engineering students Austin Moran, Taylor Knickerbocker and Sarah Porath were also featured and discussed their leadership roles and how these roles have influenced their engineering studies.

For more information, please visit http://engineering.unl.edu/lifeinengineering/

A team of Civil Engineering faculty from the Department of Civil Engineering has been awarded a National Science Foundation (NSF) grant that helped to fund and expand the Department’s summer Research Experience for Undergraduates (REU) program. The program, which was funded by the Civil Engineering Department for the past two summers and brought five undergraduate students from schools across the country to participate in research and professional development opportunities for an eight-week period.

The NSF award provides funding for the next three summers to bring 10 students to Lincoln to conduct research focused on rural infrastructure under the supervision of a faculty mentor. In addition to the research experience, students are invited to participate in department seminars and presentations, professional development workshops, and social events such as a trip to Omaha’s Henry Doorly Zoo.

Senior Connor Adamsick was featured in a *Lincoln Journal Star* article entitled “Hard work, perseverance define Adamsick’s path to team captain”. The article details Adamsick’s path from gymnastics team walk-on to team captain. A winner of the Nebraska Student-Athlete HERO Leadership Award in 2016, Adamsick wants to build bridges after graduation. Adamsick’s mantra to his teammates is to, “Do the right thing, consistently, over and over again.”
Dr. Yusong Li recently visited Lincoln’s Culler Middle School as part of an outreach program with the Nebraska Center for Materials and Nanoscience. The program targets underrepresented junior high school students and develops and integrates educational materials and hands-on activities that stimulate interest in science and engineering. The students worked with Nano Sand, which repels water, to explore how water behaves differently when it comes in contact with this material and with regular sand.

Civil engineering student Murtaza Nalwala, a senior from India, controlled the University of Nebraska-Lincoln’s Snapchat account for a day during Engineers Week and used the opportunity to promote civil engineering. Nalwala demonstrated what a day in the life of a civil engineering student looks like, promoted the department’s labs and facilities, and held a question and answer session with followers. Current and potential students viewed his snaps over 126,000 times.

Alumni Activities

Three Department of Civil Engineering alumni have been accepted to the Nebraska Water Leaders Academy:

- Travis Figard, a senior engineer with Olsson Associates
- Kevin Kruse, water resources department manager with JEO Consulting Group, Inc.
- Jack Wergin, projects department manager for the Upper Big Blue NRD

The mission of the Nebraska Water Leaders Academy is to provide learning opportunities that focus on cooperative approaches to solving Nebraska’s water issues. The one-year program provides leadership training and educates participants about the vital role rivers, streams and aquifers play in the state’s economic sustainability.
Honoring Our Students

2016 Department of Civil Engineering Scholarship and Fall Graduate Recognition Banquet

We take time during the fall semester to honor our recent graduates and our scholarship and fellowship recipients for the academic year at our fall banquet. We also use this event to thank the individuals and groups who have graciously supported our Department via the creation of, and contribution to, these scholarships and fellowships. Thank you all!

This year’s banquet was held at the Strategic Air and Space Museum in Ashland, NE. We recognized 38 graduates for the semester and over 60 scholarship and fellowship awardees.

2016-17 Department Scholarship & Fellowship Recipients

Albert Schultz Civil Engineering Scholarship/Fellowship
Francisco Garcia, Taylor Knickerbocker, Garrett Martindale, Austin Moran

Alfred Benesch & Company
Sussan Moussavi, Keyvan Zare Rami

ASCE Nebraska Section Scholarship
Connor Gilinsky

Beavers Heavy Construction
Kendra Euscher, Ann Gensichen, Garrett Martindale

C.G. “Jerry” and Florence M. Strobel Scholarship
Ronald Alvarado, Kristen Yost

Donald E. & Marjorie Wiles Student Fellowship
Jacob Thiele

Jim D. and Faye D. Rasmussen Scholarship
Sadie Erdmann, Isaac Ward

John E. Olsson Civil Engineering Scholarship
Sadie Erdmann, Connor Gilinsky, Noah Hawkins

John H.D. Davis, P.E., Memorial Scholarship
Allison Brock

John W. Hossack Engineering Scholarship/Fellowship
Waleed Khan, Tyler Sondag

Lamp Bynearson Scholarship
Brogan Andrews, Kyra Baker, Joseph Manning, Riley Ruskamp, Natalija Ward

Miller & Associates Consulting Scholarship/Fellowship
Isaac Kreikemeier

Nebraska Section, ASCE Student Support Fund for Transportation Engineers
Waleed Khan

Peck/Benak Engineering Achievement Scholarship
Austin Kellogg, Joshua Siel

Sorkin Scholarship
Teresa Blankman, Reynaldo Lemus, Sarah Ostrander, Andrew Pham, Joana Torres, Sadie Erdmann, Francisco Garcia, Connor Gilinsky, Austin Kellogg, Isaac Ward

Swaim Family Student Scholarship
Caprianna Keeler, Matthew Wynegar, Spencer Ellwanger

Thomas T. Ogee, Sr. Memorial Scholarship
Paul Ivey
As the list below shows, our faculty, staff and students continue to be recognized for their research, teaching and service achievements!

Dr. Daniel Linzell accepting the Holling Family Distinguished Senior Faculty Teaching Award from Interim Dean Dr. Lance Pérez on behalf of Dr. Gary Krause.

American Society of Civil Engineers (ASCE) State of the Art Award - Dr. Tian Zhang

Olsson Associates Faculty Teaching Excellence Award - Dr. David Admiraal

Tau Beta Pi Distinguished Teaching Award - Dr. Gary Krause

Holling Family Distinguished Senior Faculty Teaching Award - Dr. Gary Krause

Henry Y. Kleinkauf Family Distinguished New Faculty Teaching Award - Dr. Jinying Zhu

Holling Family Master Teacher Award/University of Nebraska-Lincoln University-Wide Teaching Award - Dr. Yusong Li

College Faculty Research & Creative Activity Award - Dr. Laurence Rilett

University of Nebraska-Lincoln Student Impact Award: Outstanding Advisor - Dr. Shannon Bartelt-Hunt

Daniel P. Jenny Research Fellowship - Dr. Chungwook Sim

University of Nebraska-Lincoln Parents’ Recognition Award - Dr. Richard Wood

Folsom Distinguished Dissertation Award - Jodi Sangster

Undergraduate Honor at University of Nebraska-Lincoln Research Fair - Elizabeth Regier

Commendation Award at 2017 University of Nebraska-Lincoln Research Fair - Ernest Tufuor

Top paper at 2017 University of Nebraska-Lincoln Research Fair - Hanh Phan

College of Engineering Outstanding Graduate Research Assistant Award - Hamzeh Haghshenas

Milton Mohr Graduate Fellowship Award - Maahdieh Khadmati

Nebraska Section ASCE Outstanding Student Award - Elizabeth Railsback

College Staff Award for Exemplary Service and Support - Patricia Lena and Peter Hilsabeck
RECOMMEND FUTURE ENGINEERS

Do you know of any young women and men considering engineering as a career?

If so, we’d love to love to hear about them and let them to provide information about the amazing opportunities that a Civil Engineering degree from the University of Nebraska-Lincoln offers!

Please use this link for referral information:

engineering.unl.edu/request-engineering-information/

ALUMNI UPDATES

We encourage you to keep in touch and let us know what you are doing! Your stories are important to our faculty, staff, current students and, of course, other alumni!

Please use the update form at engineering.unl.edu/alumni-updates to let us know what is going on!

We are always seeking alumni stories for the department and college, as well as to share with and to inspire our students.

Support the Department of Civil Engineering

The Department of Civil Engineering is grateful for the wonderful financial support we receive from alumni, industry and friends that help expand student access to our program and enhance student experiences, both in the classroom and in the lab.

During the past year, over $40,000 in scholarships were awarded to our students thanks to their wonderful generosity.

While $40000 is certainly an amazing level of student support, we always welcome your contribution.

For more information go to nufoundation.org/civilengineering.

Thanks in advance for any amount you can provide and GO BIG RED!