2022

UND ENGINEERING

LATEST NEWS

UND College of Engineering & Mines

UNIVERSITY OF NORTH DAKOTA

UND ENGINEERING

DEAN

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LETTER FROM THE DEAN

It is hard to believe that I have had the honor of serving as the Dean of the College of Engineering & Mines for three years already. It has been a privilege to work with our talented faculty, staff, and students and to be able to meet so many accomplished alumni. I'm incredibly thankful for the support provided to our college and students by our generous donors and industry partners.

This year we established a vision for the college that we are calling "20/20 by 2030." This refers to two separate but related goals which we want to achieve by the year 2030.

The first is to grow our externally funded research expenditures to $20 million per year. Over the past seven years, we have increased that number from under $4 million to roughly $9 million, and we hope to continue that momentum throughout this decade. Growing our research brings in additional revenue to the college, creates more opportunities for our students and faculty, and enhances our ability to contribute to the economy of this state and our region.

Because engineering, computer science, and geology are so crucial to the future, we have many opportunities to grow our research. Energy research has been a vital part of our research portfolio for many years, and that will undoubtedly continue. But we are also making significant investments to establish several other collaborative research focus areas, including artificial intelligence, cybersecurity, advanced materials and manufacturing, national security, transportation and infrastructure, biomedical engineering, and natural resources. Our faculty, staff and student researchers are needed now more than ever to help solve the world's challenges.

The second goal is to reduce our student-to-faculty ratio to 20. While the college has grown tremendously over the past decade, our faculty hiring hasn't kept pace for a variety of reasons. In order to sustain our student-focused environment, we need to reduce course sizes, offer specific courses more frequently, and allow for the level of student-faculty interaction that our students deserve. To do this, we hope to create at least 30 additional faculty positions by 2030.

These two goals are complementary, as hiring more faculty increases our capacity to do research, allowing us to pursue more opportunities for external funding. That will lead to increased revenue for the college, which can be used, in part, to support additional faculty and staff positions. One additional and critical piece to this vision is to improve our facilities through a combination of renovations and new construction. You should be hearing and reading more about those plans soon.

In short, we have ambitious plans for the college to grow our impact on the state and region while renewing our commitment to our students. One of the primary reasons we are in a position to dream big is that we have so much support from the university, the state of North Dakota, our alumni, and our generous donors. On behalf of our faculty, staff, and students, I wish you all the best and hope we can see each other soon. Take care and stay safe.

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

MESSAGE FROM THE EXECUTIVE BOARD

TERRY SEVERSON
Board Chairman

STEVE BURIAN
Board Vice Chairman

It was ten years ago that then-CEM Dean El-Rewini established the Executive Board. CEM has never in that decade been dull, business-as-usual—it's always been full of progress, accomplishments, new initiatives, and new department leaders with new energy and visions. Now supporting Dean Brian Tande and his team, we board members find ourselves involved with even more positive initiatives, programs, and activities. It's an exciting time to be associated with CEM.

As anyone reading this magazine knows, the world needs engineers and has trouble finding them. Those of us in industry are painfully aware of that need daily. Certainly, North Dakota needs engineers to support the new technology-based business sectors growing in the state and region. CEM is working hard and smart to fulfill that need. Along that line, what's going on now will shape the future of CEM for decades and more. Two such key, new, major initiatives are: 1) the National Security Initiative and 2) a new CEM building.

UND President Andrew Armacost launched the UND National Security Initiative nearly two years ago. The necessary external government and industry relationships, staffing, facilities, and infrastructure have been developing since. CEM's National Security Corridor in Harrington will begin taking shape this fall to include three labs—satellite design and engineering, digital engineering and big data, and satellite fabrication and assembly—and a clean space, all located on the first floor in a professional and appealing décor suitable to showcase these capabilities. There are clear opportunities for research projects as well internships and jobs with Space Development Agency (SDA) contractors for the low Earth orbit (LEO) satcom constellation that will be controlled out of a Grand Forks Air Force Base control facility, and with the hypersonic missile testing program technology through the Grand Sky retrofit of early blocks of the Global Hawk UAS.

The new CEM building initiative first emerged through our 2021 Homecoming meeting discussion of the UND Master Plan, laying out needs and options for UND facilities. Harrington Hall and Upson II are showing their age and were never designed to support and provide infrastructure for current engineering technologies and research activities, e.g., cybersecurity, biomedicine, aerospace, and space, or for the numbers of current and future CEM students, faculty, and staff. CEM enrollment has steadily grown 66% since 2010 to become the 2nd largest college in UND, and research has grown 141% since 2015; both figures are projected to continue to grow. They need to grow if CEM is to adequately support the emerging technology business and industry base of the community, state, region, and nation. CEM needs to attract, educate, and produce the engineers to support that market. To do so, CEM needs a new, modern facility.

CEM has been and will continue to be a very dynamic enterprise. We on the Executive Board relish the opportunity to support Dean Tande and his team as they work hard and smart to educate today's engineering students while transforming to meet future needs. We can't imagine CEM ever becoming dull and business-as-usual—quite the opposite.

2022 ALUMNI ACADEMY INDUCTION CEREMONY

On September 30, 2022, we welcomed three new members into our Alumni Academy Hall of Fame. From left to right: LaNell Honeyman (in honor of Leslie Honeyman, Geology ’69 & ’73); Scott Boe, Electrical Engineering ’83; and Kristine Brindle, Chemical Engineering ’78.

During the ceremony, we were honored to be joined by many of our previously inducted Alumni Academy members. From left to right: Larry Mattson, Mark Thompson, Dwight Wendschlag, Lisa Barnes, Ben Dove, Kristine Brindle, Steve Burian, LaNell (Leslie) Honeyman, Jim Albrecht, Ron Apanian, Terry Severson, Mike Lodoen, Scott Boe, and Jeff Vigen.

UND College of Engineering and Mines
ACADEMY

Scott Boe

Born: February 19, 1960, Fargo, North Dakota, USA
Education: University of North Dakota, BSEE, 1983, Cum Laude

Career Experience

1983-1993	Engineering Manager, Hughes Aircraft Company, Missile Systems Group
1993-1995	Management Consultant, Gemini Management Consulting Company
1995-2000	Vice President of National Operations, COMSYS Technical Solutions
2000-Present	Co-Owner, Chief Development Officer, Boecore, Inc.

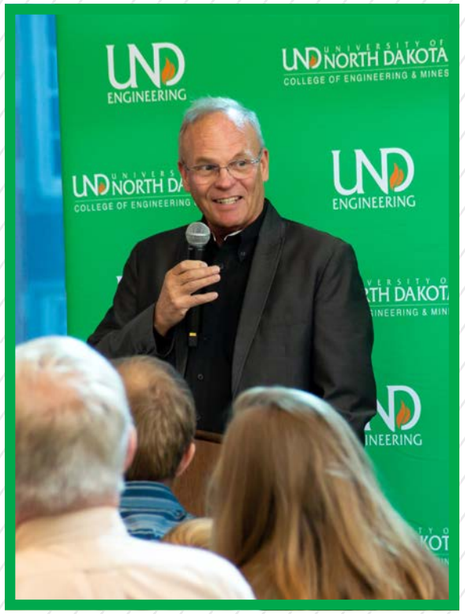
Recognitions & Accomplishments

1981-1983	UND Baseball
1983	UND Male Honor Athlete of the Year
1986	Hughes Missile Systems “Superior Performance Award”, AMRAAM Program
2000	Co-Founder of Boecore, Inc.
2005-2013	Boecore received Northrop Grumman Top Supplier Awards
2008	Boecore received a Nunn-Perry award from the Office of the Secretary of Defense and was the first Nunn-Perry award winner for the Missile Defense Agency

Volunteer Service/Interests

UND CEM Executive Advisory Board
Established the “Persistence Pays Off” Endowment for UND SEECS Students
Significant supporter for the new Griggs County, ND Hospital & Nursing Home and the Cooperstown, ND Community Foundation
Habitat for Humanity Corporate Sponsor
Major donor to the Pikes Peak United Way; the Colorado Springs Family Success Center; the University of Colorado Springs Cybersecurity Center; and funded a “Tiny Home” for homeless young adults in Colorado Springs

Boecore



SCOTT BOE

Scott Boe with wife Kathy Boe and Dave Bakken.

KRISTINE H. BRINDLE

UND College of Engineering and Mines

ACADEMY

Kristine Hefta Brindle

Born: April 3, 1956, Mayville, North Dakota, USA
Education: University of North Dakota, BSChE, 1978
Summa Cum Laude

Career Experience

1978-1983	Operations Engineer, Texaco, in various locations: Casper, WY, Cut Bank & Roundup, MT, Cortez, CO
1983-1986	Assistant District Engineer, Reservoir, Casper District, Texaco
1986-1988	Assistant District Engineer, Operations, Casper District, Texaco
1988-1989	Special Projects and Development Engineer, Casper District, Texaco
1990-1994	Project Engineer, Denver Producing Division, Texaco
1994-1999	Asset Team Engineer, Denver Division, Texaco
1999-2001	Resource Advisor, Central US Business Unit, Texaco, Denver, Colorado
2002-2006	Consulting/Contract Engineering Services, Hefta Group, Inc.
2006-2010	Senior Engineering Advisor, Wattenberg Field, Noble Energy, Inc.
2010-2014	Senior Asset Manager, DJ Basin Business Unit, Noble Energy, Inc.
2017-2018	Operations Manager, Contact/Consulting, Sierra Hamilton

Community Involvement

1992-2010	Troop 637 Boy Scout Treasurer, Parent Advisory Group
1994-1998	Denver Texaco Employees Federal Credit Union Board
2000	Leadership Denver Class of 2000, Denver Chamber of Commerce Foundation
2001-2010	Board of Directors, UND Alumni Association & Foundation
2010-2020	Castle Rock and Highlands Ranch Community Bands
2012-2016	UND ChE Industry Advisory Board
Ongoing	Church Stewardship and Treasurer Positions

Awards & Recognition

	Registered Professional Engineer, WY and CO
1992	Engineer for Coal Bed Methane Team that received Texaco USA 'StarQuality Champion" Award
2022	Alumni Academy Member, UND CEM

Hobbies & Interests

Skiing, Horseback Riding, Swimming, Travel, Fiber Arts, Bicycle touring, Hiking

Kristine was joined by her husband Rick, family, and friends.

2022 ALUMNI ACADEMY INDUCTEE

UND College of Engineering and Mines

ACADEMY

Leslie R. Honeyman

Born: January 16, 1946, Hettinger, North Dakota, USA
Education: University of North Dakota, BS Geology, 1969
University of North Dakota, MS Geology, 1973

Career Experience

Les had a successful 40+ year career as a highly respected oil expert in the field of Geology, beginning in 1973 with Exxon Mobil in New Orleans, LA and later transferring with Exxon to Midland, TX. He later worked with Endeavor Energy Resources through his own successful consulting company Honeyman Exploration, in Midland, TX. During his career, he did extensive work studying the Permian Basin.

Military Service & Honors

Vietnam Veteran
Army Commendation Medal
Bronze Star

Activities & Interests

Praise Band Leader in his church St. Nicholas' Episcopal, which later became Christ Church in Midland, TX.
Passion for target shooting and hunting which included an African Safari among his many adventures.

Les Honeyman Memorial Scholarship

LaNell Honeyman established the Les Honeyman Memorial Scholarship in honor of her late husband. In honor of Les and his 41-year career in the oil business, this scholarship has supported North Dakota resident students pursuing either an undergraduate or graduate degree in the field of geology at the University of North Dakota in Grand Forks.

HONEYMAN
EXPLORATION

LESLIE R. HONEYMAN

Family and friends joined LaNell Honeyman as she received this honor on behalf of her late husband Leslie.

UND ENGINEERING CONTINUES TO EXPAND REACH

New partnership – latest in series with liberal-arts colleges – offers students at Defiance College in Defiance, Ohio, chance to earn UND Engineering degree

Thanks to a new dual-degree partnership, students at Defiance College in Ohio can earn both a math degree at Defiance and a civil or electrical engineering degree from the University of North Dakota.

The project takes advantage of UND's long history of offering fully accredited online engineering degrees. Defiance College, a private college of about 500 students in Defiance, Ohio, is the 10th campus with which UND's College of Engineering & Mines now partners in dual-degree programs.

"The College of Engineering & Mines has been a pioneer in distance engineering education for over three decades," said the UND college's dean, Brian Tande.

"The capabilities we have developed allow us to deliver our programs in innovative ways in order to reach students for whom an engineering degree would not otherwise be accessible.

"We're very excited to be able to add Defiance College to our list of partners," Tande said. "This agreement will allow students to study engineering and prepare themselves for a wealth of career opportunities while also benefiting from Defiance's very student-focused learning environment."

Filling a need

And for Defiance, the partnership offers an exceptional new opportunity that the college can provide for its students, said Richanne C. Mankey, Defiance College president.

"When I arrived at Defiance College, I did a listening tour," Mankey said. "I spoke with people on campus, of course, but also with community leaders and business owners. And I asked them, 'What do you need from Defiance College?'"

The answer was engineers and welders, Mankey said. "And I said, 'Well, we probably can't do welding. But let me see what we can do about engineering.'"

Today, that goal is being reached, as Defiance students who study for a math degree on campus simultaneously can take online courses to earn a UND engineering degree. (Some online engineering degrees at UND call for students to come to Grand Forks over the summer to experience labs in the University's state-of-the-art facilities.)

Agnes Caldwell, academic dean at Defiance College and vice president of academic affairs, celebrated the new partnership and the opportunities it offers. "We've had a large number of prospective students who've been interested in engineering over the years, and we're thrilled to be able to meet that need," she said.

"We already have started talking about the partnership with our new students at their recent orientation, and a number of our current students also have asked about it."

Moreover, Defiance is adding faculty in both math and physics, with the goal of making sure students who take the dual-degree track have all the support on campus that they need, Caldwell said.

The agreement calls for Defiance students to take a total of five years to complete their two degrees. "Our students will be earning a Bachelor of Science degree in mathematics from Defiance, while studying for their UND bachelor's degree in either civil or electrical engineering," Caldwell noted.

"And we hope to expand those offerings with UND's other great engineering programs as the partnership evolves."

'A winning formula'

On June 20, President Mankey and Dean Caldwell from Defiance visited UND to tour the campus and sign the new agreement in person with UND President Andy Armacost. Said Armacost, "This partnership promises to be a great way for UND to deliver high-quality engineering programs for Defiance College students."

"Through this collaboration, UND and Defiance both can strengthen their enrollments, while enabling Defiance students to not only earn engineering and math degrees, but also keep attending the Ohio college they love. We're proud to be a leader in this innovative and cost-effective educational model."

The new arrangement stems in part from UND and Defiance's work with the Lower Cost Models Consortium, a coalition of private colleges and universities committed to making higher education more accessible for students and sustainable for the long term. The consortium specializes in helping its institutions collaborate to offer more academic programs, especially in fields that are in high demand in the marketplace.

Last year, Forbes magazine described the consortium in a column under the headline, "A winning formula: Collaboration, curricular expansion and lower costs."

"This is one of many innovations that colleges across the country are working on collaboratively to increase their affordability," the column concluded.

"This is a step in the right direction, and we need to encourage more such creative and innovative endeavors."

Written by Tom Dennis | UND Today

LOWER COST MODELS FOR INDEPENDENT COLLEGES CONSORTIUM

Consortium allows students from smaller colleges and universities to pursue an affordable dual degree at UND

The Lower Cost Models for Independent Colleges Consortium (LCMC) is a consortium of small colleges and universities that have partnered with the University of North Dakota to provide students with an opportunity to earn dual degrees.

Participating Institutions

Adrian College

Defiance College

Elmhurst University

Huntington University

Marymount University

McMurry University

Piedmont University

St. Thomas University

Siena Heights University

York College

Students attend on-campus courses at the partnered institution to earn their four-year degree while simultaneously taking courses online from UND to earn one of the available engineering degrees. Students can complete two degrees in four or five years by sharing their credits between the two institutions.

The LCMC is a continuation of the College of Engineering & Mines' commitment to collaborating with other academic institutions. Previously, CEM has partnered with several colleges under the 2+2 Program, a program that allows students earning their Associate in Science degrees to simultaneously pursue Bachelor of Science degrees in chemical, civil, electrical, mechanical, and chemical engineering. Bismarck State College and Williston State College are partners in the collaborative 2+2 Program.

LEARN MORE

Scan the QR code above with your phone's camera app to view all of the degree options offered under the LCMC.

APPROACHING ESCAPE VELOCITY

U.S. Space Development Agency's new satellite initiative is latest sign of growth in UND's space ecosystem

Members of North Dakota's congressional delegation visited Grand Forks Air Force Base on June 28, along with national space experts and UND President Andrew Armacost, for a ribbon cutting ceremony commemorating the U.S. Space Development Agency's latest initiative in the state.

"Grand Forks Air Force Base plays a critical role in bolstering our national security through its important satellite mission," said Sen. Kevin Cramer, R-N.D. "This is also a tremendous opportunity for the entire community in terms of opening up new jobs for the area and working with the city's academic and technology community. North Dakota's space assets and capabilities are second to none and our excellence will be a boon to improve our nation's space-based defense."

"When I see how far we've come in the last few years, I consider the need for rapid innovation in space technology and UND's role in doing this," said UND president Andrew Armacost.

Along with the dedication of the Space Networking Center comes several UND efforts to support space and national security issues.

Within UND's College of Engineering & Mines, the School of Electrical Engineering & Computer Science will break ground for a National Security Corridor at which satellite development, fabrication and testing will take place.

The College of Engineering has begun multiple research initiatives with potential direct connections to SDA's mission in the areas of artificial intelligence, cybersecurity, energy and novel materials. Under UND's National Security Initiative, eight faculty members have been or will be hired across three colleges to support research – with a special focus on space research.

(Excerpt)

Written by Adam Kurtz | UND Today

FACILITIES DESIGNED TO PRODUCE LEADERS IN NATIONAL SECURITY

Envisioning experiential learning environments to educate industry-leading professionals

The National Security Corridor will serve as the focal point for the College of Engineering & Mines' space and national security activities. Designated as the first floor of Harrington Hall, the corridor will showcase our capabilities to potential research partners, state and federal agencies, and prospective students. During the first phase, the College of Engineering & Mines' labs will undergo reconfiguration to support UND's national security initiative, including research, academic, and training programs.

The purpose of the corridor is to showcase the college's capabilities, current projects, and people. The hallway windows allow visibility into the engineering labs and design spaces, highlighting the daily research and innovation happening at the college. Redesigned display units along the walls will highlight specific industry-related projects and feature the accomplishments of students, faculty, and alumni. Once completed, the upgrades will transform a currently outdated hallway into a modern space that will demonstrate the college's commitment to national security and enhance our ability to recruit students and research partners.

Initial Financial Support

Initial financial support is provided by:

- State of North Dakota appropriated funding
- UND Strategic investment
- Edson and Margaret Larson Foundation

Additional Support

- Terry & Diane Severson Endowed Professor of National Security
- Mark & Claudia Thompson National Security Faculty Fellowship

New Positions Added

To support the National Security Initiative, UND is searching to hire up to 8 faculty; assistant, associate or full professors with experience in National Security.

For more information about the National Security Corridor, please contact:

Dr. Ryan Adams
Associate Dean for National Security
Department Chair, Director, SEECS
Email: ryan.s.adams@UND.edu
Phone: 701.777.5644

Office Address:
Upson II Room 366B
243 Centennial Dr Stop 7165
Grand Forks ND 58202-7165

"Our efforts to advance beyond visual-line-of-sight technologies for UAS are leading to new opportunities in the areas of national security and counter-UAS measures to address the threat of drones used for illegal purposes."

Dr. Andrew Armacost
President, University of North Dakota

LABORATORIES & COURSES

Satellite Design & Engineering Lab

Harrington Hall 120C, currently an undergraduate academic lab, will be converted into a satellite design and engineering lab. The room will be reconfigured with equipment to allow device and component-level integration. Components from this lab will transition into Harrington Hall 120 for integration into subsystems and full satellites.

Digital Engineering & Big Data Lab

Harrington Hall 109, currently a power electronics lab, will be converted into a Digital Engineering & Big Data Lab. The reconfigured room will host workstations and large monitors to serve both individual and group projects. This space will also be utilized in our new digital engineering course, which is being taught by an engineer from a major defense contractor.

Satellite Fabrication & Assembly Lab

Harrington Hall 120 will be converted from a general-purpose electronics lab and storage room into a hub for the fabrication and assembly of satellites and other space-related instruments and equipment. The current lab connects to several smaller labs that can be configured for various purposes, including cleanroom areas and spaces needing enhanced security.

Clean Space

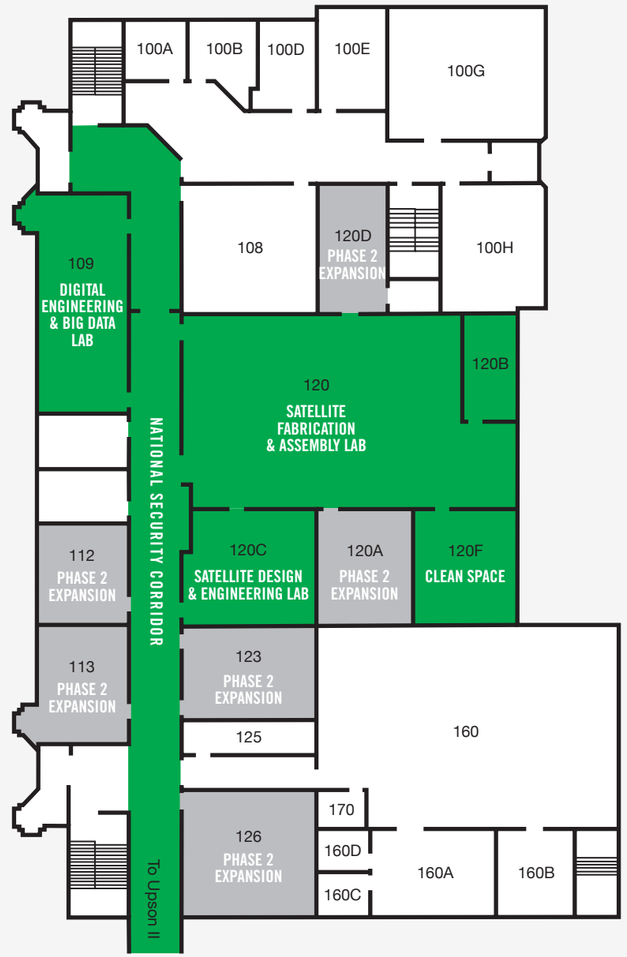
Our clean space in Harrington Hall 120F will maintain a very low concentration of airborne particulates, be well isolated, well-controlled from contamination, and actively cleansed.

Digital Engineering

This course is designed to provide a broad understanding of digital engineering. The topics included in this course are model-based engineering, the digital twin, the digital thread, Lifecycle analysis, and an overview of the tools available. Digital Engineering has become a requirement in Aerospace and Defense contracts; additionally, it has applications in all engineering fields. Digital engineering offers significant benefits in cost, schedule, and risk reduction by using modeling and simulation to rapidly design, integrate, and test, before manufacturing.

NATIONAL SECURITY CORRIDOR

PROPOSED FLOORPLAN



Phase 1	Later Phases
Convert Harrington 109 into Digital Engineering & Big Data Lab	Add Satellite & Space Debris Tracking Facility, including a room for data collection and analysis
Convert Harrington 120 into Space Systems Fabrication & Assembly Facility, including cleanroom functionality	Additional upgrades to rooms 112, 113, and 123 to accommodate future projects in cybersecurity, communications, and sensor development
Convert Harrington 120C into Satellite Design & Engineering Lab	
General upgrades to corridor, including displays featuring current projects	

Surojit Gupta, associate professor of mechanical engineering at UND, holds a packet containing one of the products of his materials science lab. Photo by Connor Murphy/UND Today.

DEPARTMENT OF DEFENSE GIVES UND $1 MILLION TO RESEARCH ADVANCED MATERIALS

Project represents an area UND research leaders are prioritizing

A proposal for "An Ecosystem for High Performance Defense Sensitive Materials Research at University of North Dakota" has been recommended for sponsorship by the U.S. Air Force Office of Scientific Research (AFOSR).

The $1-million award, which will provide funding over two years, comes from the U.S. Department of Defense EPSCoR, or DEPSCoR (Defense Established Program to Stimulate Competitive Research). The co-principal investigator Surojit Gupta, in UND's Mechanical Engineering Department, is the lead technical contact of the project. Deniz Cakir, in UND's Physics & Astrophysics Department, will lead the computational core of the project and Yun Ji, UND Chemical Engineering, will lead the corrosion component of the project. Hallie Chelmo and Forrest Ames, both from UND's Mechanical Engineering Department, are senior participants in the project.

The DEPSCoR program aims to onboard universities into the Department of Defense (DoD), said John Mihelich, vice president for research & economic development. "Because of that, an emphasis was put on how the specific proposed work fits with broader University initiatives and how the University-level research strategies can facilitate, along with the project, building a broader and sustained relationship with DoD/AFOSR," he said.

Mihelich added that the project on advanced materials represents an area UND is prioritizing.

"The University's commitment to DoD and national security research, as well as the UND College of Engineering & Mines' establishment of the 'Materials and Manufacturing Initiative,' which (Gupta) leads, were essential for securing this award," Mihelich said.

Mihelich and Gupta will provide regular research updates to DoD officials, as well as discuss the program and expanding the UND's role, with Bindu Niar, the deputy director for basic research within the Office of the Secretary of Defense. Additionally, Niar and her team would like to visit UND sometime in the near future.

This is UND's second consecutive DEPSCoR award; Cakir received an award last year for "Discovering New Atomically Laminated Transition Metal Borides with Diverse Properties," which endeavors to discover new materials with promising properties for various applications.

Written by UND Today

Taufique Mahmood (right), associate professor in the Harold Hamm School of Geology & Geological Engineering at UND, and a student colleague check a water sample on the UND campus near the English Coulee. Mahmood's research recently was awarded a CAREER grant of more than $440,000 from the National Science Foundation.

UND RESEARCHER WINS NSF CAREER AWARD

Taufique Mahmood recognized as especially promising geologist who's now early in his career

An NSF CAREER proposal by Taufique Mahmood received more than $440,000 from the National Science Foundation.

Mahmood is an associate professor in the Harold Hamm School of Geology & Geological Engineering at UND's College of Engineering & Mines. His proposal, "EAR-Climate: Impacts of Recent Wetting on Cold Region Hydrologic Change in the Northern Great Plains," will help scientists better understand future hydroclimatic changes by studying the past behavior of five headwater basins that drain into Devils Lake.

Using the NSF grant, UND researchers will study the relationship between surface water storage and hydrologic processes during a complete dry-to-wet — "drought to deluge" — or wet-to-dry — "deluge to drought" — cycle. In addition, the study will conduct a series of field-based cold region hydrology workshops for Native American high school students and summer research for Tribal College students.

These activities will develop baseline data for future climate change studies for the tribal communities, inspire Native American students into snow-and-water-resources research, and raise community awareness about water security and quality under a changing climate.

"Dr. Mahmood's research will help us better understand hydrologic processes in this region and allow us to make better predictions in the future," said Brian Tande, dean of the College of Engineering & Mines.

"We are very proud that he is being recognized by the NSF for this important work."

The National Science Foundation's Faculty Early Career Development or CAREER Program offers the Foundation's most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their organization.

"I am excited and looking forward to starting the project," said Mahmood.

Mahmood collaborates with Native American communities across North Dakota and has extensive experience working with Native American graduate students and tribal college students (NATURE summer camps) at UND. Prior to joining UND, he was a post-doctoral fellow at the University of Saskatchewan.

His group's research has been searching for the answers to critical science questions in cold and continental climates of Northern Great Plain, Rocky Mountain Range and High Mountain Asia using field-based and remotely sensed observations high-resolution physically-based modeling.

AWARDED $580,000 IN RESEARCH GRANTS TO STUDY ND TRANSPORTATION INFRASTRUCTURE

Sattar Dorafshan, assistant professor of civil engineering at UND, has been awarded multiple research grants this year from the North Dakota Department of Transportation, as well as an award from the Federal Railroad Administration. The three grants total more than $580,000 for a variety of investigations and experiments related to North Dakota transportation infrastructure.

In addition to his faculty role, Dorafshan also serves as director of the Sustainable Infrastructure Research Initiative and as co-director of the Transportation Technology Research Initiative based in UND's College of Engineering & Mines. The latter initiative directly serves the NDDOT in the department's effort to develop and maintain a modern transportation system.

"These projects share common ground, which is to promote and advance safety in our infrastructure system, reduce costs and reduce labor by developing non-contact sensing and robotics," Dorafshan said. "This work is highly beneficial to our state, and the connection between our research and our state stakeholders is crucial for state-wide adaptation of the results and to train a skilled workforce in North Dakota."

In July, Dorafshan and the TTRI were awarded nearly $50,000 by the NDDOT to study "Applications of Drones for Inventory at NDDOT."

The project aims to explore different uses for UAS at the department, Dorafshan said.

In the first phase of work, the team used UAS to inventory salt and gravel stockpiles – a task that is challenging and often inaccurate when done in person and on the ground. The team is investigating the effect of different flight patterns on the accuracy of measuring stockpile volume with UAS visual cameras.

Dorafshan is also collaborating with Susan Felege, professor of biology and a wildlife ecology expert, and the North Dakota Game and Fish Department to study animal-vehicle collisions across the state. In North Dakota, animal-vehicle collisions account for 18 percent of all road accidents, a figure that's three times the national average, Dorafshan said.

The project's first phase, funded by the NDDOT in August for just over $118,000, will review national, regional and state studies to determine factors contributing to animal-vehicle collisions. With this data, the team will then make recommendations to the department on how to reduce the number and cost of animal-vehicle collisions, as well as how to maintain a statewide dataset for such incidents.

A third study, titled "Railroad Substructure Moisture Measurement and Monitoring Using Hyperspectral Imagery," was funded for around $417,000 in September. On behalf of the Federal Railroad Administration, Dorafshan will use both visible and near-infrared imagery to evaluate moisture levels found in track ballast – the material lining the ground beneath railroad tracks.

Track ballast is usually made of crushed stone, and its load-bearing capacity can change drastically in the presence of excessive moisture. Dorafshan and his research team will use multiple wavelengths of light to detect and measure moisture trapped in railbeds.

Adapted from the *University Letter*

UND faculty and students attended a special presentation by Tim Hughes, senior vice president with SpaceX, who walked them through the live launch of a NASA mission carrying three astronauts to the International Space Station. The event was held as part of the UAS Summit & Expo sponsored by UND. Photo by Patrick C. Miller/UND Today.

UND CONTINUES TO ATTRACT TOP NAMES IN SPACE, DEFENSE FIELDS

16th Annual UAS Summit & Expo draws nation's best and brightest in UAS, space technology

From live rocket launches to spy satellites, there was much to see, hear and learn during the 16th Annual UAS Summit & Expo – sponsored for the second year by the University of North Dakota – in Grand Forks in early October.

UND faculty and students received an exclusive live play-by-play from SpaceX Senior Vice President Tim Hughes during a rocket launch for a NASA mission. Christopher Scolese, director of the National Reconnaissance Office (NRO), offered a glimpse into how the once-secret agency has used UAS technology to help keep America's spy satellites ahead of their global adversaries.

The conference's 600 attendees and 35 exhibitors heard how UAS and space technologies continue to evolve and intertwine, as well as the opportunities they present to North Dakota's UAS ecosystem. Military and industry leaders covered topics ranging from factors impacting North Dakota UAS start-up companies to innovation in the defense sector's battlespace.

In his remarks Wednesday, UND President Andrew Armacost noted that this year's conference provided the University with another opportunity to continue its streak of attracting "a steady stream of senior space leaders" to the campus and the community. He credited North Dakota's two Republican U.S. senators, John Hoeven and Kevin Cramer, with knowing what UND has to offer in the space and national security fields.

"As a consequence, it's led to agreement after agreement with the U.S. Space Force and with the Space Development Agency," Armacost said. "The energy and momentum going on as a result of your work has really had a profound impact on our programs."

In addition, he said the state of North Dakota has invested $14 million in UND's national security and space initiatives, as well as $6 million in funding to support the hiring of faculty members and an additional $3 million of the University's money.

As Hoeven's guest, Scolese visited UND on Monday to learn about the University's initiatives in national security and space, as well as tour facilities in aerospace and engineering where renovations and new labs are planned that will enable the University to design, build and test satellite technology.

During the conference, Hoeven and Scolese discussed the potential for linking the NRO with missions at the Grand Forks Air Force Base and Grand Sky, such as the Space Development Agency's (SDA) low-Earth orbit (LEO) satellite mission. Hoeven has been working to advance such collaborations.

"When we started the UAS Summit 16 years ago, innovation meant getting unmanned aircraft into our domestic airspace," Hoeven said. "Now, we have built partnerships that go well beyond our original vision, reaching all the way to space."

Scolese spoke of NOR internship opportunities open to UND students and the agency's need to continually invigorate its workforce.

"We have to renew that workforce all the time, and interns are one way to do that," he said. "We've had absolutely spectacular internships we offer to undergraduate and graduate students."

Hoeven said, "The NRO wants UND students to intern with the agency, and it's looking for research and development partners to advance new ISR (intelligence, surveillance and reconnaissance) technologies, which fall squarely in North Dakota's expertise."

During a special presentation by Tim Hughes, SpaceX senior vice president, attended by about 80 UND faculty and students, the SpaceX Crew-5 mission launched, carrying three astronauts to the International Space Station. As the in-person and online audience watched a livestreamed feed of the mission, the rocket launched from NASA's Kennedy Space Center in Florida while Hughes provided real-time narration as the event unfolded.

The launch concluded with the astronauts safely in space and the reusable rocket booster touching back down on a landing barge in the Atlantic, resulting in a round of applause from the rapt audience.

(Excerpt)

Written by Patrick C. Miller | UND Today

Johannes Van der Watt, left, and Junior Nasah, researchers with the UND Institute for Energy Studies, have received federal grants to study carbon-neutral energy production. Photo by Adam Kurtz/UND Today.

TURNING FARM WASTE INTO CLEAN ENERGY

Imagine the possibilities, researchers at UND suggest — and the U.S. Department of Energy agrees

Clean energy from farm waste? A pair of UND researchers have both received federal grants to investigate the possibilities.

The grants total more than $2.5 million in research funding, with the majority of the funds from the U.S. Department of Energy.

Junior Nasah, major project manager with UND's Institute for Energy Studies (IES), received $2.12 million to study the feasibility of using various forms of renewable biomass to generate carbon-neutral hydrogen for energy production. Hydrogen produced from biomass could also be used to create fertilizer for agricultural purposes.

Johannes Van der Watt, a research engineer also with IES, received $400,000 to investigate using renewable biogas to remediate large piles of coal waste. That would happen through the production of "carbon-negative" electricity, and would pave the way for future regional clean energy efforts when that remediation is complete.

"The Institute for Energy Studies has grown into a leader in the development of low-carbon energy technologies," said Dan Laudal, director of UND's Institute of Energy Studies. "These two new Department of Energy awards are a testament to our success, and I am very excited for Junior and Johannes and our team as we begin work on these projects.

A critical mass of biomass

Both research projects rely on renewable sources of biomass, and according to Nasah, North Dakota has plenty. Biomass comes in multiple forms, including farm or municipal waste, lawn or plant clippings, downed trees and animal manure. When they break down, biomass sources such as these release methane, a far more virulent greenhouse gas than CO_2, Nasah said. Also, municipalities generally must pay for the removal and storage of such waste, usually in a landfill, which means the waste-to-energy process may save money as well as deliver environmental benefits.

Plans for Nasah's research include transforming biomass into syngas, the "synthesis gas" that is a mix of hydrogen and carbon monoxide. A further chemical process will refine that gas into pure hydrogen, which may be burned as a fuel for power generation or used to make fertilizer. Nasah said the system could be adapted for farming operations in the state to do both.

A key component of the project is its scale, which enables clean-power generation to be brought to where it is needed. Nasah said he is looking to be able to produce between 1-5 tons of hydrogen per day. This amount could either be used by a municipality or a farming operation. Producing low-cost hydrogen at a location where it is needed also addresses the issue of having to transport it from large factories where it is manufactured, thereby expending fuel and adding to emission levels unnecessarily.

The goal: Low-cost hydrogen

Ultimately, Nasah said his goal is to create low-cost hydrogen derived from renewable sources that can be used in the region where it was created. His research will investigate the cost-effectiveness of localized hydrogen production.

"A big part of what we are claiming is our conversion step can go from biomass to hydrogen to power at a low cost, to where we can actually make this project economical," Nasah said.

Nasah will work with Envergex LLC and Singularity Energy Technologies, both located in the UND Center for Innovation. The former business works in, among other areas, solid fuel conversion, and the latter deals with waste-to-energy technology. Currently, the team is working to secure the matching funds from the North Dakota Industrial Commission's Renewable Energy Program, which expressed interest in the project.

Similarly, Van der Watt is also investigating the use of biomass for coal waste deposit remediation. Coal waste, a fine powder mixed with soil located primarily in the Eastern US coal producing regions, is left over in large unsightly mounds after the commercial mining process. Biogas generated from renewable biomass sources may be able to be co-combusted with this waste for power generation.

The goal is two-fold: remediate coal waste from a region by turning it into energy, then using the infrastructure set up to continue to burn biogas as a carbon-neutral energy source.

"Those two things are really important today, and we have a way to connect those two to make sure that we utilize the resources we have at hand, and using them wisely," Van der Watt said.

Both research projects are also looking at ways to capture CO_2 that will be produced from the energy generation, and plans include either storing it underground or finding a use for it in a local market. One such use, Nasah said, could be to sell the byproduct gas to a brewery, or a similar business.

A marriage of skills

The two UND researchers are working on the grants in tandem: Nasah is the lead on CO_2 capture and fossil fuel energy, and Van der Watt is the lead on gasification efforts.

"This is a good marriage of our skills," Nasah said.

Brian Tande, dean of the UND College of Engineering & Mines, expressed praise for the research projects and said such projects also showcase workforce development efforts by his college.

"What I like most about these projects is that these new technologies will not only benefit North Dakota but are being developed by researchers who were trained here in North Dakota. This is an important part of the mission of the College of Engineering & Mines — to help create a talented workforce to address the needs of our state."

Written by Adam Kurtz | UND Today

UND MECHANICAL ENGINEERING CLASS OF '77...

From left to right: Carl Svard, Jim Wendschlag, Daniel Bry, K Meng Tay, Doug Rothe, Cindy Kruse Loken, Rick Dahlen, Barbara Tischart Mike Stein, Suzanne Lindell Haroldson, Ralph Pederson, Elizabeth Beutler, and Dave Weston.

...45 YEARS LATER!

WE ARE FOREVER UND

The Mechanical Engineering Class of 1977 reunites to reconnect with beloved classmates and campus

Seeing the faces of old classmates - back on campus, no less - jogs back fond memories. For a group of proud UND mechanical engineering alumni, they did just that this fall. Between campus tours and meeting new department faculty, they witnessed the tremendous impact that the Department of Mechanical Engineering - from its faculty, staff, students, and alumni - has on campus, the region, and nationally.

Passing the torch of knowledge

To wrap up their reunion, the group wanted to pass on their learned experiences and knowledge to current students. Together, they devised a list of questions they wished they had asked themselves when they were students. From questions about how changing markets can affect career paths to how to find success in a male-dominated industry, the class of 1977 shared their answers with a classroom full of senior engineering students.

FAREWELL, FRIENDS!

CEM celebrates the career achievements of three

Michael Mann

Michael Mann, Chester Fritz Distinguished Professor of Chemical Engineering, retired as the Associate Dean for Research in the College of Engineering & Mines. He has worked in the energy field since 1981, first with the EERC and since 1999 with CEM.

Dr. Mann has held several positions in the college, including chair of the Chemical Engineering Department, interim chair of electrical engineering and interim dean. He has been Associate Dean, Associate Dean for Research, and Executive Director for the Institute for Energy Studies.

Dr. Mann helped found the Energy Engineering graduate program and was director of that program for several years. He has played a lead role in the Energy and Environmental Sustainability Grand Challenge, serving as its champion.

Dr. Mann was awarded UND's highest honor, the Chester Fritz Distinguished Professorship, in 2009 and UND's esteemed Excellence in Research award in 2006. He co-founded the Sustainable Energy Research, Infrastructure, and Supporting Education (SUNRISE) group and helped establish the Petroleum Research Education and Entrepreneurship Center of Excellence (PREEC). He was recognized for these efforts when he received UND's 2014 Interdisciplinary Collaborative Research Award. In 2020 Dr. Mann received the UND Foundation Faculty Scholar Award, recognizing his combined excellence and contributions in teaching, research and service to the university.

He was a primary player in the development of the Institute for Energy Studies, which he directed for several years. He has over 215 publications and has secured over $20 million in funding during his career.

In his retirement, he plans on spending more time with his family. He is looking forward to exchanging his "Dr. Mann" title for "Grandpa Mike." He is also looking forward to spending more time on his woodworking hobby and plans to do light consulting work to keep his mind active.

Forrest Ames

Forrest Ames has been a faculty member in the Mechanical Engineering Department since 1997. He has also served the college as associate dean of academic affairs and interim chair of electrical engineering, as well as on various committees for the college and the university.

Dr. Ames taught classes in the thermal fluid sciences area, including introductory and intermediate thermodynamics, fundamentals of heat transfer and convective heat transfer, fluid mechanics, compressible flow, computational fluid mechanics, gas turbines, aerodynamics, solar energy engineering, and mechanical measurements.

He regularly advised one to four senior design projects annually and served as an Alice T. Clark Mentor six times. He has worked with over 30 MS and Ph.D. students, including major advisor to 27 MSME graduates and one Ph.D.

Dr. Ames has maintained an active research program attracting significant funding from the Department of Energy, NSF, NASA, and the Navy. Among those are six major grants, including PI on four DOE/NETL sponsored grants totaling $1,920,000, co-PI on one NASA CAN grant totaling $1,125,000, and PI on one NSF grant. He built four major research facilities, including a large-scale cascade wind tunnel, an internal flow and heat transfer facility, a compressible flow facility, and a large-scale wind tunnel, all later funded with major grants.

Dr. Ames has participated in numerous international conferences, including being a keynote speaker at the 37th National and 4th International Conference on Fluid Mechanics and Fluid Power Conference at the Indian Institute of Technology Madras, Chennai, India.

He is a registered Professional Engineer in North Dakota and served as an ABET Program Evaluator. Before his position at UND, Dr. Ames worked for the Allison Gas Turbine Division of General Motors and Rolls Royce.

Forrest plans to retire to northern Idaho, where he hopes to spend more time outdoors.

Lowell Stanlake

Lowell Stanlake officially retired from UND in May 2021 after 45 years of teaching in the Department of Mechanical Engineering.

He taught courses in ME 101 and Engr 200, which touched nearly all ME students. Stanlake's teaching and service played a vital role in student retention in the program.

He has taught an estimated 10,000 individual students at UND. Most of them went on to have successful careers and contribute to their communities and country, evidenced by the many occasions he was recognized by one of UND's most notable ME alumna, retired NASA Astronaut Karen Nyberg, class of 1994.

In May 2013, he received the North Dakota Spirit Faculty Achievement Award. He received the UND Foundation/Karleen Home Rosaaen Award for Excellence in Academic Advising in February 2012.

Stanlake is a licensed flight instructor, and since retiring, he has found more time to pursue his passion for flying.

HAROLD HAMM SHARES KNOWLEDGE, INSIGHT WITH UND STUDENTS

Continental Resources founder and Chairman Harold Hamm participates in a Q&A session with students

On February 25, Harold Hamm visited UND campus and held a question-and-answer session with geology, geological engineering and petroleum engineering students at CEM's Collaborative Energy Complex. Brian Tande, CEM dean, introduced Hamm as "somebody who's had an absolutely enormous impact on our college, our geology, geological engineering and petroleum engineering programs – really, the entire state of North Dakota."

Hamm noted, "I had a lot of mentors in my life growing up. So I always want to be one if I can. I enjoy meeting with students and talking with them to answer questions."

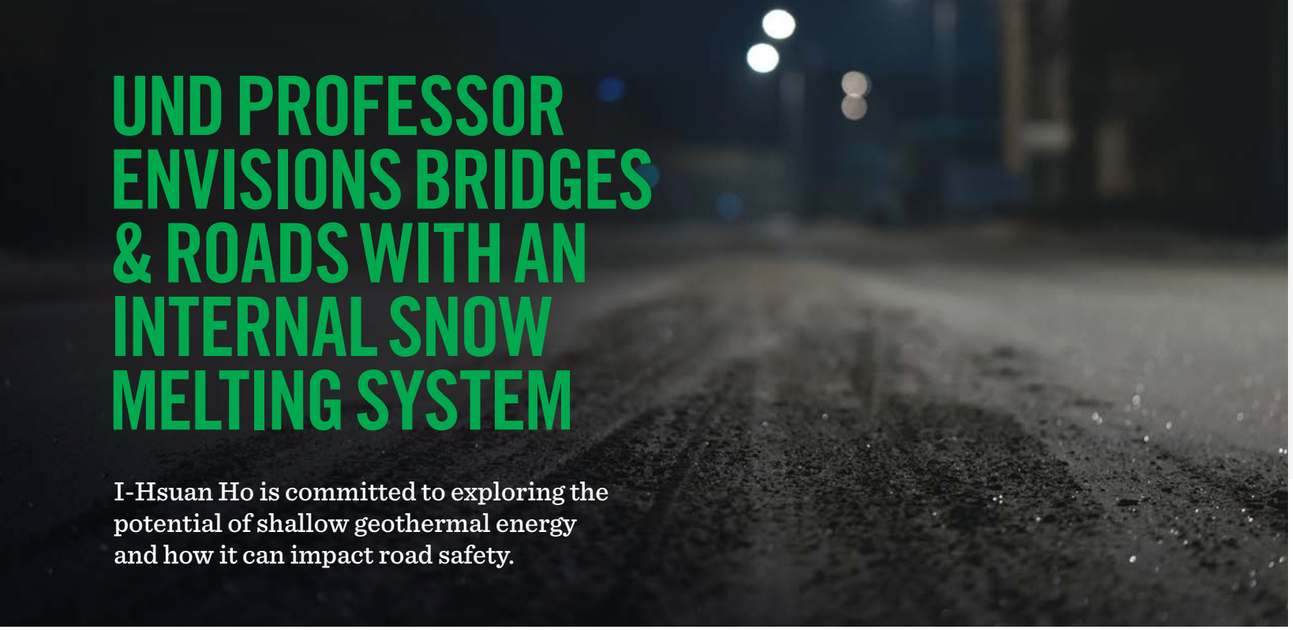
Hamm tackled questions ranging from careers in geological engineering to oil price trends to how sanctions might impact Russia. He described the evolution occurring with alternative fuels, but predicted that the world was going to need more energy, whether it's from fossil fuels, wind, solar or alternative sources.

"Everybody wonders where the future of the industry is going to go long-term," he offered. "We're going to clean the environment up and it's got to be done worldwide.

"Companies can't do it; people can't do it," Hamm said. "Countries have to do it to force everybody to clean up the air that we breathe. It's real important. I think we'll see more of that go on as time goes forward."

(Excerpt from "Oil and gas industry puts focus on CO2 sequestration, Ukraine", *UND Today*)

Written by Patrick C. Miller



UND PROFESSOR ENVISIONS BRIDGES & ROADS WITH AN INTERNAL SNOW MELTING SYSTEM

I-Hsuan Ho is committed to exploring the potential of shallow geothermal energy and how it can impact road safety.

DR. I-HSUAN HO
Associate Professor
HHSGGE

A bridge built to incorporate a system that can melt snow? A UND geology professor says the science behind the idea is sound, and he's seeking funding to take his research on a snow-melt system to the next level.

In 2019, I-Hsuan Ho received a U.S. Department of Transportation grant for $170,000 to study the feasibility of using geothermal heat to melt snow from some roadways. The winter of 2020 brought little snow, which meant little opportunity to collect data from the system. He's getting his chance to do so now. It's a system Ho says can make some roadways safer for drivers.

"I think the best strategy (is for the system) to be installed in a bridge deck for snow melting," Ho said, sitting in his office, where every surface was filled with his work.

Ho, who is originally from Taiwan but recently became a naturalized U.S. citizen, is committed to exploring the potential of shallow geothermal energy, and how it can impact road safety.

His system is not dissimilar from the way a heat pump works in a home. Ho has two concrete slabs outside the UND Facilities building on the southern edge of the campus. One is flush with the ground, and the other is suspended above it.

The slabs have been constructed to allow water to flow through them. Attached to those slabs are pipes, from which flows a water/glycol mixture. The pipes are buried underground, to the depth of about 50 feet, where the temperature remains between 44 to 50 degrees year round. Pumps force the warm water from the pipes into the slabs to heat them up and melt the snow. Once the water has cooled, it's pumped back underground to warm up again.

Last December, when the temperature hit a high of about 8 degrees, the elevated slab, simulating the deck of a bridge, was largely clear of snow. The flush slab, representing a street or curb, was covered because Ho has cooler water running through it, so he can gather data at different temperature levels.

He doesn't even need to go outside to check the temperature of the slabs.

"I can control the temperature from here, and (the circulation of the) water," said Ho, showing a schematic for the system on his computer screen.

The snow-melt system can also be used at the intersection of a road or a runway. He said he would like to test the system at locations like those, but the next stage of the project will require more money.

"We don't know yet until we secure the funding from either the Federal Aviation Administration, the federal DOT or even our state DOT," he said.

When his grant period has ended, he will write up his findings and then present them to U.S. DOT officials. He is prepared to ask the agency for more money to continue his research, and he has also submitted proposals to the North Dakota DOT.

For Ho, raising awareness of his work, especially to government agencies, is key. He wants them to know they potentially have another tool to keep roads safe in the winter.

"We need to bring more attention to this successful project, so that everybody knows that we are doing such a project and that it can be implemented in a bridge," he said.

Written by Adam Kurtz | Grand Forks Herald

NORTH Dakota | Transportation
Be Legendary.

A FOCUS ON IMPROVING TRANSPORTATION

Partnership between UND and NDDOT will focus on UAS to improve transportation

The future of transportation is the focus of a new partnership between UND and North Dakota Department of Transportation (NDDOT), which will use autonomous systems to develop and maintain a modern transportation system.

The Transportation Technology Research Initiative, which will begin later this semester, will be funded by the NDDOT and housed in the College of Engineering & Mines.

"Our goal is to build a partnership with UND that will enhance our state's transportation system and provide students a unique opportunity to develop practical skills for the future," said NDDOT Director Bill Panos.

The Initiative is divided into three focus areas: structures, materials and unmanned aerial systems (UAS). UND will lead the materials and UAS sections in coordination with the NDDOT. The NDDOT will lead the structures section and will select design projects for UND students.

The Initiative will engage in transportation research for the NDDOT as well as train a highly skilled workforce for the future. Undergraduate juniors and seniors, as well as graduate students, will participate in the Initiative.

"This is the type of project at which UND excels," said UND President Andrew Armacost. "It highlights the University's expertise in engineering, computer science and autonomous technologies while taking advantage of the unique UAS ecosystem we've built in North Dakota. More importantly, it provides opportunities for our students to do hands-on research and receive valuable firsthand experience."

One of the immediate applications that can be explored is the use of UAS to perform detailed inspections of bridges without having to shut down lanes of traffic. This has significant implications for enhancing safety while reducing and possibly eliminating those annoying traffic delays.

Other activities the UND/NDDOT team may tackle include developing a corridor between Grand Forks and Fargo to test advancements in road and driver safety, working to mitigate wildlife crossing hazards through structural and material design, and reducing costs of major highway construction projects by developing reusable precast concrete to create highway crossovers.

Daba Gedafa, chair and associate professor of civil engineering, will serve as the interim director.

"This is a win-win partnership between UND and the North Dakota Department of Transportation," said Gedafa. "The Initiative will help UND Engineering recruit, retain and train students who have the skillset for the 21st century economy and provide a competitive advantage for real-world jobs in a wide range of professional settings."

A primary focus of the Transportation Technology Research Initiative is the development of students by involving them in transportation projects that will benefit the state, but the work will have local, regional, state, and national implications.

"This Initiative gives UND an opportunity to obtain national recognition by making major contributions impacting the highway infrastructure through our entire nation," said Brian Tande, dean of the College of Engineering & Mines. "We thank the NDDOT for recognizing the excellent capabilities of our students and faculty and making this investment into our collective future."

HHSGGE WELCOMES NEW DIRECTOR

SVEN EGENHOFF
Professor
Director, HHSGGE
Tom & Carolyn Hamilton
Faculty Endowed Fellow

As the new director of the HHSGGE and interim chair of the Petroleum Engineering Department, Sven looks to increase student research involvement at UND

Sven Egenhoff, the new director of the Harold Hamm School of Geology & Geological Engineering, is no stranger to Grand Forks. In fact, before his formal interview, he visited Grand Forks over 38 times. Born in Hamburg, Germany, he's lived and studied in places around the world, including Germany, Iran, Argentina, and up until his new position, Colorado.

"I used to joke that there were only two cities I know well in the United Stares: Fort Collins, CO and Grand Forks, ND. "

Sven has previously published extensively on the subsurface of North Dakota, always focusing on the well-known and very lucrative Bakken Formation. "We were the first to describe the internal architecture of the upper Bakken shale in detail[1]," says Egenhoff, "and after many, many stays at the North Dakota Geological Survey core library I discovered that there was a hiatus between the lower Bakken shale, and the middle Bakken, something nearly invisible to the naked eye[2]."

According to Egenhoff, the Bakken has — and will — always fascinate him. Still, he's branching into other units: the underlying Three Forks with Tim Nesheim from the North Dakota Geological Survey and the Deadwood Formation with Jim Sorensen and the EERC team.

"My vision is to promote the very unique Williston Basin succession that shaped my career since I came to the US, and allowed me to explore avenues in research I hadn't even thought about just a few years before – shale sedimentology, mixed carbonate-siliciclastic successions in intracratonic basins, synsedimentary deformation features as a tool to recognize hidden faults in the subsurface, and so much more."

Six months into his position at UND, Egenhoff accepted the appointment as interim chair of the petroleum engineering, leading the department while a formal search is conducted.

"Sven is a sedimentologist and petroleum geologist with over 17 years of experience studying the Bakken formation, working closely with the North Dakota Geological Survey's Wilson M Laird Core and Sample Library and industry partners," says Brian Tande, dean of the College of Engineering & Mines, in an announcement to CEM faculty and staff.

"I am very excited to be here in a place that offers so many incredible opportunities for research," says Egenhoff, "I look forward to moving these departments forward into the future."

Before moving to the U.S., Egenhoff was a non-tenured lecturer at Technische Universität Bergakademie Freiberg in southeastern Germany, where he stayed until moving to Fort Collins, CO. In the Geosciences Department at Colorado State University, he moved through the ranks; starting as an assistant professor in 2006, he was promoted to associate professor in 2010, then to full professor in 2016.

Egenhoff says he would love to involve UND students in research activities, just as he did with CSU students previously. Undergraduates can aid in understanding basin dynamics and sedimentology of carbonate and siliciclastic systems, while graduate students can write their theses about the Williston.

He also emphasizes that our graduate students are crucial, as they will be working and publishing on ND as the prime example of an intracratonic basin succession, which is exceptionally well-documented.

"Our graduate students are the ones that ultimately make much of the research happen, and I am excited to be here for them and help them achieve their scientific goals."

UND is located in a unique and geologically-relevant area. According to Egenhoff, it is crucial to incorporate geological knowledge into our thinking moving forward.

"Our drinking water flows through rocks and sediments, which we must explore for present and future use. We need rocks and sediments to build our landfills, which are becoming more crucial by the day. Our society craves ores and elements such as REE for batteries, yet we still use large quantities of hydrocarbons locked up in shales and other units."

"In order to understand all this and find the necessary resources we need, we need skilled geologists and geological engineers – and North Dakota needs its fair share of them as will any other place in this nation and worldwide."

[1] Egenhoff and Fishman 2013, JSR; Borcovsky et al. 2017, AAPG Bulletin

[2] Egenhoff 2017, Marine and Petroleum Geology

AMERICAN CERAMIC SOCIETY HONORS DR. SUROJIT GUPTA WITH FULRATH AWARD

Surojit Gupta, associate professor of mechanical engineering at the University of North Dakota, was recognized for his 2021 Richard M. Fulrath Award at the 2022 American Ceramic Society annual meeting.

The Fulrath Awards promote technical and personal friendships between professional Japanese and American ceramic engineers and scientists. The awards recognize individuals for their excellence in research and development of ceramic sciences and materials, the American Ceramic Society reports.

Each year, five awards are given, but only one to an academic researcher based in the United States.

Gupta is honored to receive the award, he said.

"I would like to thank the College of Engineering & Mines and UND for supporting my endeavors," Gupta said. "I would like to encourage students and early-career faculty members to connect with professional societies for career development and networking opportunities.

"Lastly, I would like to thank the American Ceramics Society for recognizing my research and collaboration with my international colleagues."

The Society's annual meeting took place Oct. 9-13 at the 2022 Materials Science & Technology Exhibition in Pittsburgh. At the meeting, Gupta presented a lecture and was recognized for his work in materials science.

Travel restrictions due to the COVID-19 pandemic led to the postponement of the 2021 Fulrath Lecture sessions until the 2022 meeting.

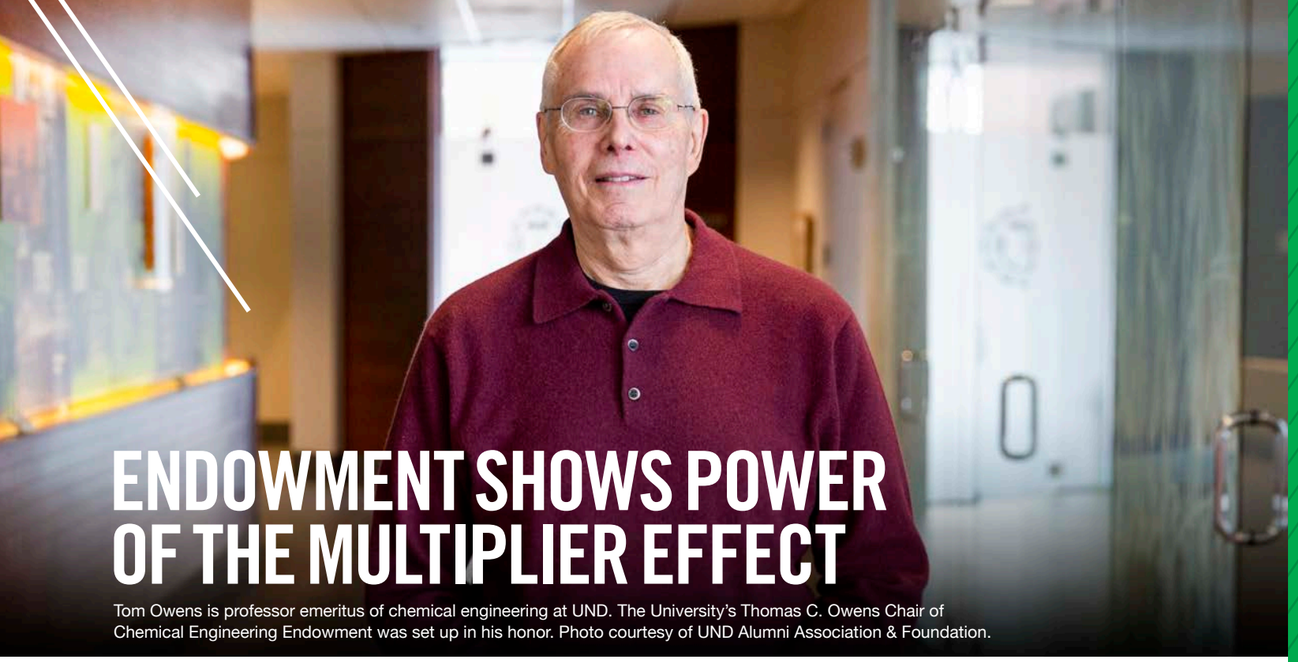
In 2019, the American Ceramic Society selected Gupta for a Du-Co Ceramics Young Professional Award, which recognizes young professional members who demonstrate exceptional leadership and service. Gupta has served as chair of the Society's Engineering Ceramics Division and is active in various professional organizations.

At UND, Gupta is an active researcher in sustainable materials, high-temperature ceramics and alloys, nanotechnology, and additive and green manufacturing. He teaches fundamental and applied courses related to materials science and engineering and has received multiple distinctions from the University for his teaching and research.

In early 2020, Gupta presented his research, "Imagine Materials: Next Generation Functional Materials for Advanced Applications," as part of UND's Faculty Lecture Series.

(Excerpt)

Written by Connor Murphy | UND Today



ENDOWMENT SHOWS POWER OF THE MULTIPLIER EFFECT

Tom Owens is professor emeritus of chemical engineering at UND. The University's Thomas C. Owens Chair of Chemical Engineering Endowment was set up in his honor. Photo courtesy of UND Alumni Association & Foundation.

For donors to endowed faculty, the reward is heartfelt, deep and personal

Tom Owens, '68, was not yet 30 when he faced a career choice: academia or Exxon. A UND assistant professor of chemical engineering at the time, Owens packed up his home and young family to head to Houston for a yearlong consulting residency with the oil and gas giant in 1973.

"I didn't know what I wanted to do for sure when I grew up," Owens said with a laugh. "But I wasn't there very long before I realized that wasn't the place for me. I had the opportunity to stay, but there was absolutely no question what I needed to do.

"I realized my place was back with my students in the classroom. I knew UND was the right place for me, so it was no contest to come back."

UND can be glad he did. So can the 800-some chemical engineering students whom Owens would come to challenge, mentor and inspire over his 33 years at the University.

Owens proved to be such an exceptional teacher that his students eventually did their own extraordinary thing: They banded together to endow a professorship in his name.

"He was one of the best professors I had," said retired chemical engineer Kristi Brindle, a 1978 UND grad who helped spearhead the endowment. "He had such an easy way of communicating. There was room for humor, and you always could tell he enjoyed being around his students and his faculty."

He also had a knack for getting to know his students, giving them confidence and opening their eyes to new possibilities. For example, Brindle said it was Owens who suggested she major in chemical engineering. The first-generation college student took that advice and went on to have a long and successful career with Texaco in Colorado.

Today, Brindle and a donor list that includes hundreds of former students have paid tribute to their mentor by establishing and providing ongoing support to the Thomas C. Owens Chair of Chemical Engineering Endowment*. They hope their gifts will continue to help UND recruit and retain the "best of the best" faculty and the most capable students.

Owens still gets email and holiday greetings from his former students some 30, 40 and 50 years later. Retired since 2001, he's now professor emeritus, a status earned after a career in which he chaired the Department of Chemical Engineering for 23 years and served three times as interim dean of the UND College of Engineering & Mines.

Looking back on that fateful decision to return to Grand Forks and to teaching 48 years ago, Owens is both humbled by and immensely grateful to his former students for endowing the professorship and chair in his name. "Really, what I think I've done is just lend my name to something that's important and positively contributes to the department, college and University," he said. "There are chemical engineering students now at UND who wouldn't recognize me or my name, and that's just fine.

"But what I hope this endowment represents is a commitment to teaching excellence. I want it to enhance opportunities for students and faculty at UND."

Frank Bowman, who today holds the title of Thomas C. Owens Associate Professor, has been enhancing opportunities at UND for almost two decades, exactly as Owens described. The current chair of the Department of Chemical Engineering, Bowman launched a project that trains elementary and middle school teachers of Native American and rural North Dakota students how to integrate engineering tasks into their classrooms.

He's also developed high-quality online courses to enrich the student experience, a focus that has helped UND create one of the nation's highest-ranked online engineering programs.

(Excerpt)

Written by Janelle Vonasek | UND Today

*On September 28, an investiture ceremony was held in honor of the Thomas C. Owens Chair of Chemical Engineering Endowment, attended by many of Owens' former students.

UND'S PETROLEUM ENGINEERING STUDENTS TAKE CENTER STAGE

During the Society of Petroleum Engineers Annual Technical Conference & Exhibition in Houston, Texas, UND's SPE student chapter members were honored with the society's Presidential Award for Outstanding Student Chapter, recognizing the top 5% of SPE student chapters worldwide.

UND'S PETROLEUM ENGINEERING DEPARTMENT RECOGNIZED FOR OUTSTANDING ACHIEVEMENT

UND's petroleum engineering program and Society of Petroleum Engineers student organization have received honors for outstanding achievement

The petroleum engineering program received the Outstanding Achievement Award (Group) from the Williston Basin chapter of the American Petroleum Institute.

The award, one of the most prestigious in the oil and gas industry, recognizes outstanding achievement in the Williston Basin which has significantly impacted or changed the way something is done.

During the 2021 Williston Petroleum Banquet, a celebration of the oil and gas industry in the Williston Basin, the department was honored for their achievement.

During the banquet, UND was recognized for its new Drilling & Completion Lab (DRACOLA), one of the world's largest oil drilling simulators, as well as for its research and training capabilities for the oil and gas industry and the state of North Dakota. Department leaders gratefully acknowledged the support of the ND Industrial Commission and PE Industry Advisory board.

"We are very grateful for the recognition and support of the American Petroleum Institute and the North Dakota petroleum industry," said Brian Tande, dean of the UND College of Engineering & Mines. "Oil and gas are an important part of the state's economy, and we are very proud to be able to support this industry by producing high-quality petroleum engineers."

Last May, the UND Society of Petroleum Engineers student organization was announced as the SPE's recipient of the Presidential Award for Outstanding Student Chapter. This award recognizes the top 5% among the society's student chapters around the globe.

Months later, the student chapter was officially honored during the SPE Annual Technical Conference and Exhibition held in Houston, Texas, attended by SPE members and industry influencers from around the world.

"This award would not have been possible without the contributions of many people, their time, hard work, and dedication," stated the student organization in an official announcement. "It would not be possible without our speakers, guests, and attendees. Thank you all for your efforts and high-quality work! Together, we can achieve more!"

Adapted from "Petroleum Engineering wins Outstanding Achievement Award" published in *UND Today*. Written by Jan Orvik.

Sougata Roy, assistant professor of eechanical engineering at the College of Engineering & Mines at UND, has received a U.S. Department of Defense grant to study advanced manufacturing techniques. Photo by Adam Kurtz/UND Today.

FROM NORTH DAKOTA, THE 'PRAIRIE OCEAN': U.S. NAVY RESEARCH

DoD grant lets UND research new materials for, among other uses, building ships

A UND researcher has received a $600,000 grant from the U.S. Department of Defense's Office of Naval Research to study advanced manufacturing processes.

The award, which will provide funding over three years, comes as part of the DoD's Defense Established Program to Stimulate Competitive Research (DEPSCoR) program. Sougata Roy, assistant professor of mechanical engineering at the College of Engineering & Mines at UND, has been named principal investigator on the research project, and will partner with Peter Collins, a professor of materials science and engineering at Iowa State University, and Andrzej Nycz, a research and development staff member from the Oak Ridge National Lab in carrying out the project.

Officially, the research aims to "develop a framework for next generation hybrid additive manufacturing process by leveraging novel synergistic approach combining multiscale DED (directed energy deposition) processes." That means Roy and his research team will study how combinations of different energy sources, an electric arc or laser, for example, pair with different feedstock in either powder or wire form to manufacture metallic components of interest to the U.S. Navy.

"We believe the findings we will get from this study will be the foundation for that," said Roy. "That's the overall goal for this project."

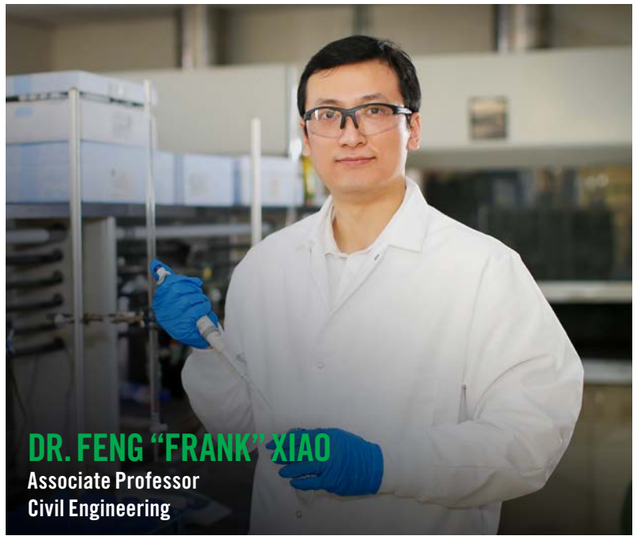
According to a DoD release, the DEPSCoR program is a capacity-building program designed to strengthen the research infrastructure at institutions of higher education in states and territories that are not typically the beneficiaries of federal research dollars.

"The Department's research mission relies on an ecosystem of creative and insightful researchers in every State of the nation," said Bindu Nair, director of the DoD's Basic Research Office. "DEPSCoR enhances our science and engineering research capacity both now and in the long term, and increases the number of researchers pursing research in DoD-relevant areas. It is crucial that we build a research infrastructure that strategically uses the research capabilities found across the country."

Roy said the researchers are free to think big while at work, as the results may have implications on how to manufacture large-scale components for naval vessels. Results from the research may also find a home in other industrial areas as well, such as aerospace or automotive manufacturing.

The research funding represents the latest DEPSCoR award to UND. In May, the University received a $1 million grant for advanced materials research, which was the second such grant of its kind at UND.

Written by Adam Kurtz | UND Today



DR. FENG "FRANK" XIAO
Associate Professor
Civil Engineering

FENG "FRANK" XIAO APPOINTED AS AN EDITOR OF JOURNAL OF HAZARDOUS MATERIALS

Civil engineering associate professor Feng "Frank" Xiao, has been appointed as an editor of Journal of Hazardous Materials. With an impact factor of >10, Journal of Hazardous Materials (JHM) is a flagship journal in the areas of environmental/chemical engineering and science. The journal received approximately 14,000 submissions in 2021. The current acceptance rate of this journal is less than 15%. Dr. Xiao is one of the few faculty of NDUS who has been appointed as an editor for a flagship environmental/chemical journal. This appointment will promote UND's recognition through Dr. Xiao's service for the scientific community.

Dr. Xiao is known for his groundbreaking research in water treatment and environmental remediation. His research focuses on water and soil quality engineering, including disinfection byproducts and black carbon. Currently he is leading an interdisciplinary team with diverse expertise to address open questions in the following research areas: (i) the fate and transport of per- and polyfluoroalkyl substances in aquatic and soil environments; (ii) new and cost-effective water treatment and soil remediation technologies; and (iii) new analytical tools and non-target identification by high resolution mass spectrometry. Dr. Xiao is the recipient of numerous awards and honors, including the EPA STAR Early Career Award, National Science Foundation CAREER Award, Dean's Outstanding Faculty Award, and UND Foundation/ McDermott Faculty Award for Excellence in Research and/or Creative Activity. He also served since 2021 as an Associate Editor of Journal of Environmental Engineering (ASCE).

"I am excited to be part of an efficient JHM editorial team that promotes quick and useful peer reviews, making sure only the best research disseminates to the environmental community," Xiao said. "With a training background in water and wastewater treatment, environmental organic chemistry, and analytical chemistry, I am passionate about, and have been fully devoted to, emerging areas of environmental engineering and science. This is a valuable chance to give back to the academic community working with such a well-respected journal!"

GEDAFA ELEVATED TO ASCE FELLOW

Daba Shabara Gedafa, Ph.D., P.E., ENV SP, F.ASCE, professor and chair of civil engineering, named fellow by the ASCE Board of Direction

Gedafa's service goals are to help the department, college, university, profession, and community move forward. He has served on ten university committees, including the senate executive committee, five college-wide committees, and all department-level committees. He has advised four student organizations and has been selected as UND's Outstanding Advisor.

Some of his major professional accomplishments are being the handling editor for Transportation Research Record: Journal of Transportation Research Board (TRB); a member of three National Cooperative Highway Research Program (NCHRP) project panels, four TRB committees, and one ASCE committee; an ABET program evaluator; scientific committee member for seven international conferences and a session co-chair for one international conference; reviewer for 17 journals and seven international conferences in addition to TRB annual meetings; and an external reviewer for proposals, report, and a book.

His research goals are to find solutions for the evolving problems in pavement and materials engineering. He has received 35 grants, donations worth $2,221,370, and currently advises eight master's and three doctoral students.

His goal as a leader is to nurture individuals' maximum potential by being respectful, inclusive, and creating a conducive environment for people to succeed while providing resources in a fair and equitable way. Since becoming the chair in July 2018, his department has seen a tremendous growth in student headcount, external research expenditure, and alumni giving.

AROUND CAMPUS

Future Engineer

Blake Amsbaugh, child of Allie (Albrecht) Amsbaugh (ChE'18) and granddaughter of Jim Albrecht (ChE'84), with Deb Austreng, Dir. of Alumni, Corporate & Public Relations in the presidential suite during UND Engineering Hockey Night.

Reconnecting Alumni

Alumni doing business on campus, ComDel Innovations team returns to recruit on campus. Left to right: Allie (Albrecht) Amsbaugh (ChE'18), Justin Baker (ChE'19), and Taylor Albrecht (ChE'14).

Never too cold!

Despite a blizzard, the UND Formula SAE team braved the weather while testing their racecar.

Family Traditions

At the Spring 2022 Order of the Engineer & Pledge of the Computing Professional Ceremony, a CEM graduate was joined by his is father and grandfathers — all of whom had participated in the Order of the Engineer previously. From left to right: Blake Apanian (ME'22); Monte Phillips (CE'59 & '61), National Board of Governors of the Order of the Engineer member; Steven Apanian (CE'83); and Ron Apanian (CE'56 & '58), a 2021 Alumni Academy inductee. Both Monte and Ron are retired faculty members of the UND Civil Engineering Department.

Digging up History

Darin Buri, CEM Facility & Library Manager, stands next to a petrified wood fossil recently dug up by construction workers near Twamley Hall. Estimated to be around 58 million years old by Joe Hartman, professor of geology and geological engineering, the fossil has a new home outside of Leonard Hall.

Donors meet Student

Don (CE'59) and Georgia Nygaard visit campus to meet Breanna Metzger, the student who received the Don & Georgia Nygaard Family Scholarship.

Senior Design Expo

Senior students, faculty, and staff come together in the Memorial Union ballroom to share and learn more about students' senior design projects. The spring event marked the first in-person Senior Design Expo since the beginning of the pandemic.

Testing their Skills

Distance students traveled to campus to test out their robotics knowledge. In the Upson I laboratory, DEDP students put their homemade robots to the test; each team's robot had to pick up a ping-pong ball, maneuver through a course, and project the ping-pong ball into stacked buckets.

ACHIEVEMENTS & AWARDS

NOTABLE AWARDS & SPONSORSHIPS FEATURED IN THIS MAGAZINE ISSUE

Junior Nasah, major project manager with UND's Institute of Energy Studies (IES) and Johannes Van der Watt, IES research engineer, have both received federal grants totaling more than $2.5 million, with the majority of funds from the U.S. Department of Energy. **Read more on page 18.**

U.S. Department of Defense give UND $1 Million to research advanced materials. **Read more on page 14.**

A UND researcher has received a $600,000 grant from the U.S. Department of Defense's Office of Naval Research to study advanced manufacturing processes. **Read more on page 28.**

Sattar Dorafshan, assistant professor of civil engineering, has been awarded $580,000 in research grants to study North Dakota transportation infrastructure. **Read more on page 16.**

An NSF CAREER proposal by Taufique Mahmood, instructor of HHSGGE, received more the $440,000 from the National Science Foundation. **Read more on page 15.**

I-Hsuan Ho, associate professor of HHSGGE, received a U.S. Department of Transportation grant for $170,000 to study the feasibility of using geothermal heat to melt snow from some roadways. **Read more on page 22.**

FACULTY ELEVATED TO ASCE FELLOW

Daba Gedafa, Ph.D., P.E., ENV SP, F.ASCE, associate professor and chair of civil engineering, has been named a fellow by the American Society of Civil Engineers Board of Direction. **Read more on page 29.**

FACULTY APPOINTED EDITOR OF JOURNAL OF HAZARDOUS MATERIALS

Feng "Frank" Xiao, associate professor in civil engineering, has been appointed as an editor of the flagship Journal of Hazardous Materials. **Read more on page 29.**

WILLISTON API OUTSTANDING ACHIEVEMENT AWARD

The petroleum engineering program at the University of North Dakota has received the Outstanding Achievement Award (Group) from the Williston Basin chapter of the American Petroleum Institute. **Read more on page 27.**

UND FOUNDERS DAY AWARDS

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

Feng (Frank) Xiao, Associate Professor, Civil Engineering

B.C. Gamble Faculty Award for Excellence in Teaching, Research or Creative Activity, and Service

Surojit Gupta, Associate Professor, Mechanical Engineering

VPAA Award for Outstanding Professional Academic Advising

Dan Cooley, Academic Core Advisor

Excellence in Online Course Development & Innovative Teaching Strategies

Hallie Chelmo, Assistant Professor, Mechanical Engineering

AMERICAN CERAMIC SOCIETY RICHARD M. FULRATH AWARD

Surojit Gupta, associate professor of mechanical engineering was recognized for his 2021 Richard M. Fulrath Award. **Read more on page 25.**

DEAN'S OUTSTANDING FACULTY & STAFF AWARDS

Tarek Elderini
Instructor, SEECS
Dean's Outstanding Faculty Award

Taufique Mahmood
Associate Professor, HHSGGE
Dean's Outstanding Faculty Award

Agnes Carlson
Department Support Specialist
Dean's Outstanding Staff Award

Harry Feilen
Director, Drilling & Completion Lab
Dean's Outstanding Staff Award

RETIRING CEM FACULTY

Forrest Ames
Mechanical Engineering

Mike Mann
Chemical Engineering

THREE MINUTE THESIS (3MT) COMPETITION

The UND 3MT competition culminates students' academic, presentation and research communication skills, as each must effectively explain their research in three minutes with only one PowerPoint slide. **Read more on page 40.**

Rabie Fadil
First Place | Biomedical Engineering

Maharshi Dey
Second Place | Mechanical Engineering

Vida Atashi
Third Place | Civil Engineering

SOCIETY OF PETROLEUM ENGINEERS OUTSTANDING STUDENT CHAPTER AWARD

The UND SPE student chapter has received the 2022 Presidential Award for Outstanding Student Chapter, recognizing only the top 5% of SPE's student chapters around the world. The recipients were recognized at the SPE Annual Technical Conference & Exhibition in October. **Read more on page 27.**

U.S. DEPARTMENT OF ENERGY GEOTHERMAL COLLEGIATE COMPETITION

The UND team earns second place and $5,000 for their design of a combined heat and power geothermal system in North Dakota. **Read more on page 46.**

UND PLACES THIRD IN STEEL BRIDGE COMPETITION

A team of UND students placed third at the 2022 Western Great Lakes Student Conference, an annual competition that challenges students to develop a scale-model steel bridge. **Read more on page 41.**

COMPUTER SCIENCE STUDENTS DESIGN EMERGENCY PREPAREDNESS APP FOR GRAND FORKS COUNTY

The Grand Forks County Commission signed off on the submission of a smartphone application to the Google Play and Apple Store. The application is an emergency preparedness platform for Grand Forks County that would allow residents, for example, to locate emergency shelters anywhere in the county. The app was designed by computer science seniors Gannon Engkvist and Sean Larson.

UND PETROLEUM ENGINEERING STUDENT NAMED 2022 GOLDWATER SCHOLAR

Sabrina Sullivan
Sophomore student, Petroleum Engineering

Sabrina Sullivan is one of two UND students who were selected as 2022 Goldwater scholars - the only two students from a North Dakota institution to win this year's Goldwater award. A U.S. Air Force veteran, Sullivan has 14 years of experience working in the oil and gas industry and now works as an Optimization Supervisor. Her most recent and proudest achievement is helping develop an innovative lift to more efficiently and ecologically extract oil.

CHRISTINE MIRZAYAN SCIENCE & TECHNOLOGY POLICY GRADUATE FELLOW

Chioma Onwumelu
Ph.D. student, Geology

Chioma Onwumelu (DELS/BESR), a Ph.D. candidate in geology at UND, has been named a Christine Mirzayan Science & Technology Policy graduate fellow. She is a researcher working at UND's Energy & Environmental Research Center (EERC) studying and conducting laboratory analyses to interpret data on improved unconventional oil and gas production, enhanced oil recovery in unconventional and conventional resources and CO2, and rich gas storage in a geologic formation.

UND ENGINEERS WEEK AWARDS

Dr. Tarek Elderini
"Professor of the Year" Award

UND American Institute of Chemical Engineers chapter
"Student Organization of the Year" Award

CEM NEWS DELIVERED DIRECTLY TO YOUR INBOX

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At the beginning of every month, we'll send you the biggest stories from the previous month, along with important updates and upcoming events for our alumni and friends.

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blogs.UND.edu/cem

REBECCA'S STORY

Scan the QR code above with your phone's camera app to hear more of Rebecca's story.

CATALYSIS:

STUDENT + UND = DREAM CAREER

Transfer student turns passion for details and nature into chemical engineering degree tailored for protecting the environment

As a young girl, Rebecca Seemann spent back-to-back summers with her family trampling the wooded trails in search of geocaching treasure in every state park in Minnesota.

That's 66 parks in all, and the family sometimes hit as many as four parks in one day.

The treasure might have been a simple collectible card describing the habitat of the ruby-throated hummingbird or the native blue darner dragonfly. But Seemann said you could learn a lot more if you were paying attention.

And that's exactly what the home-schooled Seemann did while growing up outside the tiny town of Zumbro Falls, Minn. She had a way of looking at the world a little differently. Leaves weren't just leaves. And dirt was never just dirt.

"I always liked to know all the little details," Seemann explained. "I liked getting down close to the leaf to see all the little patterns and cells. And with soil, too, there are so many different types to compare. You could rub it onto a page and get like a million different colors.

"You look at it and think it's just dirt, but no, there's so much more that goes into it. If you pay attention to the details in your environment, there's always another layer of information and another layer of cool things happening."

And so it is with the chemical engineering degree program at the University of North Dakota. The program is the perfect catalyst, Seemann says, for turning her talents, background and interest in the natural world into a rewarding career.

"I really love the environment, and I want to preserve it," she said. "The cool thing about chemical engineering is you can go anywhere and do anything, and at UND the instructors and advisors are incredible. They'll work with you and tailor your courses to your own unique career goals. That's kind of their trademark."

Finding the right fit

It also was a key reason Seemann knew UND was the right fit. She had considered another university but said UND kept "checking all the boxes."

For example, Seemann has multiple dietary restrictions, so it was no small potatoes for her to discover UND's large variety of allergen-free meal options.

"It's all good, and it's all something I can eat," she said. "I've gotten to know the cooks, and they're all experts at their jobs."

Just as important to Seemann was how easy it was to transfer her college credits. As a high school junior and senior, she had taken classes at a community college, and already had racked up an impressive 87 credits and two associate degrees before coming to UND.

Ultimately, every credit transferred, Seemann said, leaving her with only the chemical engineering-specific courses to take.

After she was enrolled at UND, Seemann said her professors were accommodating again when she was offered a six-month internship at Boise White Paper in International Falls, Minn.

"Before I could accept, I needed to know if it was going to work out with my classes," she said. "I asked three different instructors, and they all came back with the same answer: 'We'll work with you. Don't worry about it. We want you to have this great opportunity.'"

Work in the real world

And she's glad she did, because it was an internship like no other. Seemann quickly proved she could fill the shoes of full-time employees on the environmental team — first, jumping in for a colleague on maternity leave and later, taking on the role of the wastewater engineer after that executive took a promotion.

Seemann then wound up training the new wastewater engineer, too.

One of her biggest responsibilities was managing the company's industrial landfill. This included regular sampling, upkeep, maintenance and inspections. In the end, the mill manager applauded her by name and said she'd been a good influence on not only the department but the whole mill.

"Every day I was learning," Seemann said. "I look back and think, 'Wow, you really trusted an intern with that?' I'm just glad I could live up to their expectations because it was an amazing experience."

For now, Seemann doesn't know what the next adventure will be. But she does know that thanks to UND's chemical engineering program, she'll forever be looking at leaves and dirt and dragonflies in a whole new way.

Written by Janelle Vonasek | UND Today

UPGRADES AT UND FLIGHT OPS WILL IMPROVE SAFETY FOR DECADES

Aviation faculty and administrators say they are grateful for funding that will complete work on Bravo apron, in a project being worked on by a civil engineering student

Patrick Casserly entered his senior year at UND in the fall, where he will continue his studies at the College of Engineering & Mines, as a civil engineering student. Until then, he's working on a project at Grand Forks International Airport (GFK) that, when completed, will see long-needed infrastructure upgrades brought to UND Flight Operations.

Since mid-May, Casserly has been working as an intern for Mead & Hunt, a national consulting group that provides airports and other entities with a variety of engineering and architecture services. His job: to help oversee the reconstruction of large portions of Bravo ramp, used by UND student-pilots to taxi to and from the runway. The project is set to be completed later this summer.

For Casserly, a U.S. Air Force veteran, it's a chance to see the design and construction of necessary infrastructure from another perspective – that of an engineer.

"I think it's a really great opportunity to get to capitalize on my experience with airfield operations," he said.

Professor of aviation Kim Kenville was visiting with Jon Scraper, department manager of aviation services with Mead & Hunt, the project manager who told her about the educational opportunities that exist in such a project. Kenville brought that idea to Daba Gedafa, chair of the Civil Engineering Department, which led to Casserly taking the job.

"Jon told me he would really like to have a UND intern on this project, so that learning can ensue," she said. "This opportunity allows the next generation to see how a project like this happens."

Replacing a decades-old apron with one to last decades

The project, while not as eye-catching as a brand-new building, is crucial to ensuring UND's flight leadership and is a matter of safety for both students and aircraft. It is being funded by a $5 million appropriation by the Legislature.

University aviation students use two aprons, Bravo and Charlie, both of which were constructed in the 1970s and 1980s. Bravo ramp is located on the north side of the flight operations buildings, with Charlie on the south. The latter apron underwent a significant renovation in 2016, at the cost of $6 million. In 2015, Kenville, with the help of members of Grand Forks' local delegation to the Legislature, successfully led an effort to secure the funding for Charlie apron.

But that left Bravo, which was in rough shape. Dick Schultz, director of flight operations, said that after observing its crumbling nature, GFK officials shut down the ramp a few years ago. A $15,000 repair job was only a temporary fix. One of the main safety concerns is what is referred to as "FOD," or "foreign object debris." As the decades-old concrete crumbles, it leaves chunks and shards on the apron. Thrust generated by taxiing aircraft can send that debris flying into another aircraft – or a student walking on the apron. Students pick up those pieces and deposit them into specially marked cans set up around the area, but more and more shards turn up.

"We've been just surviving on patchwork until now, so this puts us in a much better position," Schultz said.

Kenville, in expressing her thanks for the funding, said it takes more than a village to build an apron; it takes the state.

"It is with great gratitude that we see this ramp reconstruction enter its final phase," she said. "It also has the added benefit of a civil engineering student interning on the project. It just makes it a bit more special!"

Kenville acknowledged the difficulty in finding funding for a new apron – not exactly an eye-catching project. Schultz agreed and likened the aprons near UND Flight Ops to laboratory spaces elsewhere on campus, though of a different nature.

"It's the least fancy lab you could build," said Schultz. "It's a piece of concrete!"

Said Kenville: "Pavement is certainly not glamorous, and no one wants their name on it, so we worked really hard to deliver a solid message to the North Dakota Legislature over a six-year period. Our delegation could see the benefits of the project, and they and their colleagues found money and appropriated it to the University."

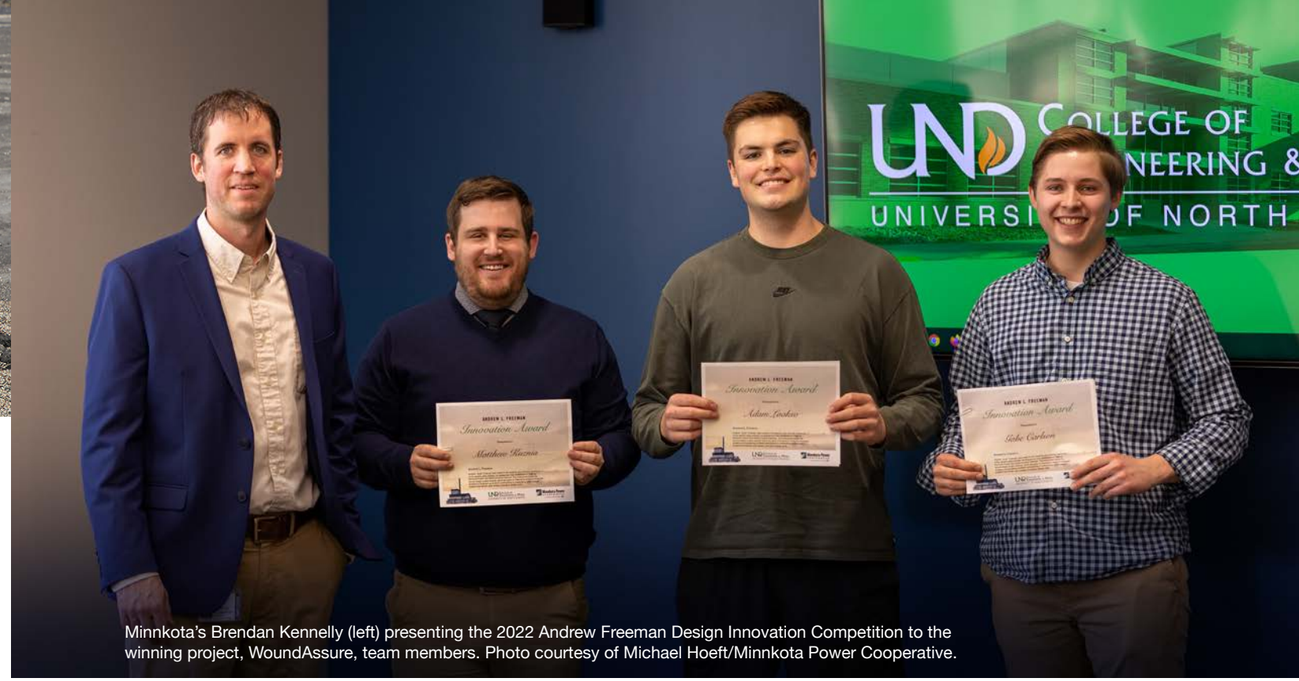
In 2015 the project was projected to cost $16 million. Work on Charlie ramp came in at $6 million, but the $5 million bid for Bravo ramp came in much lower than expected, offering considerable savings for the project.

Until he returns to UND in the fall, Casserly is spending his time learning about the concepts surrounding topsoil and drain tile (which was never installed under the original apron and hastened its degradation) under the tutelage of Scraper, with Mead & Hunt.

"This is how you get to be a really good designer, by spending time watching things get built," he said of Casserly's internship.

Written by Adam Kurtz | UND Today

Photo courtesy of Adam Kurtz



Minnkota's Brendan Kennelly (left) presenting the 2022 Andrew Freeman Design Innovation Competition to the winning project, WoundAssure, team members. Photo courtesy of Michael Hoeft/Minnkota Power Cooperative.

WOUNDASSURE WINS 2022 FREEMAN DESIGN AWARD

WoundAssure was awarded first place at this year's Andrew Freeman Senior Design Innovation Awards. The winning team consisted of UND electrical engineering and computer science collaborative team of seniors Adam Laasko, Gabe Carlson, Matthew Kuznia and Zachary Wenzel who created a portable device that allows diabetic wounds to be assessed by using thermal mapping technology and a UV camera.

"Our project was pure innovation," Kuznia said. The team engineered a device that was not only functional but also provided accessible results from a tablet or smartphone. Filling a need in the diabetic community was a driving factor in this project, which aims to more accurately assess wound severity and healing prognosis. Team member Gabe Carlson is a Type 1 diabetic himself.

"It has a lot of practicality in the medical field," added Laasko. "There are a lot of senior design projects that are hard to apply, but seeing ours get results and have an effect on people makes it really interesting."

For the past 22 years, this award has been bestowed to the students who have embodied the core values of Andrew "Andy" Freeman – innovation, communication and teamwork. Freeman was a UND engineering graduate and the general manager of Minnkota for 42 years. His legacy also includes inventing the head bolt heater – a plug-in heating device to help a car or tractor start on cold days.

WoundAssure was awarded $2,000 from the endowment established in 1996 in honor of Andy.

"Keeping Andy's legacy alive is really the key mission," said Brendan Kennelly, Minnkota senior manager for power delivery engineering. Kennelly represented Minnkota while presenting the awards on May 10 in the Collaborative Energy Complex at UND.

"We are all very thankful for the support of Minnkota," said Brian Tande, Dean of the College of Engineering & Mines. "This is always a fun event every year and as I'm sure you realize, a lot of work goes into these projects, not only by the students but by the faculty. Your recognition of that is very much appreciated."

The second-place winners reverse-engineered a Digital Media Vending International (DMVI) slushie machine to increase the efficiency of the machine and improve product capacity. Team members were mechanical engineering seniors Jacob Hatfield, Elijah Riesgraf, Daniel Vallejos and Jorge Florencia were awarded $1,500.

The third-place winners focused on a method to convert fuel-grade ethanol into aromatic hydrocarbons. The project evaluated how various high-value chemicals could be created through this process. Team members were chemical engineering seniors, Abbie Radermacher, William Moe and Josiah Burkman were awarded $500.

Written by Emily Windjue | Minnkota Current

A LEGACY OF BUILDING FUTURES

Three students receive scholarships from the Associated General Contractors of North Dakota to support their civil engineering education.

The ND AGC awarded the first John Jardine Scholarship in 1964 and the Walt Swingen Scholarship in 1988. Both are full tuition scholarships, enabling civil engineering students to follow their passion.

Patrick Casserly | Walt Swingen Scholarship
Coby Stauss | John Jardine Scholarship
Scott Rousseau | Don Lindberg Scholarship

GIFTS TO GO THE EXTRA MILE

Kevin (ME '72) & Kathie Kiefer

Kevin Kiefer never got the chance to attend graduate school, but today he's making it his mission to be sure other aspiring engineers do.

"My main advice to students would be to stay after undergrad and get their master's degree. I wish that I could've pursued mine but there wasn't enough money available at the time. That's why I give back: for the one student who would've stayed around if he or she saw a little bit of money available. That's where I want my legacy to go," Kevin said.

Kevin graduated with a bachelor's degree in mechanical engineering in 1972 and landed a job immediately out of college, working in energy research and development. In 2007, he retired from a successful 31-year-long career with Thermo King, a manufacturer of transport temperature control systems for trucks, trailers, shipboard containers and railway cars. He and his wife, Kathie, now live in Gardnerville, Nevada, and enjoy supporting future engineers.

Kevin has steadfastly supported UND for the past 40 years, starting with his first $50 gift in 1981.

Recently, he and Kathie pledged $50,000 to the Kiefer Family Engineering Scholarship Endowment. They declared their intention to give another $50,000 through a gift in their will, supporting students at the College of Engineering & Mines.

"Giving back is important to me. I feel like it's my duty to pay back what was given to me, and I really want to help students succeed," Kevin said.

They hope their gifts encourage students to go the extra mile by pursuing a graduate degree from UND. Kevin is a firm believer that continued education is a great step for launching a successful career in engineering. "We want our money to support students who want to earn a graduate degree but maybe wouldn't have had the funds to do so if it wasn't for our gift," Kevin said.

Written by the UND Alumni Association & Foundation

STUDENT SPOTLIGHT: KAYLEE HUSARIK

Meet Kaylee, biomedical engineering student and member UND's Society of Women Engineers

(The following interview was previously published by the Society of Women Engineers, featuring interviews by influential biomedical engineering students and SWE members across the nation.)

Kaylee is pursuing her master's degree in biomedical engineering at the University of North Dakota. She recently earned her bachelor's degree in electrical engineering, too.

Q: Can you describe a "day in your life" studying biomedical engineering and share what you like most about your program at the University of North Dakota?

A: My days can be a little busy. I currently work for SafetySpect here in Grand Forks as well as pursuing my masters. A lot of my classes are project based, so I spend most of my time working on projects instead of studying for tests. I like this a lot better because I get to apply my knowledge to real-life applications. I also am running a few pilot studies with about eight different nursing homes in the area to test our contamination sanitization inspection and disinfection (CSI-D) device for post cleaning auditing use. This is very important and exciting for me because I have a background in long-term care, and this impacts those with compromised immune systems who live in these facilities.

Q: What do you like most about the University of North Dakota and its biomedical engineering program?

A: What I love most about UND and the biomedical engineering program as well as the engineering college as a whole, is the relationships I have with other students and my professors. UND has smaller class sizes, so most of our professors know us on a personal level. I have gotten the chance for multiple different exciting opportunities because of my professors and them wanting me to succeed.

Q: What challenges have you encountered as a woman studying biomedical engineering, and how have you overcome them?

A: I do not think I have encountered many challenges being a woman in engineering. It is becoming more and more popular, and we have a lot of resources for women in engineering here at UND. I think more people are intrigued by women studying engineering and think it is really awesome!

Q: What are some really cool things that biomedical engineers work on?

A: There are lots of really cool things biomedical engineers work on! Right now, we are working on a robot that will be fully autonomous (does not need to be controlled by a human) that scans around a room and disinfects areas that have contamination on them. This is all being done using different types and wavelengths of light.

Another thing biomedical engineers work on is prosthetic limbs, such as arms and legs, which are controlled using input from your nervous system or brain signals.

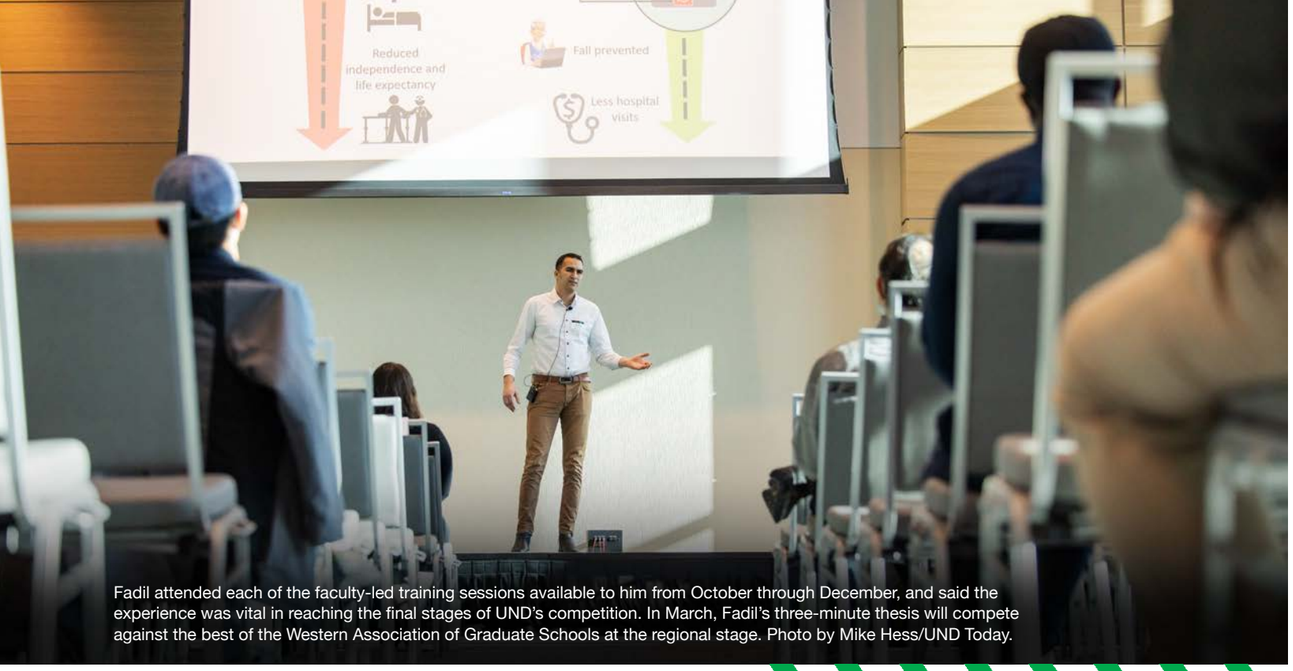
Q: Can you share any advice for our readers who might be considering going to school for mechanical engineering?

A: I would say that if you even have the slightest interest in any sort of engineering to try it! It does not hurt to try. I knew nothing about electrical engineering when I decided to pursue that as my career field. Now, I would not have it any other way. I would also say if you get the chance, ask an engineer if you could follow them for a day to see what they really do. It would be a great opportunity to learn more about engineering.

(Excerpt)

Written by Allison Osmanson

SWE Member News



Fadil attended each of the faculty-led training sessions available to him from October through December, and said the experience was vital in reaching the final stages of UND's competition. In March, Fadil's three-minute thesis will compete against the best of the Western Association of Graduate Schools at the regional stage. Photo by Mike Hess/UND Today.

'CLEAR AND CONCISE' IN MINUTES FLAT

UND's Three Minute Thesis competition rewards gift of gab, but takes a village to perfect

North Dakota is No. 1 in the nation for honey production and No. 2 in oil production, but also ranks third in incidents of Parkinson's disease.

Within three minutes of that opening statement, Ph.D. student Rabie Fadil made his case for a new type of medical device and secured a first-place finish at UND's 2022 Three Minute Thesis competition, to boot.

Fadil, a biomedical engineering student, topped a diverse field of graduate students and research topics to win a $500 scholarship prize with his presentation, "Preventing falls in Parkinson's disease."

Through his talk, Fadil detailed the conditions contributing to fall risks among those living with the brain disorder, and how a device that he and fellow researchers are developing can help people with Parkinson's know when they might be at a higher risk for a falling incident.

Fadil's idea is to create something akin to a common bathroom scale that uses multiple body measurements and a predictive algorithm to determine someone's risk of falling. Ideally, this information can help everyday people and doctors alike in living with and addressing the disease.

Using straightforward graphics and a streamlined spiel, Fadil impressed judges through two rounds of competition among 14 other competitors. This spring, he'll take part in the regional competition hosted by the Western Association of Graduate Schools in March.

"To me, it's a prestigious title, and it's something that's going to add a lot to my life," Fadil told UND Today shortly after his win. "Earning first place is something I'm really proud of, and it was very challenging for me. I'm thankful to everyone who helped me in getting that title."

Competing from near and far

This year's "3MT" competition, a concept originally conceived in 2008 at the University of Queensland, Australia, was the sixth for UND's School of Graduate Studies. Contestants are supposed to clearly and concisely explain their research in a three-minute window, using only one PowerPoint slide.

Joining Fadil on the podium were Ph.D. students Maharshi Dey, from mechanical engineering, and Vida Atashi, from civil engineering, in second and third place, respectively. All three received scholarship awards, with each being presented on an oversized check after the final round.

The larger-than-life checks were a welcome return for the competition, as it was the first time since the pandemic's outset that 3MT could be held in-person. Chris Nelson, associate dean of UND's School of Graduate Studies, was glad to once again play emcee throughout the day (with some drumroll help from the audience).

"I think everyone involved was happy to be able to move to an in-person format, given the emphasis on communication to an audience, which, even given rapid advances in technology accelerated by the pandemic, is still perhaps best experienced in person," Nelson said. "At the same time, the switch to a virtual format last year showed us that it is possible for our remote students to successfully compete in 3MT."

In the Memorial Union ballroom, two distance competitors presented to judges via video recording, and one of those entries advanced to Wednesday afternoon's final round. Jessica Passini, a master's student in public health, connected with the competition from Alaska to talk about her work studying connections between mental distress and heart attacks among military veterans.

Three months for three minutes

Fadil, who competed live and in-person, lauded 3MT as a learning opportunity when asked about his motivations to enter the event.

"It's a great opportunity for me to improve my communication skills," said Fadil, who came to UND from Morocco, an Arabic-speaking country. "Whether you're in academia or industry, you always have to communicate, no matter the role. Sending that message, in a clear way, is something that's very important."

According to Nelson, employers and organizations in just about every industry have "communication skills" at the top of their needs for job candidates.

Speaking to anyone involved with 3MT reveals that what ends up as a three-minute talk is typically the result of at least three months of work, replete with faculty-led training sessions, drafts, re-drafts and last-minute adjustments to hopefully leave a lasting impression.

Soojung Kim, associate professor of communication, watched Fadil and all of Wednesday's competitors from the crowd feeling like a "proud mom," given her role as faculty training lead for 3MT. After calls for nominations go to campus departments in August to draw students, Kim spends the rest of the year leading sessions for students to workshop their ideas into viable three-minute presentations.

"What I really love is that every one of these students is doing an important thing in their own research field," Kim said. "When they start talking about what they do, their eyes sparkle. And I want them to be a storyteller. It doesn't matter whether you're a communication student or not, you always have to be a storyteller about your own research.

Motivating, rewarding results

With the help of a clever infographic, Fadil showed that regardless of the variety of factors causing falls among people with Parkinson's, as well as the elderly, the consequences tend to cascade. Injuries and resulting financial hardship can quickly take away peoples' independence, thereby damaging quality of life.

In rural tracts of the country where care can be far away, such as North Dakota, that independence is even more valuable, Fadil said.

Citing the research he has done working with Parkinson's patients at Sanford clinics in Fargo, Fadil told his audience of judges and spectators that he wants to deliver what is currently a complex and expensive monitoring process to an inexpensive, at-home device – a product that can evaluate factors such as balance, heart rhythm, respiration and leg muscle activity in one place and provide guidance that can ideally prevent falls and injuries.

Nearly everything that Fadil presented at this year's 3MT came as a result of attending the monthly training sessions, and it was the most important thing that helped him earn first place, he remarked.

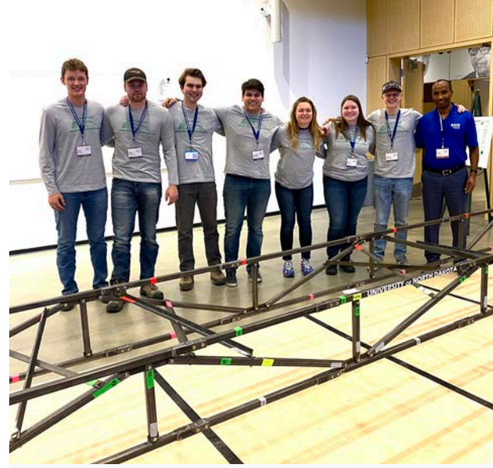
"I didn't miss a single one, and the comments from people such as Dr. Kim and all of the other trainers were very beneficial," Fadil continued. "They helped me refine my speech, and the idea of my slide came from those sessions. I learned a lot."

Shortly after hoisting the $500 check for a grip-and-grin photo, Fadil added his 3MT placement to his CV. With his eyes set on a career in academia, he considers the competition as a starting point for elevating his communication skillset.

Fadil said, "It's going to keep me motivated and learning every day, so when the day comes and I'm a professor, I'll be ready to provide a better education for future students."

(Excerpt)

Written by Connor Murphy | UND Today



UND PLACES THIRD IN STUDENT STEEL BRIDGE COMPETITION

Congratulations to the team of UND students who won third place at the 2022 Western Great Lakes Student Conference! Hosted by the ASCE Student Chapter at the University of Illinois at Urbana-Champaign, fourteen universities from across the Midwest United States and Southern Canada competed in the 2022 Western Great Lakes Student Conference in April.

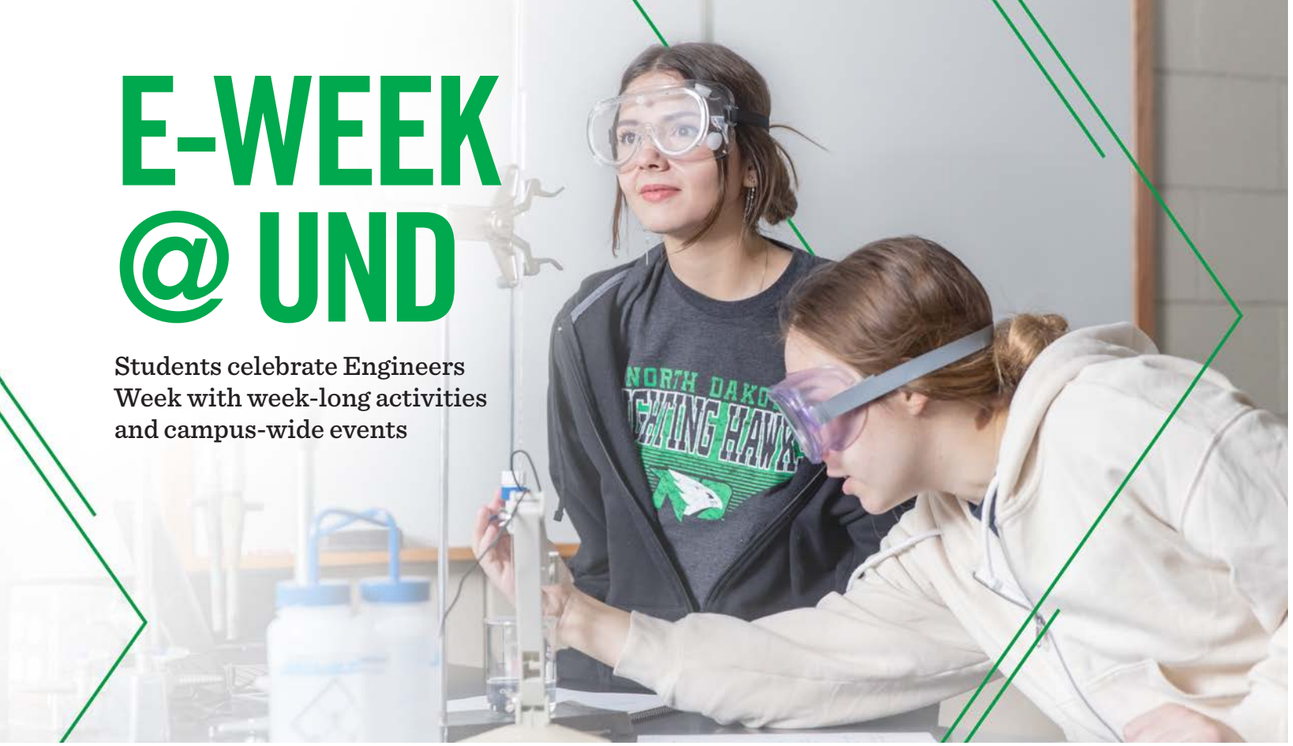
Placement Scores

Construction Speed - 2nd
Stiffness - 2nd
Structural Efficiency - 2nd
Lightness - 3rd
Aesthetics - 4th
Construction Economy - 4th
Overall - 3rd

About the Competition

The Student Steel Bridge Competition is an annual competition that challenges student teams to develop a scale-model steel bridge. The team must determine how to fabricate their bridge and then plan for an efficient assembly under timed construction at the competition. Bridges are then load tested and weighed. The bridge must span approximately 20 feet, carry 2,500 pounds, and must meet all other specifications of the competition rules. Bridge aesthetics are also judged and considered in the competition's final results.

E-WEEK @ UND



Students celebrate Engineers Week with week-long activities and campus-wide events

Thanks to their experience in uniting engineering-based interest groups and bringing students together, the Dean's Engineering Council, also known as the ECouncil, organized and hosted UND's E-Week - a celebration of the nationally recognized Engineers Week celebrated between February 20-26, 2022.

Founded by the National Society of Professional Engineers in 1951, Engineers Week is dedicated to ensuring a diverse and well-educated future engineering workforce by increasing understanding of and interest in engineering and technology careers.

While student organizations at UND have celebrated Engineers Week in previous years, a week-long schedule of activities hasn't been attempted — let alone feasible — in many years.

A STEM-filled event line-up

To kick off the week strong, the ECouncil designed a scavenger hunt throughout CEM's many interconnected buildings. Students followed hidden medallions, each marked with a QR code, giving students hints as to where the next medallion in the puzzle hid. Progressively, the clues became much more difficult with every step closer to the final medallion. Only a few students managed to locate the last medallion, hidden inconspicuously in Leonard Hall.

Tau Beta Pi, UND's engineering honor society, hosted a paper airplane competition in the Collaborative Energy Complex [1]. Whether using tried-and-true concepts or testing their unique self-made designs, students launched paper airplanes down the Lodoen Innovation Corridor. Meanwhile, the ECouncil managed a feedback booth during the day, encouraging students to give feedback on their college experience in exchange for a chance to win prizes [2].

During the middle of the week, UND's Formula SAE team hosted a racing simulator challenge [3]. In the FSAE shop located in Upson I, students lined up to compete for the fastest race and win prizes for the speediest three racers.

The UND Society of Women Engineers student chapter hosted multiple events, including "De-Stress Fest" and "Study Session Stavaganza," giving students the opportunity to network and collaborate with one another in team-building activities.

Celebrating community

The ECouncil ended the week on a high note during the E-Week Wrap-up Social. On Friday afternoon, students, faculty, and staff congregated in the Hamilton Atrium of the CEC to celebrate one another and conclude a week of pride in engineering education.

After handing out awards from the previous events, the ECouncil presented awards for best student organization and professor of the year on behalf of student body votes.

The Student Organization of the Year award was given to the UND American Institute of Chemical Engineers student chapter [4]. The ECouncil highlighted the student chapter's commitment to enhancing its members' lifelong professional development, providing a learning environment for academic and industrial knowledge, and providing ways for members to apply chemical engineering expertise in meeting societal needs.

The Professor of the Year award was given to SEECS instructor Dr. Tarek Elderini [5]. Presenting the award, the ECouncil noted that in December, Dr. Elderini put together the college's first BatSuBot competition, a robotic competition for students in Elderini's Intro to Robotics course that challenged his students' creativity and ingenuity while also having fun.


Steve martin, '89

HE DARES TO DREAM

Since he was a child, Steve Martin, '89, has dreamed of becoming many things: a mechanical engineer, an entrepreneur and a philanthropist to his community.

Thanks to a lot of hard work and his time at the University of North Dakota, Steve has achieved those dreams. As a member of the Turtle Mountain Band of Chippewa Indians with over 28 years of energy project experience, he now feels equipped to help Native American students at UND fulfill their dreams.

After becoming a mechanical engineer, Steve spent 11 years working for GE Energy in Central and Eastern Europe, developing and executing strategic plans for all GE Energy profit centers across 19 countries. In 2008, he pursued his dream of becoming an entrepreneur and co-founded KS Energy in Botswana and Nigeria, Africa, now one of the fastest-growing African energy companies on the continent.

In 2018, after more than two decades working and living in Africa, Steve had an idea.

"I wanted to help an Indigenous kid from North Dakota who had knowledge in engineering and lead them off the beaten path where they could experience the similarities and differences between cultures in Africa," he said.

Steve worked with UND's College of Engineering & Mines to establish a cultural exchange internship for three Native American engineering students. While they gained valuable career experience and were immersed in African culture, he covered their travel and living expenses.

Steve still mentors all three students and plans to continue the program to give unique opportunities to more Indigenous students. His biggest dream is to use his knowledge and resources to help students learn from a different perspective and encourage them to take chances throughout their career.

"When I'm gone, I want to be remembered as a leader who taught people to be open minded, dream big and make decisions that benefit communities and people," Steve said.

TO FETCH A PAIL OF WATER

AND A SCHOLARSHIP, INTERNSHIP AND JOB

UND civil engineering scholarship winners travel to Guatemala to help remote community get clean water

Hauling a heavy backpack up a steep and "jungle-y" mountain path in extreme heat and punishing torrential rains wasn't exactly a vacation. But then again, it technically was for then-sophomore UND civil engineering students Nicole Dolejs and Savana Schauer.

"We were very muddy at all times," Dolejs said. "There were a lot of wipeouts on that trip."

"And a lot of bruised butts," Schauer added with a laugh.

The students from Lakeville, Minn., and Mandan, N.D., respectively, were among a team of eight who spent their 2019-20 winter break in the remote Guatemalan village of Pambon.

They were part of UND's student chapter of Engineers Without Borders, and they were there to get to the bottom of why the children of the small village — population 500 — kept on getting sick. Both the locals and the future engineers suspected the drinking water was to blame, and they were right. But what no one knew going in was exactly what the scope of the $30,000 project would be.

"It wasn't super-defined when we started out because we hadn't been to the community yet," Dolejs said. "We didn't know what the people there wanted, what we'd be able to accomplish or what was even feasible. We just knew we were going to develop some type of sustainable, low-cost water treatment solution for them."

Community input

The proposed solution would come after long nights of sleeping on the concrete floor of the village school, and even longer days of hiking up and down the slippery slopes to conduct water quality tests at the village's three natural springs.

"One of the other big pieces we did in the community was we went to everyone's house and asked them a list of questions," Schauer said. "We wanted to get a better idea of what they wanted and not necessarily what we thought they should have."

And what the villagers wanted was not only easier access to clean and safe water, but also a place where they could gather to visit while making quick work of their laundry.

"There was a social aspect to it," Schauer explained.

That made even more sense when they learned just how much time the village women and children devoted to a resource and household chore so many Americans take for granted.

With the nearest transportation miles away from the village and no such thing as electricity or running water, every drop they used for cooking, cleaning and consumption had to be collected on foot and by bucket, pan or pop bottle.

And to make matters worse, the students discovered the best of the village's existing water storage tanks was 30 years old and had no working taps. This sometimes left the villagers to rely on the dribble of a single overflow pipe near the top of the reservoir. It was tedious and time-consuming.

"It was really a challenge and a major component of the woman's life in that village," Dolejs said. "The consensus was they spent most of their day going to collect water and then boiling it to clean it. A new system, at least, would make accessing the water easier."

Mission accomplished

For certain, the UND students had their work cut out for them. But, they had a rough plan. They would design and build a water treatment and storage system that would incorporate clothes-washing stations and two new chlorinating tanks at the far outreaches of the village — one at the top elevation and one at the bottom — so neither end would be at a disadvantage.

Data gathered and surveys complete, they returned to UND and immediately got the ball rolling. And when the pandemic threatened progress later that year, they pushed on. Unable to return to construct the project themselves, the team reached out to an international EWB branch to hire local contractors — and the contractors got the job done.

Meanwhile, back home, Schauer and Dolejs were getting a whole lot more done. With the technical knowledge and real-world experience they had gained at UND, they both landed internships with Grand Forks' Advanced Engineering and Environmental Services, or AE2S. They earned prestigious scholarships from the Associated General Contractors of North Dakota.

On top of that, they both signed on with AE2S for full-time jobs after graduation.

Following through

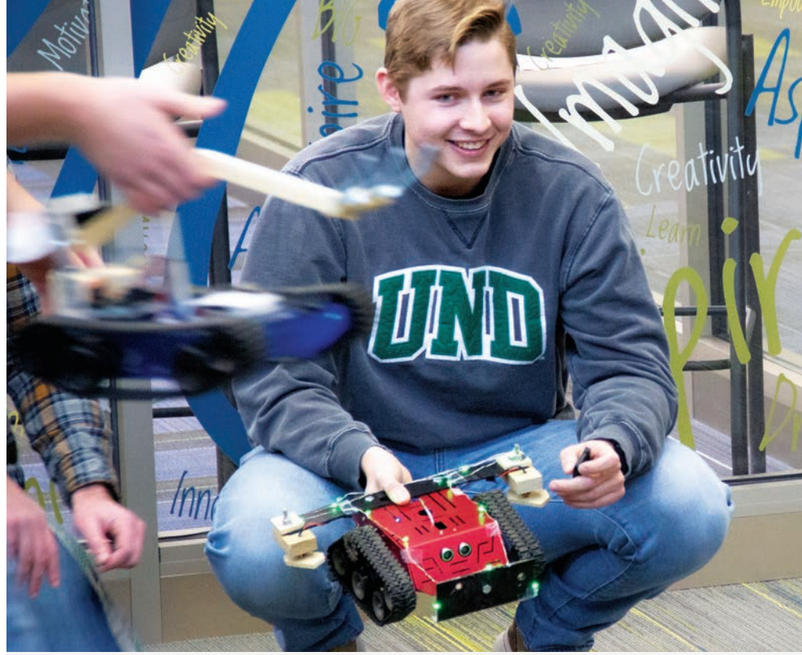
Now two years, dozens of pictures and countless Zoom sessions later, they're also looking forward to a possible return visit to Guatemala this winter to see their water system in action.

"It's been exciting to see everything and know it's actually happening," Schauer said.

Dolejs agreed. "Yeah, it feels really good to be part of something like this and see the impact good engineering can have on a community," she said. "While we were there, so many people told us, 'We really hope you guys are legit and for real. Others have come to help us, but we've never seen it happen.'

"It's going to be so cool to go back now and see it running. We were true to our word. We delivered what we promised."

Written by Janelle Vonasek



POWERING UP INTEREST IN ROBOTICS

A robotics competition excites and educates UND students about engineering

Sounds of encouraging cheers, metallic clashing, and revving electric motors filled the Collaborative Energy Complex (CEC) Hamilton Atrium during finals week.

Spectated by UND students, faculty, and staff, a small army of student-made robots battled it out during UND College of Engineering & Mines' first BatSuBot Competition.

What is "BatSuBot"? The naming is a blend of BattleBot and SumoBot, two similar types of competitive robotics tournaments with different guidelines.

The BatSuBot competition challenges students in Elderini's Introduction to Robotics course to design and build a robot that will force an opponent's robot out of the ring.

According to competition guidelines, "students can build robots equipped with numerous extra features to give them a competitive edge, as long as they do not inflict permanent damage to the opponent's robot."

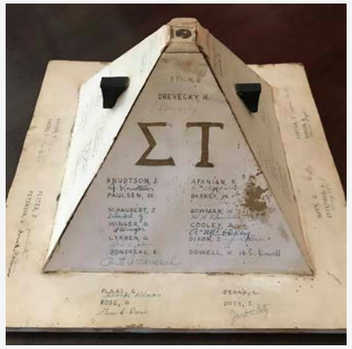
Led and organized by Dr. Tarek Elderini, an instructor in the School of Electrical Engineering & Computer Science (SEECS), the event marked the college's first class-organized robotics competition of its kind. Judging by students' genuine excitement and ambitious competitiveness demonstrated during the event, it won't be the last either.

From traditional metal frames to repurposed pizza boxes, every student-built robot showcased unique features to outperform their opponents.

"The concept of this event is to make the Introduction to Robotics class not only educational but also enjoyable and fun," says Elderini.

HATS OFF
TO OUR ALUMNI

Last year, we published an article about the brief history of Sigma Tau's iconic headwear. After distributing last year's magazine, we received many emails, letters, and stories from our alumni - all sharing stories of their own Sigma Tau hats. Thank you to everyone who's shared their photos and stories!



Ron Lehrer (BSChE'63)

"Not only did it have to support the piece of railroad rail, but it also had to support the person who signed the hat. Signatures have somewhat disappeared; however, still many memories on the hat."

Robert (Bob) J. Marttila (BSME'69)

"Above are pictures of my Sigma Tau hat and my class ring with the Sigma Tau inlay in the stone... The hat had to support any faculty or other Sigma Tau members if they wished to stand on it prior to signing their names. Those were good times in my memory."

UND WINS SECOND PLACE IN U.S. DEPARTMENT OF ENERGY'S 2022 GEOTHERMAL COLLEGIATE COMPETITION

UND team earns second place for their design of a combined heat and power geothermal system in North Dakota

On May 17, the U.S. Department of Energy (DOE) announced the winners of the 2022 Geothermal Collegiate Competition. This annual event prepares students to lead the next generation of geothermal energy development.

The University of North Dakota team earned second place and $5,000 for their design of a combined heat and power geothermal system for the city of New Town, North Dakota, located on the Fort Berthold Indian Reservation and home to the Mandan, Hidatsa, and Arikara (MHA) Nation. The team used extensive, pre-existing geological information from oil and gas exploration in the area to design a system that could heat and power an entire district, including potential for greenhouses and aquaculture efforts.

"Geothermal energy is a 24/7 source of renewable energy that has the potential to reliably power, heat, and cool millions of American homes," said Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy Kelly Speakes-Backman. "The Geothermal Collegiate Competition prepares students to scale up geothermal technologies in a way that prioritizes individual communities and their unique needs."

The Geothermal Collegiate Competition inspires students to consider new career opportunities, learn geothermal industry-relevant skills, and connect students to their communities. As part of the competition, students assumed the role of project developers, working with communities across the U.S. to identify local energy challenges and explore geothermal energy solutions. In addition to technical research, teams conducted an economic feasibility analysis, crafted a strategy for local stakeholder engagement, and created geothermal education modules in partnership with local schools.

"These teams presented incredibly complex systems and technical processes in innovative ways to a diverse set of stakeholders," said Elisabet Metcalfe, Stakeholder Engagement Lead with the Geothermal Technologies Office. "The results are impressive and inspiring; I can't wait to see how all of these students will continue to work with communities and contribute to our nation's geothermal story."

A MESSAGE TO OUR ALUMNI & FRIENDS

COMING SOON: CEM-FEST

Something exciting is happening on campus in May 2023: our first annual CEM-Fest! Stay tuned to our blog at **blogs.UND.edu/CEM** for upcoming announcements of this college-wide multi-day extravaganza. Featuring community engagement events, facility tours, the Senior Design Expo, and more, we're inviting all alumni, faculty, staff, students, and the community to celebrate our combined achievements, advancements in research, and tremendous opportunities ahead of us.

The old phrase "teamwork makes the dream work" is just another way we operate at the College of Engineering & Mines.

Collaboration is key. On campus, we're joining forces with other colleges to accomplish multi-disciplinary projects on a national scale. We're also creating partnerships with outside institutions to provide students with pathways to engineering degrees otherwise inaccessible. Working with industry leaders, we are equipping our graduates to fulfill the world's evolving needs.

Our collaboration with you - our alumni and friends - "makes the dream work" as well.

Students benefit from connecting with alumni during networking events or information sessions. The links between our students, alumni, and industry professionals create meaningful experiences, successful internships, and impactful opportunities.

Endowments, scholarships, and contributions to the CEM and departmental Annual Excellence Funds make a tremendous difference in what we do for our students. Our college is dependent upon your generosity and support for students, faculty and programming. Every year, gifts of all sizes impact the education and lives of our students.

You can make a gift at
UNDalumni.org/CEM
or contact Robin Turner

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