## UND ENGINEERING SPECIAL ISSUE



#### Also featured in this issue:

\$3M gift from Ann & Norman Hoffman Family Foundation Five new research centers approved within CEM National Center of Excellence in Cyber Research



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## VIVI YOUR CAREER WIND ENGINEERING

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**COVER:** College of Engineering & Mines students show off their UND pride in the Collaborative Energy Complex. Photo by Paige Prekker.

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As I begin my sixth year as the dean of the College of Engineering & Mines, I am filled with gratitude for all that our faculty, staff, students, alumni, and other supporters are doing to help move this college forward.

The pages of this magazine are filled with many impactful stories, but they represent only a small subset of all the great things we are doing in CEM. As we continue to build our team and develop strategic programs, partnerships, and capabilities, there is no end to what we can do together.

One of the things we will accomplish together is making our new STEM Complex a reality. As we reported last year, the North Dakota Legislature appropriated \$57.4 million toward the project's first phase, with the requirement that we raise another \$25

million. We have been working hard toward our goal of raising those funds by the end of 2024. Thanks to many of you, we have made tremendous progress already (see page 24) and hope to get additional support from the legislature next year for Phase 2 of the project.

Our top priority for the STEM Complex is to create modern and welcoming spaces that help us not only attract students to UND but also serve them well once they arrive. We also need this new facility to accommodate our enrollment growth. Last fall, CEM had its largest enrollment ever, exceeding 2,300 students for the first time, and we expect to set another record in the Fall of 2024. We attribute this growth to our new programs in Aerospace and Biomedical Engineering as well as new investments we have made to strengthen our outreach and recruiting efforts. We are proud to have a growing college (and university) when so many other campuses across the country see the opposite trend.

This is important because the State of North Dakota needs us to successfully attract students and produce the engineers and scientists that our continued economic growth requires. We are working hard to fulfill that mission, but we could only do it with the support of so many stakeholders who each contribute to our success in their own unique way.

On behalf of our faculty, staff, and students, thank you for all you do for CEM. I wish you the best and hope we can see each other soon.

R. he

**Brian Tande, Ph.D.**Dean, College of Engineering & Mines

**Brian Tande, Ph.D.**, is the Dean of the College of Engineering & Mines. In his 18 years at UND, Dr. Tande has served as a faculty member and department chair in the Department of Chemical Engineering, as well as Associate Dean and Interim Dean of CEM. Other roles he has held within the college include Director of the Jodsaas Center for Engineering Leadership & Entrepreneurship and Director of UND's Grand Challenge Scholars Program, sponsored by the National Academy of Engineering.

Prior to UND, Tande spent several years in research, product development and management in the plastics and composites industry. His career has centered around the development of advanced polymeric materials for automotive, healthcare, construction, and sustainable energy applications. He is also the founder of two companies that have successfully commercialized and licensed new coatings technologies, including a novel infection control product currently used by hospitals nationwide.



#### **Terry Severson**

Terry Severson is the Board Chairman of the College of Engineering & Mines Executive Board. Founding Member and President of Trace Systems for 13 years, Terry has extensive industry and military experience, ranging from on-the-ground field support to command and corporate-level leadership.



#### **Steve Burian**

Steve Burian is the Board Vice Chairman of the College of Engineering & Mines Executive Board. He is the President & CEO of the civil engineering consulting company Burian & Associates. He brings 30+ years of industry and leadership experience to the CEM Executive Board.

## MESSAGE FROM THE BOARD

The momentum at UND and our College of Engineering & Mines continues to build. CEM offers exciting new programs, refurbished engineering labs, a new National Security Corridor, increased research, increased enrollment, and now a new STEM Facility is on the horizon.

Professor Kouhyar Tavakolian's Biomedical Engineering team, through its Bioinnovation Zone (BiZ), is bringing together student engineers, faculty, and industry partners to work on real biomedical projects that have real-world impact. The program's unique teaching approach may become a model for other CEM programs. The new undergraduate Aerospace Engineering program is experiencing phenomenal interest from students—over 500 applicants. It is a great example of collaboration with the John D. Odegard School of Aerospace Sciences that will substantially benefit both colleges and UND.

The labs in Upson II likely look better than they ever have after a lot of concerted CEM effort to clean out outdated equipment and material—truckloads of it—that had accumulated since we were students. Now, with new Kelly Green and white paint, the labs look attractive to potential students, parents, and faculty, as well as industry sponsors, not to mention current and potential benefactors. This is far from a cutting-edge initiative, but the basic stuff is vitally important, too.

Associate Dean Ryan Adam's National Security Corridor in Harrington Hall has been completed, equipped, and began operations with a grand opening scheduled for October 7<sup>th</sup>. This is cutting-edge stuff; it's the realization

of generous North Dakota Legislative funding that offers satellite design and engineering, digital engineering, big data, satellite fabrication, and assembly labs to students, faculty, and industry and government partners. It includes collaborative efforts with both the aerospace school and College of Arts & Sciences (A&S).

CEM research grants and awards increased for the 4th consecutive year in FY23 to \$11M, while FY24 looks like it will exceed that. Enrollment for this fall, although not yet final, shows a 7th consecutive year of growth, discounting the COVID year, to ~2400 undergraduate and graduate students—an all-time peak CEM enrollment. Undergraduate applications are 28% higher than for Fall 2023.

A new STEM facility is UND's #1 development priority—a reflection of the importance of CEM to UND's, the community's, and the state's future.

CEM is UND's 2<sup>nd</sup> largest college and a major factor in the continued growth of the high-tech and aerospace industry in the state and region. It is a collaborative effort with the science parts of A&S. It will be the foundation of UND's engineering and technology programs for the next 50-75 years. Remember, Harrington Hall was built in 1952.

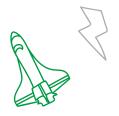
There's a common aspect to many of the highlights we've addressed—effective CEM collaboration with other colleges to mutual and UND benefit. Dean Tande and the team are leading our CEM to new heights in value to all their stakeholders. It's a great time to be associated with, and to be very proud of, our CEM!





From lectures shared to projects made together, there's so much that bind our students to one another. It's shown in the teamwork of their projects and the camaraderie of student organizations. They're here to challenge one another to lead with big ideas and do the work that matters most. Regardless of what type of engineers or scientists our students aspire to become, they are all on the road to becoming **#UNDproud**.

Leaders can come from anywhere, but they go here.







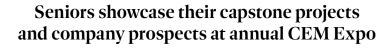






## DIFFERENCE MAKERS AT UND SHOW THEIR WORK













"Energy Harvesting from Human Motion," "Electric Drive 'E-bicycles'," "3D Printable Beehives," and a plan to turn two one-way streets in downtown Grand Forks into a pair of two-way streets were just some of the student research projects on display at the College of Engineering & Mines annual Expo on Tuesday, April 30.

Visitors to that Expo were welcome to check out all those projects and more, after they enjoyed a breakfast of 3D-printed pancakes, made by CEM graduate students Tuesday morning. The table of whirring pancake-printing machines was a fitting complement to other displays, such as a bridge frame, a six-foot rocket, and the chassis of a one-person race car.

In total, 62 different booths, many of them showcasing senior capstone research projects, were available for viewing that morning in the Memorial Union ballroom. Though each project displayed students' ingenuity and problem-solving skills, people were able to vote on what they thought the best projects were. And assisting in that voting were regional high school students. Hundreds of students across North Dakota and Minnesota had the chance to view the Expo online, and several groups of students were bussed in to view and vote on the projects in person.

After welcoming the students,
Brian Tande, dean of the College of
Engineering & Mines, said there is more
to studying Engineering at UND than
school work. It's also about being able
to engage in hands-on learning that
can make a difference in peoples' lives,

"It's great to see all the inventiveness, all the ingenuity, and all the hard work that's gone into these projects," Tande said. "This is really what engineering and science is all about."

Engineering, Tande continued, "is not just about working out problems, doing homework and taking tests. It's about doing real things, building real projects that solve problems. Thank you to all of

you for taking the time to be here and sharing with others all the cool things that you're doing."

One of those difference-makers was Civil Engineering senior Molly Forrester. The Grand Forks-native was on hand to present her group's idea on turning a pair of downtown one-way streets into two lane streets. The idea? Ease the flow of traffic in that area and remove the need for those students to have to cross a nearby four-lane thoroughfare when getting dropped off or picked up from school.

Forrester said she enjoyed working on the project and hoped her group's idea would help to alleviate "Mostly the traffic problems with the school and add more access to the community."

Forrester won't have to travel for work as she said she has already secured employment locally in the area of transportation engineering.

Another pair of difference-makers was Zachary Staples and Benjamin Warren,

who spoke about a different kind of research project, one in which a regional company had contacted UND to get help from students in solving an actual engineering problem.

That company is Argo, a Canadian manufacturer of ATVs and other off-road and amphibious and terrain vehicles. The company has a manufacturing facility in Their River Falls, Minn. And while it has developed an all-electric version of one of its models, battery power remains an issue, when it comes to extremely cold temperatures.

"Argo gave us the project of 'Hey, can we get this to work in negative 30 degrees?" said Dominik Steinhauer, senior lecturer in Mechanical Engineering.

Staples and Warren (along with online team members) got to work on how to insulate the batteries, while the electrical engineering component of the project worked on a heating pad system to allow the battery to heat itself. For Staples and Warren, the project was right up their alley

"We all apply for the projects that we like the most," Staples said. "We both had some outdoor interests in our resumes and interest package."

Their one regret? They weren't able to take the vehicle off land and into the English Coulee.

Beyond Argo, several of the Senior
Design projects featured in the CEM
Expo were sponsored by various
industry partners, with students having
opportunities to experience work
on strategies addressing real-world
issues. Industry projects included:
Hess Corporation; Marvin Windows;
Retrax; Steffes; AgriTech North and
Textron. Many of these companies
sent representatives to the Expo to
see their project exhibits and visit
with student groups.

Written by Adam Kurtz // UND Today

# "This is really what engineering and science is all about... It's about doing real things, building real projects that solve problems."





#### **CEM Expo Awards**

[1] John Strum and Hunter Hendrickson were selected as recipients of the **Best Process / Research Project Award**, for their Materials Research on Campus group.

[2] Laina Behrenbrinker, Yunxiang (Aric) Cai, Carrie Carpenter, Cheyenne Harrison, Caden Knutsvig, Zachary Schwindt, John Snyder and Nicholas Snyder received the **Best Prototype Project Award**, for their NASA Lunabotics Competition Mechanical Engineering Team.

## Save the Date: 2025 CEM EXPO

Memorial Union Ballrooms April 29, 2025 // 9 a.m. - 5 p.m.

Visit engineering.und.edu/outreach/cem-design-expo to learn more about the upcoming expo.



Each year, 100+ students present their projects in engineering, computer science, and geology to the public during the CEM Expo.

Here are just three examples that prove our students' works range from the innovative to the extraordinary.





### A SMARTWATCH TO IMPROVE THE QUALITY OF LIFE FOR SENIORS

A biomedical engineering and computer science student join forces to help the elderly and cognitively disabled populations prevent health hazards as a result of poor hygiene habits and cognitive impairments.

A lightweight watch that monitors ambient conditions and vital signs of the wearers, the watch utilizes predictive and preventative machine learning models to track bathroom activities and detect unusual problems associated with cognitive impairments and urinary tract infections.

The project was sponsored by CarePredict, an Al-powered digital health platform for senior care, which was invested in by Aspire HealthTech, a venture capital and private equity firm, founded by Phil Gisi, '82.

#### "What skills did you learn by doing this project?"

"Definitely project management--like the Agile system for project management—as well as collaborating with stakeholders and working with a team of multi-disciplinary experts. These are important skills that real-world companies incorporate, so it was great to learn these new skills while working with CarePredict."

#### "Why did you pursue this project?"

"One of my goals is to apply IoT to biomedical technology, using machine learning and predictive models to improve our healthcare. I do not believe a person must get sick before we treat someone—that's 'sickness-care', not healthcare."

"I have a grandma, so when I heard about this project, I thought, 'Hey, this could help someone like her.' I also admired how the project was non-invasive, protecting the privacy of these individuals."



### A SEWER DESIGN FOR CAMPUS DEVELOPMENTS TO THE EAST

Civil engineering students collaborate with Burian & Associates, the City of Grand Forks, and the University of North Dakota to design an updated sewer system to service new and upcoming developments on the east side of campus, including the new Memorial Villages.

#### "When did this project start?"

"We had two semesters to work on the project, but the physical project itself just started in the fall. It was so cool because not only did we all have internships with civil engineering firms while this was happening, but we also got to see the project all the way through. Seeing it happen from beginning to end was interesting because you see all of the work in parts: you see the engineers and what they think is best, and then they work with the city and the school to make something for everyone."

#### "Did the project come with any challenges?"

"There were considerations that needed to be made for what UND needed, but also what the city needed. The sanitary sewer line that they were putting in needed to be upsized because of the many buildings that are coming in. With more hook ups and activity, we had to figuring out how big things would end up being. Another issue was how we kept the roads minimally impacted; the city specifically wanted to keep North 25<sup>th</sup> as intact as possible, so there were only so many methods we could use to do that without completely tearing up the street. It was really a team effort to figure out what the best option."



### A NEW, INNOVATIVE TRAILER BED COVER FOR RETRAX

Mechanical engineering students redesign a one-size-fitsall trailer bed cover for Retrax, a leading manufacturer of retractable, low profile truck bed covers.

Retrax has generously sponsored senior design projects at the College of Engineering & Mines throughout the years, giving our students incredibly valuable hands-on experiences and opportunities to make real-world impacts.

#### "What makes this redesign so different?"

"We redesigned this entire system. It used to be a static lock rod system—since these are all for different pick up beds, they come in different lengths, so the lock rod had to come in all different lengths for every different pick-up bed we designed for—very inconvenient. We changed it to a cable system, making it work for different sizes."

#### "What challenges did you face going into this?"

"We wanted to save about 10% from the original project. In the end, we ended up saving 22.2%. So that was a big win. It was also a huge reduction time for labor since it doesn't require CNCing anymore. With the change in process, it reduced 4 minutes in build time. In total cost savings, we're helping save \$500,00-\$600,000 per year with this new design."

#### "What comes next?"

"The senior design project is done now, but I'm going to continue working with Retrax as an intern. We will work on this over the summer, refine it, and put it into the production process. So this will be on our new covers within about a year."







#### After placing in the top 3 in all categories at the regional competition, the team represented UND amongst the top teams in the nation

Competing against formidable opponents from Illinois, Wisconsin, Minnesota, North Dakota, and Ontario, the UND Steel Bridge Competition Team proved their prowess at the American Society of Civil Engineers (ASCE) Western Great Lakes Regional Competition, securing their ticket to the coveted National Finals.

And their report card was indeed something to write home about. Categories to place in at Steel Bridge Competition include cost estimation, stiffness, structural efficiency, and aesthetics. The UND team took home first, second, second, and third in each category, respectively.

And as a bonus, this year, the team took first in a secret fifth category: concrete cornhole.

With an impressive overall performance, the UND Steel Bridge Team clinched the third position overall, reflecting their comprehensive excellence across diverse criteria.

"It is good to come back to our more spring-like weather in Grand Forks," said Dr. Sattar Dorafshan, the team's advisor, upon their return to campus. "The students did a fantastic job representing our department, college, and university and deserve all the recognition and credit. Thank you very much for the encouraging and kind words."

Following their well-earned celebratory welcome back to campus, the team had little time to prepare for the National Finals. The team competed with roughly 50 schools from U.S., Canada, and Mexico at Louisiana Tech University from May 31 to June 1, 2024.

"While we didn't repeat our usual great performance, we competed against the best steel bridge teams in North America," said Dorafshan.

The Student Steel Bridge Competition (SSBC) serves as a platform for students to apply theoretical knowledge to realworld challenges, fostering innovation and honing professional skills. Tasked with designing and constructing a scale-model steel bridge capable of spanning approximately 20 feet and

carrying 2,500 pounds while adhering to stringent competition regulations, the event tests teams' technical and aesthetic proficiency, with bridges undergoing meticulous evaluation.

The competition has evolved into a beloved engineering contest across the country, attracting approximately two hundred schools annually, UND included.

As the University of North Dakota Steel Bridge Team winds down from the National Finals, they carry with them the pride of their institution and the anticipation of next year.

Written by Paige Prekker // blogs.UND.edu/cem

### **VIRTUAL TEAMMATE AT LAST APPEARS** IN 3D

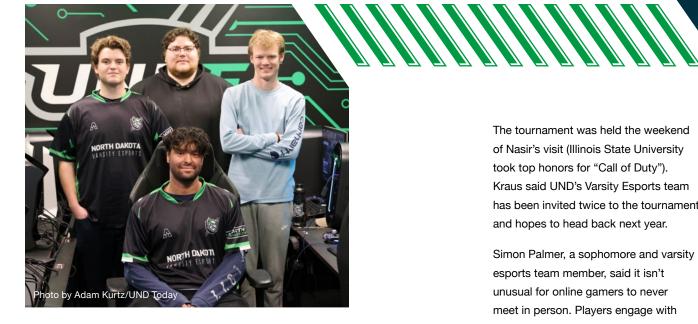
#### Esports athlete and online aerospace engineering student Muhammad Nasir visits campus, joins UND teammates to compete in tournament

Of course, UND's online students have been known to visit the bricks-and-mortar campus in Grand Forks from time to time. But even so, the situation that brought Muhammad Nasir, an online sophomore from Massachusetts who's studying aerospace engineering, to the UND campus stands out.

That's because Nasir is a member of UND's North Dakota Varsity Esports team. Coming to campus allowed him to not only take part in an in-person esports tournament - and thereby fulfill a dream - but also gave his teammates the chance to bond with someone they'd only ever spoken to online.

"I've never been to a LAN (local area network) tournament before, or a tournament setting, and I've always wanted to do that," Nasir told UND Today. Moreover, because Nasir's schedule - he works full time as well as taking online classes - at last eased up enough so he could make the trip, "I just thought it was good timing. ... I just thought this would be the perfect time for that to happen, where I'm representing a school, and I have a team that I'm playing with consistently."

Nasir always has been into gaming, and his game of choice is "Call of Duty," a military-style game where teams compete to eliminate each other from virtual combat situations. He said that over the years, he became proficient enough to try his hand at



competitive gaming. Luckily for him, then, he chose to attend UND, which has a growing presence in esports (alongside varsity esports, UND offers the state's first bachelor's degree in esports, which was approved in early 2022).

As a matter of fact, it was UND's online presence that first attracted Nasir to the University.

UND is among only a handful of universities that offer an online bachelor's degree in aerospace engineering. And just as participating in a LAN tournament had been one of Nasir's dreams, another is working at NASA. Nasir's online handle is "Space," and the UND degree is what he needs to advance his career.

Since its recent inception, the aerospace engineering program has attracted more than 50 majors. It is available for students on campus, but having it online opens doors for people such

All things considered, Nasir said, UND seemed like the best fit.

On campus, his recent visit also allowed time for a little team building, prior to the Rockstar Energy Collegiate Esports Invitational held at Minnesota State University Mankato.

The tournament was held the weekend of Nasir's visit (Illinois State University took top honors for "Call of Duty"). Kraus said UND's Varsity Esports team has been invited twice to the tournament and hopes to head back next year.

Simon Palmer, a sophomore and varsity esports team member, said it isn't unusual for online gamers to never meet in person. Players engage with so many people online and with such frequency they can become close: "You don't even know a lot of their real names, but they're people that you build a connection with on a very personal level." he said.

Still, having the team together for practices in the esports complex in Swanson Hall allowed the members to build chemistry. "Doing it in person is a lot easier because everyone can be in the same room, watching the same screen, and just be able to talk anytime," Nasir said.

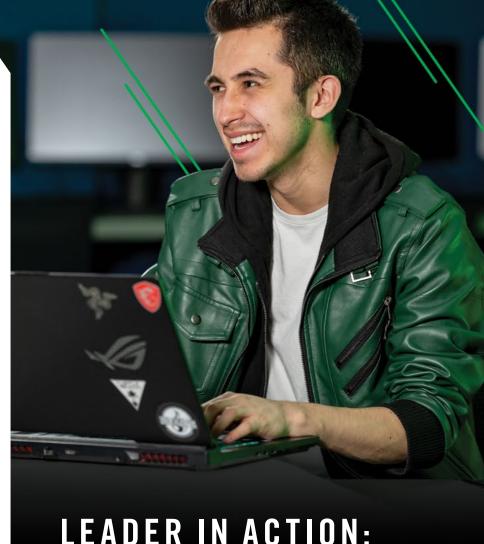
Fellow sophomore and teammate A.J. Lake agreed. "Now that we're in person, we can mesh a little better," he said

It felt a bit surreal for him to be physically present on the UND campus, Nasir said. But he was wonderfully impressed by the campus' size and beauty.

Matt Clauson, a senior and varsity teammate, also found it surreal to have an online teammate - someone with whom he'd been speaking to remotely for the past three months - at last be in the same room with him and the other team members.

"It's just nice to put a face to the voice," Clauson said.

Written by Adam Kurtz // UND Today



### **LEADER IN ACTION:**

Major:

Hometown:

Computer Science

Iowa Colony, Texas

"Computer science is a very, very wide spread discipline. Every single day there is a new technological innovation. There's this new AI, there's this new app, there's this new social media... I want to play a part. I want to take control, whether it be in cyber security, whether it be in software engineering, or even a federal, private or commercial domain; I want to set some sort of guidelines when it comes to these types of topics, and then to really assess that we can use technology for good and not to use it as a weapon or leverage against one another."



#### **VIDEO: EAPC Architects Engineers supports Ryan** Lemker, mechanical engineering student (and rocket scientist) with new scholarship for UND students



Scan the QR code to meet Ryan: UND student, President of the Rocketry Club, and EAPC Architects Engineers' scholarship recipient. A passionate future mechanical engineer, Ryan embodies the spirit of innovation and dedication.





## FOR BIOMEDICAL ENGINEERING STUDENTS, INTERNSHIPS START ON DAY ONE

#### Each day after class, students' real-world problem solving with industry partners begins

"Learning:" The first core value of the UND LEADS strategic plan. The core value that exemplifies UND's dedication, commitment and efforts to, among other things, "encourage a lifelong sense of wonder by providing educational experiences essential for living intellectually curious, personally fulfilling and socially responsible lives."

There are several strategic objectives embedded within the Learning core value, and UND's Biomedical Engineering program is creatively engaging with them – by standing the traditional model of "learning" on its head.

That means guiding students to work on solutions to real-life problems their first year in the program. They do this by interning for medical technology or device companies from the second floor of Columbia Hall, which houses the nerve center of the program, the Bioinnovation Zone or BiZ.

This hands-on approach is called innovation-based learning (IBL), and it encourages students to use their innate creativity to solve problems in the biomedical field.

This methodology, IBL, coincides perfectly with the Learning Strategic Objective of cultivating experiential learning opportunities with realworld applications derived from applied learning.

"Students take their classes in the BiZ, then walk out the door and go to work," said Dan Ewert, program director for Biomedical Engineering. "It's this new idea that you can seamlessly combine education and economic development. That's really what this whole package is; that's the big idea."

Ewert is no stranger to this area. He spent 20 years teaching at North Dakota State University before heading to the University of Minnesota-Mankato in 2010, where he helped establish a successful engineering program that used project-based learning. It was part of Ewert's efforts to transform the education model

from "teach, assign homework, quiz and test," to providing hands-on educational experiences to students.

It remains, Ewert said, a unique approach:

"Back in 2010, this was a hot thing. Nobody did this. It was crazy," he said. "The idea behind it is that if you're going to educate engineers, they should do engineering."

#### So long, quizzes; hello, adding value

Ewert said education is handled differently in the BiZ. Students get the classroom education in the engineering principles they require, but then they put those principles into practice for actual medical device companies that have partnered with UND Biomedical Engineering.

Students do their internships just a few steps away from their classroom. They work remotely on projects through what are called internships-in-place. It's the program's goal to have an internship for every student who wants one, said Kouhyar Tavakolian, director of the BiZ. That makes the process a win-win for the

company and the student, who has the opportunity to graduate debt-free.

Over the summer, Tavakolian spent time in countries such as Australia and Taiwan, talking up the program to medical device companies and sharing with them the chance to have critical work done by students.

In order to do that, cultivating creativity is key, Ewert said. He cited entities such as the World Economic Forum and Harvard Business Review (the latter has opined that the future of value creation lies in creativity), as inspirations to help put in place the IBL-based curriculum.

But how do you encourage student creativity? Creatively, it turns out. Gone are tests and quizzes, Ewert said.

Employers don't need or want someone who can "look up the answer at the back of the book." Instead, they need people who can create value by harnessing creative energy to solve problems, and that means putting recently acquired skills into practice.

So, for example, "it can't be 'I'm going to give you a written report on what I did," Ewert said. "You've got to go to conferences; you've got to present your work. And that means, even as freshmen."

#### **Solutions for industry**

Ewert said that students studying in the BiZ have developed more than 30 "high-impact deliverables."

Picture a student bioengineer applying problem-solving methods to biology and

medicine. That might mean developing new wearable technology, creating a new medical device or improving an existing one. UND students have been leaders in these efforts.

Yitzi Devor is studying in the department online, from where he lives in New York. The second-year student is working on a device to improve the lives of people with hydrocephalus, a condition that causes a buildup of fluid in the skull, leading to intracranial pressure issues.

Devor spoke at a conference about his ideas, and his research team was awarded \$50,000 to continue its work through the Center to Stream Healthcare In Place (C2SHIP), a research consortium that recently brought UND into its ranks. Participating in the consortium will give student biomedical engineers here more access to resources and opportunities than they could find regionally.

Also studying online is Bianka Valecruz. She is collaborating with the National Institutes of Health, where she collaborates with mechanical engineers and architects to revise, organize and archive drawings of the buildings at NIH campuses. She is also focusing on the standards and maintenance of research labs.

Valecruz took to heart the lessons she has learned in value creation and said she enjoys interdisciplinary work.

"I am drawn to biomedical engineering due to its expansive opportunities, driven by its rich interdisciplinary nature, allowing me to learn from each major engineering discipline and apply this knowledge to innovate solutions with the potential for significant real-world impact beyond the classroom," she told UND Today.

Tavakolian has spent time teaching senior capstone projects in areas such as electrical engineering. He said he recognized the value of getting students to work on design right away, instead of waiting until their final year of university.

Seeing successes in their work, either through company recognition or grant funding, builds their confidence. "You can really thrive in this environment if you want to go out and make a difference in the world," he said.

"There are no engineering students in Biomedical Engineering at UND. There are only student engineers."

Locally, most people in the region are perfectly familiar with the moniker Red River Valley, for the region that encompasses the cities along the Red River of the North. The area is known for several things, including the University and its sports and academic programs, not to mention the rich agricultural land.

But Ewert said he hopes that as the Biomedical Engineering program grows at UND, our region will also come to be known as the "Medical Valley."

UND's student engineers already are working hard to put their biomedical engineering program on the map.

Written by Adam Kurtz // UND Today



### New student organization for students interested in energy engineering

UND students welcome a new engineering student organization chapter on campus: the Association of Energy Engineers. During their first year, they've already been honored with an award at the association's world conference: "Best Social Media Campaign."

#### **LEADER IN ACTION:**

## CARRIE CARPENTER

Major:

Hometown:

Mechanical Engineering

Billings, Montana

In 1962, President John F. Kennedy declared, "We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard."

It's a sentiment that Carrie Carpenter has carried with her through her education at the University of North Dakota. She is no stranger to hard work. In fact, she even enjoys it.

When Carrie came to UND to pursue mechanical engineering, she had no idea of the opportunities that awaited her. As part of the Engineers Without Borders organization during her freshman and sophomore years, Carrie was able to help build a water distribution and purification system for those without access to clean water in Guatemala.

"That's something I've really appreciated from these groups; it gives us an opportunity to take what we're learning in class and actually apply it," she said.

"It's rare. You don't always get to do that because we're students, but we get to use what we're learning in our classes to help people. That's been my favorite part."

"I've been able to meet so many amazing people and I've been able to have some amazing opportunities and it just wouldn't have been possible without UND." Over the next few years, Carrie continued to take the hands-on experiences she gained from her classes and apply that knowledge to more opportunities through her involvement in other campus organizations and various internships around the country.

Her first internship led her to Summit, SD, where she was a field engineer with Mortenson Construction, and helped build a wind farm. "I really love wind turbines, and especially sustainable energy," Carrie said. "I think it's a field that has a lot of growth that could be made."

The following summer brought her to Textron Specialized Vehicles in Augusta, G.A., where she delved into design-focused tasks, fabrication work and physical testing. This past summer, she rejoined the Mortenson Construction team in their Eagle Mountain, U.T., location as a member of their mechanical team.

"That's the great part about internships. I feel like having three different experiences I got to see a lot of different industries," Carrie said. "By the end of it, I recognized a company culture that I really liked, and I was able to apply for a job."

After graduation, Carrie will join Mortenson Construction full-time in their wind division. "I always encourage people to seek out internships," she said. "It's a good way to see if it's something you would enjoy doing."

Alongside her internships, Carrie has also been involved in the robotics club on campus. For her senior project, Carrie is part of a national competition with NASA where she has been tasked with building a lunar robot capable of collecting lunar soil samples.

Looking back, Carrie is glad she came to UND for mechanical engineering. "I can't imagine myself being anywhere else," she said. "The coursework is heavy but that's something that we know as we're entering in as engineers, it will be difficult. But it's been some of my favorite years of my life."

She credits the community at UND for helping her get this far, emphasizing the support she's received from friends, faculty members and coaches. "I've been able to meet so many amazing people and I've been able to have some amazing opportunities and it just wouldn't have been possible without UND."

Carrie's time at UND has ignited a genuine desire to make a lasting impact in the lives of others. "As engineers we have a responsibility to do things well because our decisions do affect other people," she said. "I just want to leave things better than I found them."



## UND mechanical engineering student receives VEX Mentor of the Year Award

Thea Haaven-Farstad, a UND mechanical engineering student, received the Mentor of the Year Award at a VEX IQ Minnesota State Championship Tournament earlier this year.

While a VEX Robotics team is new to UND campus, Thea is no stranger to the competition series. She's been involved with middle and high school teams for a long time — and still is. While she competes at the collegiate-level on UND's VEX-U team, she and her teammates help mentor middle and high school teams in the community.

"I'm not sure if its her experience in VEX, her time around middle schoolers, or a superhuman strength not yet explained by science, but Thea has a way of explaining concepts that is as rare as it is effective. She can generate interest in robotics incredibly easily," says Andrew Dahlen, lecturer of mechanical engineering.

"There is nothing I like to see more than a positive feedback loop, and Thea is creating just that. Our world would be better off with as many Thea's as possible."



## COMING TOGETHER TO FOSTER NORTH DAKOTA'S FUTURE CIVIL ENGINEERS

Civil engineering professionals across North Dakota come together at UND to support the next generation of leaders in their field

On Wednesday, September 13, 2023, the Associated General Contractors of North Dakota (AGC) visited the UND College of Engineering & Mines to extend congratulations and awards to three exceptionally talented students from the Department of Civil Engineering.

The AGC of North Dakota's tradition of awarding scholarships to UND students spans over half a century. Among these prestigious scholarships, the John Jardine Scholarship, established in 1964, holds the distinction of being the oldest scholarship in North Dakota and is still awarded annually. Alongside it is the Walt Swingen Scholarship, both of which offer full-tuition support.

This year's event carried an added layer of uniqueness as it witnessed the AGC's first-ever scholarship award to a UND student studying abroad, thousands of miles away. Spencer Rousseau, currently pursuing his studies in Australia for a year, was able to participate in the scholarship presentations via Zoom. Despite the considerable time difference, Spencer expressed his heartfelt gratitude to the AGC representatives.

"As a recipient, I promise to be a good student and to continue to strive to be a future engineer that you would want to represent your organization," Spencer remarked. "Thank you all for this incredible honor."

Several other representatives from the college were present at the event, echoing the students' profound gratitude. Daba Gedafa, Chair of the Civil Engineering department, and Will Semke, Associate Dean, extended their appreciation for the AGC's generosity and commitment

to nurturing the next generation of engineering professionals.

"I want to thank everyone for coming and handing our students these very generous scholarships," said Associate Dean Will Semke. "They've worked very hard to earn these. These students are going to do very well in their careers, helping make the industry even more successful – all while showcasing the talents that come out of UND."

These generous scholarships not only ease the financial burden for students but also play a pivotal role in nurturing the legacy of civil engineering professionals in North Dakota. The AGC's unwavering support ensures that future engineers are well-equipped to contribute to the industry's success and uphold the high standards set by their predecessors.

Written by Paige Prekker // blogs.UND.edu/cem



## FREEMAN AWARDS CONTINUE TO INSPIRE INNOVATION

An ammonium nitrate project has won Minnkota's annual innovation competition at the University of North Dakota

Innovation has always been at the heart of Minnkota's operations, a legacy rooted in the visionary leadership of Andy Freeman, the cooperative's first general manager. His commitment to teamwork, communication and creativity continues to inspire new generations through the Andrew L. Freeman Innovation Awards, which recognize the top senior engineering design projects at the University of North Dakota (UND).

Four UND chemical engineering students took home first prize at this year's award ceremony held on May 9. The team, consisting of BriAnna Amundson, John Goebel, Austin Hamilton and Samuel Williams, earned \$2,000 for their project, which investigated the technical and commercial feasibility of a facility that produces fertilizer-grade ammonium nitrate pellets for supply to Upper Midwest and central Canadian farmers.

"In the Midwest, farmers grow corn, soybeans and sunflowers, and they all need very high nitrogen fertilizers,"
Williams said. "This fertilizer would
essentially be better than the common
urea option, which is typically produced."

The proposed project would not only improve the quality of fertilizer used by farmers in the region with increased nitrate in the soil, but the byproduct of nitrogen could also be sold to oil and gas companies in western North Dakota – benefiting two major industries in the state.

UND Professor of Chemical Engineering Wayne Seames nominated and mentored the winning engineering students.

When asked what encouraged him to nominate this particular group of students, he credited their high standard of excellence and the innovative thought process behind their project. Seames has nominated students for the Freeman Awards since the first competition in 2000.

Two student teams tied for second place and each earned \$1,000. One group focused on the design of lunar robots capable of transporting and reforming regolith (soil) into berms. The other team worked to improve the battery performance of an all-terrain vehicle while operating in extreme cold conditions.

"We've been at this for 24 years and it's pretty amazing," Brendan Kennelly, Minnkota's Vice President of Power Delivery, said of the Freeman Awards during the ceremony. "We are proud to keep Andy's legacy of teamwork, communication and innovation alive."

The Andrew L. Freeman Innovation
Awards have been held since 2000
following the formation of an endowment
by Minnkota. A UND alumni, Freeman
helped lead many energy industry
innovations throughout his 42-year
career, but he's perhaps best known as
the inventor of the headbolt heater – a
product developed to ensure vehicles
would start on cold winter days.

Deb Austreng, the Director of Alumni, Corporate & Public Relations for the College of Engineering & Mines, has been assisting with the Freeman Awards for the past 15 years.

"We have instructors that nominate students every year. They start reaching out mid-semester asking when the awards are," Austreng said. "The students are excited about it. It's very cool to end your semester and your college career winning something like this."

Written by Emily Windjue // Minnkota Current



### LEADERS IN ACTION:

## JOHN & RYAN BERGUM

Major:

Hometown:

Civil Engineering

Detroit Lakes, MN

John and Ryan Bergum have a lot in common: They are civil engineering majors; they maintain 4.00 GPAs and they enjoy archery and fishing. They are also twins.

Coming from a family of engineers, it's no surprise that the duo would choose to carry on the family legacy. "I really like problem solving," Ryan said, "And growing up, seeing what my dad worked on sparked my interest."

"Engineering runs in the family," said John, "Problem solving – all that kind of stuff. I interned with Apex Engineering in high school and got to be a part of the Washington Avenue project in my hometown. From then on, I really liked civil engineering."

Also coming from a large UND alumni family, Ryan and John felt a strong connection to the university from the start. "I toured a lot of different campuses," said Ryan, "But we have quite a bit of history here and I got the impression that the student atmosphere is really good."

Their decision to attend UND was not only influenced by family ties, but also by the campus itself. "[Our family] kind of influenced us to go here but out of all the campuses I toured I liked UND the best." John said. "And I really liked how invested UND is in its campus. The Memorial Union being brand new, I just saw a lot of things going up and I really liked that too."

Now, as juniors, both John and Ryan are active members of the American Society of Civil Engineers (ASCE). Ryan serves as the president and John as the vice president of the UND chapter.

"It's really challenged me because I was never part of student organizations in high school, and never as a leader of one, that's for sure," Ryan said. He credits his leadership role in ASCE for helping his professional skills and pushing him out of his comfort zone.

"I wasn't comfortable with it right away, but I really ended up enjoying it," he said. "Your friends are there for you. Rely on them and don't be afraid to ask for help from professors. They all want you to succeed just as much as you do."

"A lot of my friends that I've met here and opportunities I've gotten at UND have been through [ASCE]," said John. "I've gotten to travel and have these experiences."

Through his role as ASCE vice president, John has improved his communication and time management skills by working on various tasks and assisting other officers. "I'm kind of like the bounce-around guy, helping where I'm needed," he said. "There is a lot of communication with employers trying to secure funds for our trips."

"Your friends are there for you. Rely on them and don't be afraid to ask for help from professors. They all want you to succeed just as much as you do."

While Ryan and John have and continue to share many experiences and pursuits during their time at UND, they are resolute in the desire to forge distinct paths in their careers. "We want to be different people and a lot of people would see twins as the same person," John said.

"We want different lives." Despite their close bond as twins, they are determined to make their own lasting impact as individuals.

"I'm just excited to see what my 'once in a lifetime' projects are going to be," said Ryan, "you know, over the years there will be a lot of opportunities to work on bridges, highways, all sorts of projects – I'm excited to see what those will be."

"I'd say very similar things, I want to get my professional engineering license and I'm looking forward to going around the community and seeing some of the projects I got to design making an impact on my community," said John. "Seeing that all come to light."









Above: Updated conceptual renderings of the STEM Complex provided by Clark & Enersen.

#### Answering the urgent call for a modern STEM Complex that will enable students, researchers, and faculty to thrive

Interested in making a lasting impact? Contact Robin Turner, Sr. Director of Development, to learn more about how you can nurture and develop a strong pipeline of students pursuing degrees and careers in STEM. See contact information on page 47.



#### A SPARK FOR

## SCIENCE & ENGINEERING

#### A \$3 million gift from the **Ann & Norman Hoffman Family Foundation will** help build a new facility for collaborative learning and research

A generous family is paving the way for future engineers at UND by transforming their educational experiences.

The Norman & Ann Hoffman Family Foundation has contributed \$3 million toward the new UND STEM Complex. With an additional match from the State of North Dakota, the gift will grow to \$9 million of impact for the project. The gift follows years of passionate support from Norman Hoffman, '59 (pictured above with his wife, Ann), to his alma mater and is a pivotal donor commitment to the \$82 million STEM project. This initiative will enhance UND's engineering, chemistry, math, data science, biology, and physics programs.

Norman first gave to the University of North Dakota in 1968 and has been

supporting engineering ever since. In 2008, he and Ann established the Ann & Norman Hoffman Chair of National Defense and Energetics, a position held by Dr. Gautham Krishnamoorthy since its inception. The Ann and Norman Hoffman Energetics Resource Center is a space in Harrington Hall that symbolizes Norman's passion for the industry. His journey of philanthropy led to the creation of his family foundation.

Norman and Ann are still active in philanthropy, but the next generation of Hoffmans is leading the foundation into the future.

Pictured above, their daughters Julia (left) and Jeanne (right) serve on the Norman & Ann Hoffman Family Foundation's Board of Directors along with Chief Financial Officer Jerry Storms, Norman's longtime friend.

"He grew up with almost nothing, and after achieving more success in life than he ever imagined possible, he wanted to help other people get to where they want to be in life," Julia said.

The latest gift from the family will help kickstart Phase I construction of the UND STEM Complex, which will house research labs, collaboration spaces, student success resources and classrooms, and office spaces. The building will bring together the best minds across several programs within the UND College of Engineering & Mines and the UND College of Arts & Sciences.

"We're excited about this because it provides a chance to bring collaborative elements together," Jeanne said. "Having these programs in close proximity will percolate advancement and spark more creativity and chemistry among students and faculty."

Learn more about the UND STEM Complex project at **UND.edu/stem-complex.** 





## EMPOWERING COMMUNITIES AND SHAPING FUTURES: THE (CONTINUED) INSPIRING WORK OF JILL & DAVID

Nestled in the heart of Botswana's arid landscape, the small community of Goodhope has become a beacon of hope and transformation, thanks to the dedicated efforts of Jill (Owen), '82, and David Engelstad, '90.

Jill (Owen) Engelstad, '82, and David Engelstad, '90, are no strangers to the challenges and rewards of living abroad.

Their shared commitment to service, which began decades ago, has taken them around the world, from the Navajo Nation in Arizona to American Samoa, and now to the heart of Southern Africa in Botswana.

Their journey has always been guided by their professional expertise—Jill in physical therapy and David in civil engineering—and an unwavering dedication to making a difference in underserved communities.

The Engelstads' journey began after they graduated from the University of North Dakota (UND). David, a civil engineer, and Jill, a physical therapist, met and soon discovered a shared passion for helping

others. David started his career with the Indian Health Service, where he improved water and sanitation infrastructure for the Navajo Nation. Jill provided much-needed physical therapy and preoperative care for Native patients. This early experience set the stage for a life of service and teamwork.

"We're so lucky to have that experience. That's when we became quite the team," Jill recalls.

#### A New Chapter in Botswana

Now, in their early 60s, Jill and David have embarked on another exciting chapter in Botswana as Peace Corps volunteers. Since settling in Goodhope five months ago, Jill and David have embraced the community as their own, working tirelessly to address pressing local issues.

"We continue to love (rata) our community, co-workers, and friends in Goodhope (and Botswana)," the Engelstads write in their latest newsletter. Their work in Goodhope has been nothing short of transformative, focusing on education, health, and gender equality—areas where they believe they can make the most impact.

Jill and David's recent efforts have centered around several key initiatives aimed at improving the lives of the people in Goodhope:

David brings his engineering expertise to Goodhope, tutoring students in STEM subjects and initiating after-school STEM clubs to ignite a passion for science and math among young learners.

- Safe Sex & Life Skills Classes: Jill and David are facilitating life skills classes at Goodhope Senior High School, focusing on promoting healthy relationships and reducing HIV rates among youth. For the first time in Botswana, HIV testing has been incorporated into school programs, a groundbreaking step toward combating the epidemic.
- After School Girls Mentorship Program:
  Jill, drawing on her experience from
  Tanzania, is mentoring young girls at
  Goodhope Junior High School, helping
  them realize their potential and combat
  gender-based violence.
- Coaching for Life: The Engelstads also coach boys and girls through sports at Phitsane Molopo Primary School, helping rebuild after-school programs that had been dormant since COVID-19.

Their work extends beyond these programs, as they continually identify new community needs, such as planning a new public library and starting a community tree planting program.

#### **An Ongoing Commitment**

Jill and David's current work in Botswana is a natural extension of their lifelong commitment to service. Their efforts to provide quality education, promote health, and support sustainable development echo the principles they have lived by throughout their careers.

As they continue their Peace Corps service until November 2025, the Engelstads remain dedicated to empowering the communities they serve, ensuring that their impact will last long after moving on to their next adventure.

"We feel like, in a way, we're just beginning another exciting chapter," David says.

For the Engelstads, this new chapter in Botswana is yet another step in their journey of intentional living—one that continues to be guided by the belief that education, health, and sustainable development are the keys to building a better world.

Written by Paige Prekker // blogs.UND.edu/cem



The new research-focused Centers will be managed through the College of Engineering & Mines (CEM) Research Institute, which was formed in 2022 and serves as the research division of the CEM. Through initial CEM support, each center has the goal of becoming self-sufficient through full external funding. Authorization establishing the Centers came on June 25, following a meeting of the North Dakota State Board of Higher Education.

The five new CEM Centers are: Artificial Intelligence Research Center (AIR), Center for Cyber Security Research (C2SR), Materials and Manufacturing Research Center (MMRC), Center for Water Research (CWR), and the Center for Process Engineering Research (CPER).

[Excerpt]

Written by Adam Kurtz // UND Today



## COLLABORATING WITH DICKINSON STATE UNIVERSITY TO BRING ENGINEERING PROGRAMS TO WESTERN NORTH DAKOTA

UND and Dickinson State University are proud to announce a collaboration to expand engineering education opportunities in western North Dakota. This partnership aims to provide DSU students with seamless access to UND's engineering programs, enhancing educational offerings and supporting regional workforce development.

Under the terms of a recently signed Memorandum of Understanding agreement, DSU students who meet the specified criteria will be eligible to enroll in UND's engineering programs. Program options include Chemical Engineering, Civil Engineering, Electrical Engineering, Geological Engineering, Geology, Mechanical Engineering, and Petroleum Engineering. This initiative leverages the strengths of both institutions to deliver high-quality engineering education through a combination of DSU's local resources and UND's specialized programs.

UND will accept DSU students into its engineering programs, subject to the transfer requirements outlined in the agreement. This ensures that DSU graduates can continue their education without interruption. The advising of DSU students regarding admission and program requirements will be a joint effort between DSU and UND, utilizing dual admissions and enrollment.

UND will provide online courses for DSU freshman and sophomore engineering courses required for an engineering degree. Upper-level engineering courses will be scheduled to allow DSU students to complete the necessary coursework over a three-year period.

Required laboratory instruction will be offered on the UND campus during summer semesters. DSU students who complete the articulated program of study and meet all UND graduation requirements will be eligible for a UND bachelor's degree in the specified engineering discipline and their DSU degree.

"We are excited to partner with the University of North Dakota to bring these essential engineering programs to our students in western North Dakota," said Holly Gruhlke, DSU Vice President. "This collaboration aligns with our mission to provide accessible, high-quality education and support the workforce needs of our region."

"This agreement represents a significant step forward in expanding educational opportunities and fostering collaboration between our institutions," said Brian Tande, dean of the UND College of Engineering & Mines. "We look forward to welcoming DSU students into our engineering programs and supporting their academic and professional success."

The UND College of Engineering & Mines work closely with schools regionally and nationally to offer flexible and affordable pathways through various educational partnerships. This new partnership is an addition to our existing partnerships with other colleges: Bismarck State College, Williston State College, Benedictine College, Schreiner University, and the University of Mary.

## UND DESIGNATED AS NATIONAL CENTER OF EXCELLENCE IN CYBER RESEARCH





#### Designation 'recognizes UND's ability to make a truly national impact in cyber research,' UND president says

UND has been designated as a National Center of Academic Excellence in Cyber Research (CAE-R) institution through 2029. This marks the first time the University has received such a designation and comes on the heels of increased cybersecurity research projects on campus.

The CAE-R program is among a number of programs within the National Centers of Academic Excellence in Cybersecurity (NCAE-C). The notice of approval was sent to Prakash Ranganathan, director of the Center for Cyber Security Research, housed within the UND College of Engineering & Mines.

The designation means that UND has joined the national community of Centers of Academic Excellence in Cybersecurity (CAE-C) institutions, which is committed to increasing the number of cybersecurity professionals dedicated to reducing vulnerabilities in the national infrastructure.

UND President Andy Armacost offered his congratulations to those on campus who diligently worked on receiving the CAE-R designation.

"I am exceptionally proud of the hard work that went into this important designation, which recognizes UND's ability to make a truly national impact in cyber research," said Armacost. "Congratulations to the School of Electrical Engineering & Computer Science and Dr. Prakash Ranganathan for this signature achievement. UND's exceptional faculty and academic programs make us the go-to university for anyone studying cybersecurity, artificial intelligence, and data science."

Both Ranganathan and Brian Tande, dean of the College of Engineering & Mines offered their thanks to Jamison Jangula, cybersecurity analyst for the College of Engineering & Mines, for his efforts in working to secure the CAE-R designation. Tande expressed his gratitude for receiving the designation and said it will pave the way for future opportunities at UND.

"Achieving this important designation will open up research funding opportunities for our faculty, as well as scholarships and career opportunities for our students," he said. "We are all grateful to Dr. Ranganathan, Jamison Jangula, and the rest of the team for this significant accomplishment."

Ranganathan said the CAE-R designation underscores the quality of the UND cybersecurity curriculum as well as its alignment with current industry and governmental standards. He said the designation can boost an institution's ability to attract grants and funding from both government and private sources interested in advancing cybersecurity research.

The designation also carries with it the potential for community engagement and economic development, Ranganathan

said. CAE-R institutions frequently engage with their local communities through outreach programs, workshops and seminars to raise awareness about cybersecurity.

The enhanced reputation and capabilities in cybersecurity also can attract companies and investments to the region, contributing to economic development and job creation.

"The CAE-R designation is more than just recognition, it's a catalyst for comprehensive growth and development in cybersecurity research and education," Ranganathan said. "It signifies a step toward becoming a hub of excellence in cybersecurity, attracting talent, funding and partnerships that will elevate the institution's status and impact in the field."

The conferring of the CAE-R designation comes shortly after UND received funding to participate with a national laboratory and other institutions and entities to develop software algorithms to protect a portion of the nation's energy grid.

In receiving the CAE-R designation,
Ranganathan offered his thanks and
gratitude to Tommy Morris, director of
the Center for Cybersecurity Research
and Education at the University of
Alabama in Huntsville. Morris, a mentor
to Ranganathan, offered his generous
support in preparing for the application
package for the designation.

[Excerpt]

Written by Adam Kurtz // UND Today

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### NAIMA KAABOUCH NAMED CHESTER FRITZ DISTINGUISHED PROFESSOR

Dr. Kaabouch becomes CEM's first female professor to receive UND's highest academic honor

UND Professor of Mechanical Engineering Surojit Gupta has been awarded a \$3.7 million grant to study the feasibility of recycling wind turbine blades, a topic of increasing importance with the rise in wind power development.

The grant's research will be conducted in collaboration with co-principal investigators from UND, including Professor of Chemistry Yun Ji and Assistant Professor of Mechanical Engineering Hallie Chelmo. Beth Klemetsrud, assistant professor of chemical engineering, will lead the project's life cycle assessment in collaboration with the Idaho National Laboratory.

The grant will cover a period of three years, with \$3 million of the funds coming directly from the U.S. Department of Energy (DOE). An additional \$500,000 will come from the North Dakota Industrial Commission, with local sources rounding out the total.

UND will partner with Grand Forks-based Singularity Energy Technologies (SET), led by its founder and President Nikhil Patel. Hasan Jamil, associate professor of computer science at the University of Idaho and Yingqian Lin, researcher of bioenergy at the Idaho National Laboratory, will assist with carrying out the grant's research activity.

The team will also employ UND graduate students and postdoctoral scholars.

Gupta, whose research interests center around sustainable materials, called the difficulty of recycling turbine blades "a major impediment to adopting wind energy." He said most turbine blades that have reached their useful lifespan — typically around 20 years — end up in landfills.

"Currently, the major problem is that everything is going underground in landfills," said Gupta. "Recently, the North Dakota Legislature has passed legislation that restricts blades being dumped in landfills in North Dakota. Similar legislation is getting in place all over the country. There are places in Texas and lowa where they have sites filled with blades."

In addition to the University of Idaho and Idaho National Laboratory, UND will partner with Grand Forks-based energy companies to carry out research.

"As a part of that, we will work with local companies such as LM Wind Power, as well as our partner in the proposal is SET Technologies," he said. "They (SET) have gasification technology that can recycle wind blades. It's a major award."

Gupta said that a comprehensive recycling matrix composed of various propriety degradation processes and gasification will be used to recycle turbine blades holistically, converting fibers into material suitable for uses such as construction and resin into different composite systems.

Naima Kaabouch was in for a surprise when UND President Andrew Armacost and Provost Eric Link entered the CEM dean's office on a Thursday morning in April.

Kaabouch named Chester Fritz

Distinguished Professors — UND's
highest academic honor — joining an
exclusive club of faculty lauded for their
excellence in teaching, research and
service. Recipients are selected via
a panel of nine UND professors, who
consider letters of nomination from
deans and fellow professors, among
other factors, in rendering a decision.

"This is to honor you — you were nominated as a Chester Fritz
Distinguished Professor!" Armacost said to Kaabouch, professor in the School of Electrical Engineering & Computer Science within UND's College of Engineering & Mines, as well as director of UND's Artificial Intelligence Research Initiative.

Thrilled and humbled by the announcement, Kaabouch thanked her colleagues and UND administrators for creating such a positive work environment.

"I really appreciate the recognition, and the support of UND, Brian (Tande) and the College (of Engineering & Mines)," she said. "That's why I am happy to work here, and I am still here after 18 years. I cannot think about moving from here, just because of all the support and collaboration I am receiving."

A leading authority on cybersecurity, artificial intelligence and autonomous systems, Kaabouch has published many award-winning academic publications, and according to Link, has secured more than \$35 million in research funding during her 18-year tenure at UND.

Brian Tande, dean of the College of Engineering & Mines, added that Kaabouch is the first female professor from the college to receive the honor. The level of admiration felt by Kaabouch's colleagues toward her is reciprocal.

Numerous faculty members within the College of Engineering & Mines, and UND's National Security Initiative, authored letters of nomination for her award. Among them was Mark Askelson, associate vice president for Research-National Security.

"I have experienced numerous blessings in my life, and Dr. Kaabouch is one of them," wrote Askelson in his letter of nomination. "Dr. Kaabouch is one of the key talented and wonderful people to whom I owe a great debt. Through our collaborations on projects, Dr. Kaabouch has performed outstanding and brilliant work, deepening the respect stakeholders have for UND."

[Excerpt from 'Kaabouch, Tan named Chester Fritz Distinguished Professors']

Written by Joe Banish // UND Today

Written by Joe Banish // UND Today



Wayne Gretzky and the five-time NHL champion Oilers may be the first topics that come to mind.

But the city is also the namesake of the Edmontosaurus, one of the largest planteating dinosaurs to ever roam North America. That's because remains of the species were first discovered in 1917 in sandstones of the Horseshoe Canyon Formation in southwestern Alberta.

In October 2023, a team led by Paul Ullmann, an assistant professor of paleontology in UND's Harold Hamm School of Geology & Geological Engineering, returned to campus with a new Edmontosaurus specimen consisting of approximately 25 bones and weighing 4,400 pounds - a find that greatly pleased Ullmann and his team.

"Anything better than two bones is a wonderful find," he said.

Bringing the specimen to UND was an immense undertaking and team effort, in

family of dinosaurs, a fully grown adult Edmontosaurus could reach upwards of 40 feet in length, comparable in size to carnivorous dinosaurs such as the Tyrannosaurus Rex.

"There have been cases where you find one of these hadrosaurs, and it's so large you may think you have a T-Rex," Ullmann said. "Then you find more diagnostic bones that show you it's a plant eater, not a carnivore."

The specimen was found near Jordan. Mont., in the Hell Creek Formation, a suite of rocks famous for the study of dinosaurs of the cretaceous period. Ullmann estimates the new specimen to be 67 million years old.

As evidenced by previous bone discoveries, Edmontosaurus was a gregarious species, congregating in herds of several hundred.

"There's a butte I worked at in South Dakota for my doctorate research,

it onto a trailer for transport back to Grand Forks.

Ullmann said the expedition was funded in part by an anonymous donor, as well as internally through partnerships with Concordia College and Rowan University, located in Moorhead, Minn., and Glassboro, N.J., respectively. He and his team are applying for further grants to support future expeditions to the area and other dinosaur-bearing badlands in North Dakota.

The specimen is currently housed in the North Dakota Geologic Survey's Wilson M. Laird Core & Sample Library, encased in 10 protective layers of plaster and burlap, which Ullmann likened to a cast, further reinforced with rebar. After it is removed from its protective coating - a process that may take up to a month - the bones will be examined more thoroughly to determine their geochemistry and whether they contain original soft tissues, such as

blood vessels and bone cells. Such research can provide vital insights into the dinosaur's habitat and physiology.

"Recovery of soft tissues, cells and molecules from such ancient fossils is right at the forefront of paleontology," Ullmann said. "My collaborators at North Carolina State University and several other teams around the world have used molecular data out of such cells and soft tissues to test how dinosaurs were related to other animals, independent of their skeletal anatomy. We are trying to make big steps in that direction as we investigate more specimens over the years."

Despite the clues they may provide, Ullmann jokingly dispelled any notion of cloning dinosaurs through molecules recovered from fossil soft tissues or bone cells.

"Anytime you have molecules and dinosaurs in the same sentence, it gets brought up," he said. "But, as fun as it is, Jurassic Park is still science fiction."

The bones are being stabilized and cleaned for display at Leonard Hall in a process called fossil preparation, which Ullmann said is likely a "two-to-three-year project, if not more." The fossil preparation sessions are open to the public, will providing a novel opportunity for UND students and members of the community to work together.

Interested in volunteering during a fossil preparation session? Visit bit.ly/UND-Dinosaur to find and register for available sessions.

[Excerpt]

Written by Joe Banish // UND Today

Photo by Adam Kurtz/UND Today

### WATER GOES IN. **ENGINEERS** COME OUT.

#### With water-filtration project, fourthgraders show power of UND's new Center for Engineering Education Research

What's a beach burn to do when it's the dog days of summer, the wind is still, the skin is sticky and the giant lake just a paddleboard away looks as thick as pea soup?

We don't know, but there's a bunch of fourth-graders in Devils Lake who might just have an answer.

Julie Robinson, director of UND's new Center for Engineering Education Research (CEER), says teachers there, and elsewhere in North Dakota, are learning how to incorporate standard engineering practices into the classroom to engage young learners in finding solutions to issues or problems that are relevant to them and their communities.

The formal collaboration between UND's colleges of Education & Human Development and Engineering & Mines — made possible by a three-year strategic investment — aims to transform PreK-20 engineering education and broaden pathways to engineering through research partnerships and outreach.

"We're talking about this deep need to really understand how we can support teachers at all levels so that we're providing education that affords student learners regular opportunities to see engineering as something that can provide solutions to community interests - something all students can see themselves doing by identifying with it and engaging with it in very relevant, personal and authentic ways."

The CEER leadership team consists of faculty from the colleges of Education & Human Development and Engineering & Mines, including Beth Klemetsrud, Assistant Professor of Chemical Engineering, and Frank Bowman, Thomas C. Owens Endowed Chair of Chemical Engineering.

[Excerpt]

Written by Janelle Vonasek // UND Today

## 

PRESENTED BY





Oct. 31-Nov. 2

ALERUS CENTER

The UND College of Engineering & Mines is pleased to announce it will host the North Dakota Signature, a VEX Robotics Signature Event, presented by Bifrost Manufacturing, from Oct. 31 to Nov. 2 at the Alerus Center.

VEX Robotics competitions are the largest and fastest growing middle school and high school robotics program globally, with more than 20,000 teams from 50 countries playing in over 1,700 competitions worldwide.

Each year, an exciting engineering challenge is presented in the form of a game. Students, with guidance from their teachers and mentors, build innovative robots and compete year-round. In its inaugural year, the North Dakota Signature, presented by Bifrost Manufacturing, is anticipated to bring in 250 teams comprised of 1,500 students.

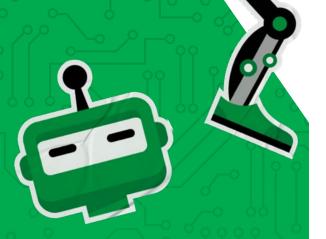
"We at Bifrost are excited to be a part of this event," said Killian Erickson, founder & CEO of Bifrost Manufacturing. "It's a great opportunity to bring bright young minds together to build valuable skills, further advancing the future of STEM fields and giving students a chance to excel. Members of our team have participated in various STEM competitions through high school and college, experiences which are invaluable for us and them."

UND President Andy Armacost said he is delighted the University has the opportunity to host the event in Grand Forks, both for its entertaining robotics challenges, and the inspiration the event can instill in the minds of young people.

"We are thrilled to co-sponsor this major event with VEX Robotics," he said. "This tournament will inspire many students to consider future studies in robotics, engineering, and science. We will show them what is possible when imagination and a sense of discovery come together to unleash incredible creativity."

According to VEXrobotics.com, "VEX competitions are a great way to expose students to valuable soft skills like communication, collaboration, and time-management in a fun and authentic way. The VEX Robotics competition prepares students to become future innovators with 95% of participants reporting an increased interest in STEM subject areas and pursuing STEM-related careers."

The North Dakota Signature is set to be a boon to the Grand Forks community. According to Alerus Center data, similar robotics competitions held there in recent years have brought in nearly \$1 million in economic impact per event.





Members of the community are welcome to come out to the Alerus Center on Oct. 31 to Nov. 2 to cheer on competitors and experience the excitement of VEX Robotics first-hand.

#### **About Bifrost Manufacturing**

Bifrost Manufacturing is committed to revolutionizing the manufacturing sector through innovative 3D printing and advanced manufacturing processes. Bifrost operates across all sectors, with a specialized focus on UAS, agriculture, and industrial applications. Bifrost's mission is to deliver rapid, affordable, and custom solutions that drive progress and efficiency.





### UND & VEX Robotics: A winning combo

This past year, the UND College of Engineering & Mines launched a campaign to support the VEX Robotics Competition, inspiring high school students to pursue engineering careers. This campaign included creating a VEX Robotics University Team, hosting tournaments, and supporting regional events with a tournament-in-a-trailer service.

The UND's team advisor, Andrew Dahlen, has supported VEX Robotics for 13 years. Having served as an emcee for the past five years on the VEX Robotics World Championship Tournaments, he brings a wealth of insight into the college's outreach and recruitment efforts through robotics events.

"The students involved in the VEX Robotics teams are already doing engineering work in solving problems while facing multiple constraints," says Andrew. "Robotics competitions are a fun and engaging way to develop an appetite for engineering careers."

UND's tournament-in-a-trailer has supported eight regional tournaments. This trailer service makes it easy for schools to host their own VEX Robotics tournaments. The College of Engineering & Mines transports the trailer to the school, where local volunteers unload it and set up the tournament. After the event, the trailer is loaded up and ready for the next game. With this, the college played a crucial role in supporting the Minnesota Signature Event at the Mall of America, featuring 100 teams across the United States and Canada.

VEX Robotics isn't just a tournament series; different VEX programs worldwide provide opportunities for children and teens of all ages to get their hands on robotic activities. Team members like Thea Haaven-Farstad volunteer their time and talents to younger teams in the region, fostering the cycle of interest in engineering and science. Read more about Thea's involvement with VEX on page 19.

This year also marked the first time UND has hosted a VEX Robotics tournament. In February, the College of Engineering & Mines and the newly established VEX-U team welcomed leagues of K-12 VEX teams to the Memorial Union for regional qualifiers.

The college is committed to growing its presence at VEX robotics events regionally and nationally. "We are proud to bring the North Dakota Signature Event to Grand Forks, and I expect great things from the UND VEX U competition team," says Andrew.



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#### The first to come, **CEM's Scholarship Award Ceremony brings** together the hearts behind scholarships

While snow in October isn't uncommon up north in Grand Forks, the first snow of the season is seldom welcome with

Yet despite the snowy weather, donors, students, and community members gathered in the Gorecki Alumni Center on Oct. 27 to celebrate a recurring yet extraordinary and transformative occasion: scholarships.

The inaugural Scholarship Award Ceremony for the College of Engineering & Mines was a heartwarming recognition of the philanthropic contributions impacting hundreds of CEM students annually. In the 2021-2022 academic year, \$1,279,161 in scholarships were awarded to over 500 CEM students.

Of that total, \$503,911 was raised by the UND Alumni Association & Foundation.

During the ceremony, every donor was honored and recognized for their generosity. On stage, the donors hand the student who benefited from their scholarship an envelope containing a congratulations letter: a symbolic gesture of giving them their scholarship.

As students came to the stage to receive their congratulations letter, cheers came from students and guests alike - a testament to the college's team-driven atmosphere.

#### Paying it forward

Closing the ceremony, Robin Turner, FCEP, Sr. Director of Development for the College of Engineering & Mines, spoke to the participating students about the intention behind every scholarship awarded to them: to pay it forward.

"I have the privilege of traveling regionally and all over the country to meet with our alumni and donors," said Robin. "Many of them have told me that they received a scholarship while attending UND. After graduating from UND, they went on to have amazing careers all over the world. They never forgot how their education at UND prepared them for the real world and one day wanted to pay it forward."

Robin emphasized the heartfelt intentions behind the giving. "These scholarships have so much meaning. I hope you know that our alumni /donors believe in you and want to see you succeed. They want you to go on into the world and do amazing things."

During the post-ceremony reception, Ashly, a geological engineering student, reflects on the power of paying it forward

"What Robin said earlier on stage was to "pay it forward"; I want to help pay everything forward that I am learning here at UND so that I can go back and help my community, being that conduit connecting science to the Indigenous communities and making sure that we're pushing forward in a really good way."

Like the other students that day, Ashly felt grateful and happy for the support at UND.

"I've been able to be supported by an amazing advisor, Taufique Mahmood, and I've gotten to meet some amazing colleagues that I am able to collaborate with and open up good conversations with. I am very thankful for the community here at UND because I feel that I am very welcome and that my culture is able to be celebrated. I'm glad to be here and very thankful to be supported by UND."

#### The faces behind the scholarship

Perhaps the most impactful moment of the event was the interaction between students and the donors who made their scholarships possible. After the ceremony, students and guests socialized and got to know one another in the Gransberg Room.

For civil engineering student Norah, meeting Brad & Gayle Aafedt wasn't just an opportunity to extend her thanks in person — it was a moment of genuine connection

"It's really cool to receive the scholarship because I wasn't expecting it," said Norah. "All of a sudden, I looked to see that I received the scholarship and I felt really grateful! Meeting my donors is a great experience because I get to tell them how thankful I am for the scholarship and how much it really means to me

On any other day, Norah, Brad, and Gayle may have been strangers to one another. For both parties, the ceremony was an eye-opener of the deeply personal impact that binds them together.

"The Aafedt Family Engineering Scholarship is really important and special to me because it is a scholarship we put together for our family; our son is a 4th generation engineering graduate from the University of North Dakota, and we wanted to celebrate that," said Gayle. "The reason why we put together an engineering scholarship is to pay forward all of the scholarships that we received. We want to pay it forward, thank the people that did before us, and create another generation of engineers."

There's often more than just one or two generous donors behind one scholarship - and sometimes it's a whole company. Representing EAPC Architects Engineers, Casey Hutton, Office Manager & Architectural Project Manager, and Lori Bakken, Marketing Director, attended the ceremony on behalf of the organization.

"The main reason that I'm here and why we give to the college is that it gives back to the community and to a client we work with quite frequently," said Casey. "We do a lot of work with the UND campus, but it's really a win-win for both of us because we get a lot of our staff from UND. I can count at least five people in our engineering department who are UND graduates. We get a lot of strong people from this program."

#### The life-changing impact of scholarships

For some students, the reality of going to college is a matter of one thing: funding. For Nicholas, a biomedical engineering student, scholarships meant the opportunity to finish his education and spend time with his family.

"This scholarship gives me something I normally can't get for myself; it gives me the support to work less hours. And working less hours means I get to spend more time with my kids. The philanthropy buys me time I would normally spend working to pay for my education - time I don't get to spend with my family. And as a father of five, there's a lot of family to go around."

Nicholas notes that without his scholarship, he wouldn't have been able to afford to go to college and work towards his engineering degree — which has been a dream of his since childhood. "I am finally accomplishing that, thanks to the generous support I have received through financial aid, scholarships, endowments... it's all the difference in the world to me."

#### A tradition of passing the torch

Students today like Nicholas experience life-changing impacts through scholarships — but they are an echo that reverberates from scholarships from generations past. Terry Lucht, a 1974 graduate, recalls the philanthropy he, too, received back as a student.

"I was able to get a scholarship to help me get through college. So, with a great career and the opportunity to give back, I decided it would be fun to set up an endowment and give back to the university that helped me tremendously," said Terry. "I learned a lot of good things; it was a great school that carried me through a long career."

"I'm grateful to have that behind me and to be able to pay it forward a little bit to the next group of new engineers. It's a great school, great bunch of people, and it's good to see that tradition being carried on."

Written by Paige Prekker // blogs.UND.edu/cem

## ALUMNI ACADEMY

CEM's highest honor bestowed upon three alumni at the 18th annual Alumni Academy Induction ceremony.

On October 6, 2023, the University of North Dakota College of Engineering & Mines celebrated the achievements of three distinguished alumni during the annual Alumni Academy Induction Ceremony. Family, friends, and colleagues gathered to observe the induction into the Academy.





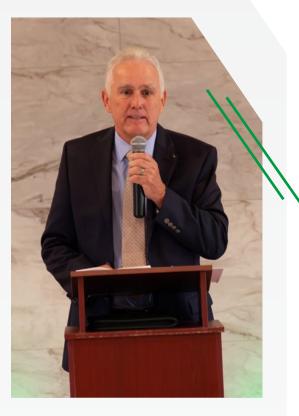


#### Alumni Academy unites and welcomes newest members

During the ceremony, we were honored to be joined by many of our previously inducted Alumni Academy members. From left to right: LeRoy Kuta, Dean Wieland, Donald Hynek, Dwight Wendschlag, Larry Mattson, Thomas Owens, Mike Lodoen, Terry Severson, Mark Thompson, Arlen Nordhagen, Barbara O'Toole, Robert Johnson, and Gary Hartz.



#### 2023 Alumni Academy Inductee





#### UND College of Engineering and Mines $\label{eq:ACADEMY} ACADEMY$

#### Donald L. Hynek

Born: March 24, 1949, Stanley, North Dakota Education: University of North Dakota, BSCE, 1971

#### Career Experience

1971-1974 Civil Engineer, Texaco Inc.
1974-1980 Manager, Civil Engineering, Texaco Inc.
1980-1988 Manager, California Operations, Texaco Inc

1988-1990 Manager, Non-operated Properties, Texaco Inc.
1990-1992 Manager, Gulf of Mexico Operations, Texaco Inc.
1992-1997 General Manager, UK Project Development, Texaco Inc.
1997-1999 Regional Manager, Asia Pacific Operations, Texaco Inc.

1999-2002 General Manager, International Project Development, Texaco, Inc 2003-2007 President, Hynek Consulting LLC

#### Service

President, Kappa Sigma Fraternity

Church Council – New Orleans, London, Houston, Ventura
Council President – Trinity Lutheran Church

Habitat for Humanity Volunteer– 18 years
Project Understanding Food Pantry Volunteer– 10 years

Engineering Advisory Council – Heriot-Watt University, Edinburgh Scotland Management Committee – Hamaca Heavy Oil Development, Venezuela

Management Committee – Angola LNG Project

#### Achievements

Established Don and Sandy Hynek UND Civil Engineering Endowment Registered Civil Engineer – Louisiana and California



## Donald L. Hynek Civil Engineering '71



Don was joined by his wife Sandy, Lena Rose (Cissy) Drosdal, Diane & John Ponticello, and Orv & Karen Drosdal.



#### **Robert P. Johnson** Geology '70, '73



UND College of Engineering and Mines

#### **ACADEMY**

#### **Robert Post Johnson**



July 27, 1947, Rugby, North Dakota University of North Dakota, Ph.B., Geology, 1970 University of North Dakota, M.S., Geology, 1973

#### Career Experience

Coal Geologist, Hunt Oil Company, Williston, ND Petroleum Geologist, Hunt Oil Company, Williston, ND 1975-2011 Owner, Harris, Brown, & Klemer, Inc. Founder, Kyte Mineral Properties, LLC

#### Founder, PetroStrive Production, LLC

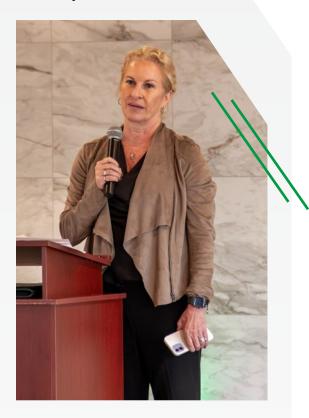
2017 Arthur Gray Leonard Award for outstanding contributions to the field of geology, Harold Hamm School of Geology & Geological Engineering, UND College of Engineering & Mines

36-year career with Harris, Brown, & Klemer, Inc., a geological consulting firm which specializes in diverse geological problems relating to the Williston Basin and surrounding area.

As of October 2023, Bob is now enjoying semi-retirement while keeping up with various mineral and oil and gas properties acquired over the last 48 years



**2023** Alumni **Academy Inductee** 







#### UND College of Engineering and Mines **ACADEMY**

#### Barbara O'Toole



Modine Manufacturing, Racine, Wisconsin Senior Design Engineer, The Joiner Rose

Founder & CEO, Advanced Environmental

Concept (AEC), Inc.

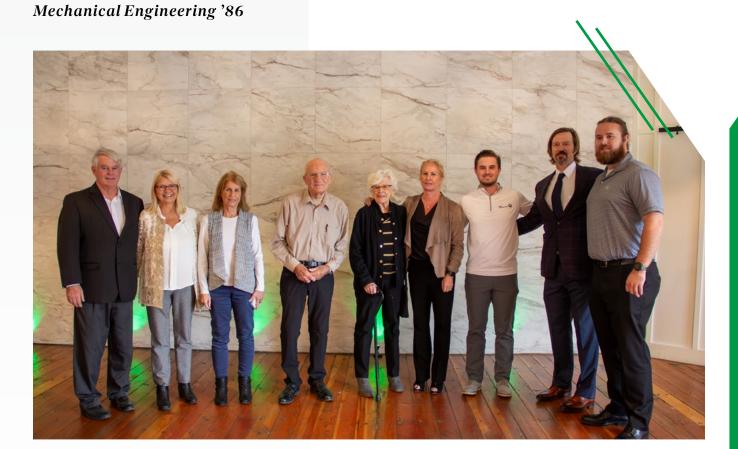
Barbara started AEC, a specialty commercial interiors contractor, in 1991 with \$3,000 and an unwillingness to take no for an answer, a well learned trait while growing up in rural North Dakota. She is now the CEO of AEC which has grown to be a \$25 Million / year business located in Dallas TX and currently employs over 100 people. Her greatest achievements are the people in her life that she has had the honor to mentor and are hungry to keep learning and growing both in business and life. Her motivation for herself has always been to take one day at a time and life is measured in happiness, achieving goals, and helping others to succeed.

2008, 2009 - Texas Building Branch Excellence in Construction 2009 - Texas Construction Best of Interior Construction 2010-15 - Exxon Mobil Campus Design/Build Award 2017. 2018 - TEXO Distinguished Building Award

2013, 2018, 2021, 2022 - Dallas Business Journal Largest

2021 - AIA/TEXO Design Build Champion for Bark & Build Charity







#### Proven impact — grand results. Here's what made us #UNDproud over this past year.

#### **Notable Grants & Sponsorships**

#### UND receives funding to establish a Global Center for Indigenous energy sovereignty

A team of UND researchers, including

Chemical Engineering faculty Bethany Klemetsrud and Wayne Seames, has received \$250,000 in funding to develop the plans needed to successfully launch the Energy Sovereignty for Indigenous Peoples (ESIP) Global Center (GC).

#### **UND receives \$7.6 million Army** contract for revolutionary sanitation technology

UND has been awarded a \$7.6 million Other Transaction Authority contract by the U.S. Army Combat Capabilities **Development Command Soldier Center** to develop an innovative Contamination and Sanitation Inspection system. The project's principal investigator is Kouhyar Tavakolian, director of UND's

BioInnovation Zone (BiZ).

#### Faculty member receives Fulbright U.S. Scholar Award

Ali Alshami has been selected to receive a Fulbright U.S. Scholar fellowship grant to engage in overseas research in Qatar. He will conduct research into developing a water purification system that enables simultaneous water and energy applications. He will also teach courses on engineering skills and ethics, and engineering research methods.

#### **Mechanical Engineering lecturer** receives NSF grant to study glaciers

Anjali Sandip has received a National Science Foundation grant that will help her and her colleagues study the impact on sea levels of melting Antarctic ice sheets.

#### **UND** receives U.S. Department of **Energy funding for cybersecurity** initiative

"This is a very timely grant," says Prakash Ranganathan, director of the Center for Cyber Security Research. "The DOE really wants to address this growing network of distributed energy resources, which manes we need to develop realistic attack threats and evaluate the software-based solutions."

#### Five UND-NDSU projects awarded grants through the University **Research Collaboration Program**

Grants totaling \$200,000 were awarded for five cross-institutional projects between UND and NDSU, fostering activities such as data collection, materials, experimental and instrumentation needs.

#### **UND Founders Day Awards**

#### **UND Award for Departmental Excellence in Teaching**

Department of Chemical Engineering

UND Foundation/McDermott Faculty Award for Excellence in Research and/or Creative Activity

Taufique Mahmood

#### **CEM Dean's Outstanding Faculty & Staff Awards**

**Outstanding Faculty Awards:** Hallie Chelmo & Tom Stokke

Outstanding Staff Awards: Tonya Parton & Paige Prekker

#### **UND Early Career Scholars Program**

In a new campus program that selects junior faculty from across the campus to initiate cross-disciplinary projects, Hallie Chelmo and Bo Liang represented CEM in 2023 and collaborated with UND Aerospace to research aerosol formation in exhaust from rockets and hypersonic vehicles at high altitudes. Ahmed Abdelhadi, Chonglin Zhang, Mahmut S. Ersan, Mariia Goriacheva, Jielun Zhang, Hallie Chelmo, and Gautham Krishnamoorthy have been announced as 2024 Early Career Scholars.

#### **Retiring Faculty & Staff**

Joseph Hartman, Assistant Professor, Harold Hamm School of Geology & Geological Engineering

Ronald Marsh, Professor & Associate Director, School of Electrical Engineering & Computer Science

#### **3-Minute Thesis (3MT)** Competition

First Place: Temitayo Ikuerowo (Energy Engineering)

Finalists: Mansurat Abdulmalik Ali (Environmental Engineering) and Glavic Tikeri (Chemical Engineering)

#### **Milestones**

#### Rare Earth Element development hits commercial milestone

Efforts by UND researchers to transform the state into a hub to produce rare earth elements (REEs) and critical minerals (CMs) continue to move forward, and the pilot production facility, located off Mill Road in Grand Forks, has begun to produce concentrated mixtures of the compounds.

#### Five new research centers created

Authorization to establish the following centers in the college was provided

by the North Dakota State Board of Higher Education: Artificial Intelligence Research Center (AIR), Center for Cyber Security Research (C2SR), Materials and Manufacturing Research Center (MMRC), Center for Water Research (CWR), and the Center for Process Engineering Researc (CPER). Read more on page 27.

#### Naima Kaabouch named Chester Fritz **Distinguished Professor**

UND's highest academic honor, Naima Kaabouch joins an exclusive club of faculty lauded for their excellence in teaching, research and service. She is the first female professor from the college to recieve this honor. Read more on page 31.

#### **UND's Society of Women Engineers** (SWE) student chapter turns 50

After half a century on UND campus, the student organization will be formally celebrating their milestone at an alumni reunion in September.

#### **UND** designated as Cyber Security Center of Excellence in Research

UND has been designated as a National Center of Academic Excellence in Cyber Research (CAE-R) institution through 2029. This marks the first time the University has received such a designation and comes on the heels of increased cybersecurity research projects on campus. Read more on page 29.

#### Association of Energy Engineers (AEE) student chapter established at UND

This year, students came together to form the first AEE student chapter on campus. The chapter was honored with the "Best Social Media Campaign" Award at the organization's annual world conference. Read more on page 17.

#### Other Awards & Achievements

Sen. U.S. Senator Kevin Cramer (R-ND), member of the Senate Armed Services

Committee (SASC), joined University of North Dakota (UND) President Dr. Andrew Armacost to celebrate the establishment of the Mark and Claudia Thompson Endowed Faculty Fellowship in National Security. The investiture ceremony recognized the endowment's first recipient, Professor of Mechanical Engineering, Jeremiah Neubert.

#### The **Department of Biomedical** Engineering has been accepted into a rank of universities that make up the Center to Stream Healthcare In Place (C2SHIP) research group. The collaborative research group was generated through the NSF's Industry/ University Cooperative Research Centers Consortium (IUCRC). The inclusion of UND into C2SHIP marks the first time the University has participated in an IUCRC initiative.

The Steel Bridge Team secured a ticket to the national competition amongst the other best teams in the nation after a successful regional performance. Read more on page 12.

#### The Advanced Rocketry Club

successfully launched their rocket Perception at the 2024 Spaceport America Cup. Despite a "suboptimal" accent, the rocket reached a maximum altitude of 11,753 ft and a max speed of Mach 0.999. With a successful recovery, Perception has ensured a future launch.

#### A pair of CEM alums, Chioma Onwumelu and Moones Alamooti,

have collaborated together to create a

children's book, "Rock Adventures: A Global Journey of Three Friends," taking young readers on a journey through the fascinating world of rocks and geology. "We aimed to create a storybook that not only entertains but also educates," says Moones, who also created the storybook's illustrations. "We believe that by engaging children in the wonders of geology, we can inspire the next generation of scientists and explorers."

## GAME HANGER GAME CHANGER CHANGER CHANGER GAME CHANGER































## AROUND CAMPUS & BEYOND

[1] A student meets Harold Hamm, oil and gas magnate and benefactor of UND Harold Hamm School of Geology & Geological Engineering during UND's Homecoming Week. [2] A student volunteer cleans a dinosaur fossil at a Fossil Prep Session. [3] UND student Anakin Bosek represents the college at snowmobile racing competitions along with other mechanical engineering students. [4] A geology student, Mary Soaper gets her hands dirty during the summer excavating a dinosaur called Diplodocus. [5] Chioma Onwumelu presents her and Moones Alamooti's new book, "Rock Adventures: A Global Journey of Three Friends," created in collaboration by the two alumni. [6] ] U.S. Senator Kevin Cramer joined UND to celebrate the establishment of the Mark & Claudia Thompson Endowed Faculty Fellowship in National Security. [7] High school students compete against one another at the summer BatSuBot Robotics Camp. [8] Thanks to a generous donation from Milwaukee® Tool, competitive student team labs have brand new tools. [9] The Steel Bridge Team placed in many categories at the regional competitionincluding cornhole. [10] The Advanced Rocketry Club successfully launched their rocket, Perception, at at the 2024 Spaceport America Cup. [11] Civil engineering students tour the Fargo Moorhead Diversion project. [12] Students and their families celebrate graduation at the CEM Graduation Ceremony. [13] Chemical engineering graduates show off their Order of the Engineer rings. [14] On February 10, UND hosted the North Dakota FIRST® LEGO® League (FLL) Robotics State Championship. [15] Middle/ high school teams from North Dakota and Minnesota competed against one another at the VEX Robotics Tournament Regional Qualifier sponsored by the college and UND VEX-U Student Club in February 2024. [16] Studentmade robots go bot-to-bot at the annual BatSubot Competition.



#### **Fossil Preparation Sessions**

Now through project completion Wilson M. Laird Core & Sample Library, UND Campus

Do you like dinosaurs? We do too! We're looking for volunteers to help clean and stabilize the fossils of a bones of a duckbilled dinosaur called Edmontosaurus. Read more on page 32.

Visit bit.ly/UND-Dinosaur to register for a session.

#### **CEM Homecoming Social**

September 27, 2024 // 5-7 p.m. Collaborative Energy Complex, **UND Campus** 

Calling all CEM alumni and friends! We're thrilled to invite you back to our annual Homecoming Social back on campus during UND's Homecoming Week. During the social, we invite you to join us on a tour of the new National Security Corridor. Here, you'll get a first look at the new experiential laboratories and facilities dedicated to research, education, and training in national security and space operations at UND.

Visit bit.ly/CEMhomecoming2024 to RSVP.

Harrington Hall, UND Campus

The National Security Corridor showcases UND's latest national security capabilities to research partners, state and federal agencies, and prospective students.

For more information, contact Deb Austreng.

#### **Seattle Alumni Social**

October 17, 2024 // 5:30-7:30 p.m. (Program at 6 p.m.) The Museum of Flight, Seattle, WA

We're heading west to meet with our amazing alumni and friends this October at The Museum of Flight in Seattle. Join us for an evening of hors d'oeuvres, drinks, networking, and fun!

For more information, contact Deb Austreng.

#### **Cyber Security Research** & Awareness Symposium (CARS) 2024

October 28-29, 2024 **Memorial Union, UND Campus** 

Held in person and online, CARS promotes and raises awareness of cybersecurity activities.

Visit IEEE-CARS.org for more event information

Alerus Center, Grand Forks, ND

The UND College of Engineering & Mines is pleased to announce it will host the North Dakota Signature, a VEX Robotics Signature Event, presented by Bifrost Manufacturing. Read more on page 34.

#### **BatSuBot Robotics** Competition

November 22, 2024 **Memorial Union, UND Campus** 

At BatSuBot (a hybrid of BattleBot and SumoBot robot competitions), UND students are challenged to design, build, and operate robots capable of forcing opponents' robots out of the ring. Everyone is invited to spectate and cheer on this bot-to-bot showdown!

Visit bit.ly/BatSuBot-2024 for more event information.

#### **CEM Expo**

April 29, 2025 // 9 a.m. - 5 p.m. **Memorial Union, UND Campus** 

The annual CEM Expo is a showcase of nearly 100 student projects which highlights different areas in engineering, computer science, and geology.

Visit engineering.UND.edu/outreach/cem-design-expo



#### **Deb Austreng**

**Director of Alumni, Corporate** & Public Relations

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#### Robin Turner, FCEP Sr. Director of Development

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robint@UNDfoundation.org

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#### PLEDGE YOUR PRIDE

You can make contributions to the STEM Complex at UND.edu/stem-complex. To explore how you can ignite the future through your gift,

contact Robin Turner.

## A LETTER TO OUR **ALUMNI & FRIENDS**

In this special issue, we could only capture a fragment of the fantastic projects and achievements of our 2,300 students. We are looking forward, as you are, to imagining what the future of our students' experience will be like with new spaces.

The STEM Complex is on the horizon, poised to revolutionize our students' learning experiences and reshape the future of education.

This new complex will be a game-changer for our students. More than just a building, it will be an environment where they can dive deep into their studies, work alongside peers from different disciplines, and engage in hands-on projects that mirror real-world challenges. The opportunities this space will provide are limitless-allowing students to develop the skills, knowledge, and confidence they need to make a meaningful impact in their fields and communities.

We need your help to make this vision a reality. Your support—whether through financial contributions, mentoring, or staying connected—will directly impact the students who will shape our future. Together, we can ensure that this new chapter for the college provides the resources and opportunities our students need to thrive.

If you're interested in learning more about how you can contribute to this project and help us support our students, please reach out to Robin. And if you're planning a campus visit, we'd love for you to engage with our students or meet with our leadership and faculty. Contact Deb to arrange a visit—we're always excited to share the progress and possibilities that lie ahead for our students.

With your support, we can create a future where our students are empowered to lead and innovate-together.

UND College of Engin

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