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ENGINEERING is published by the College of Engineering and Mines at the University of North Dakota. Please send comments and address changes to Deb Austreng at debra.austreng@UND.edu or call 701.777.4249.

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Hello Alumni and Friends,

It was an incredible honor to be named as the next Dean of the College of Engineering and Mines this past spring. I consider it a privilege to lead a college that does so many important things and holds such a special place in the hearts of so many people.

After serving as Interim Dean for a little less than a year, I thought I would be well prepared for this job. But of course I didn’t anticipate a pandemic would come along and completely change the face of higher education, perhaps permanently. But as universities around the world scrambled to adapt, I felt CEM was better positioned than most to deal with this situation. For that I have to thank those who helped to create and maintain our student-focused culture and those who had the foresight to invest in distance education some thirty years ago. More than anything else, those two factors allowed us to continue to serve our students in the best way possible despite the circumstances.

As you will read in the pages that follow, not even a pandemic could slow down CEM this year. Our students, faculty, staff, and alumni continued to do great things and make positive impacts on the University, the State, and the World in a number of ways. We certainly had challenges this year, but we faced them like engineers and scientists: by solving problems and finding creative solutions under a new set of constraints.

One effect the pandemic did have was to expose certain inequalities among our students. I was continually impressed by the resilience shown by our students, but I was also reminded how many students rely on resources available on campus—computer labs, internet access, employment opportunities, safe and affordable housing, etc. It is clear that some students have been disproportionally affected by the pandemic. This is why the UND Alumni Association and Foundation has created the “Open Door Scholarship” to help these students return to UND to finish their degrees. I hope you will consider joining me in making a contribution, which will be matched equally by funds from the UNDAAF and a generous CEM alum. To learn more, please contact our Director of Development, Robin Turner (Robin@undfoundation.org, 701-739-3211).

I hope you enjoy this year’s magazine. Best wishes and stay safe!

Brian Tande, Ph.D.
Dean | UND College of Engineering & Mines
A conversation between Brian Tande, dean of the UND College of Engineering & Mines, and Andy Armacost, incoming president of UND

BRIAN TANDE: So, the first question I have is just, what got you interested in engineering? What and what was it that led you to pursue an engineering degree?

ANDY ARMACOST: As a kid, I didn’t know that I had an engineering degree. In fact, I thought an engineer was somebody who drove tractors. But I was always a very curious kid, trying to figure things out and how things worked. And it turns out, I was really good at math too.

Those two things naturally, for many people, point in a certain direction. And engineering is one of those directions that people with that type of background might head.

It turned out that my father had an engineering undergraduate degree and two graduate degrees in a field called operations research, which is owned partially by engineers. It’s an interdisciplinary field. They deal with quantitative modeling. So that is my dad’s background. My brother went to college two years before I did, and he was a mechanical engineer.

And so, between the two of them, I said, “Wow, this engineering thing seems to pretty cool. Tell me more.” My dad asked me a bunch of questions, and after just observing me over time, he thought I should be an electrical engineer. Which is called whole-brain engineering. What it recognizes is that the analytic piece and the creative piece can work side by side to generate some really cool solutions. And at UND, we aspire to do the same thing – to really tie the sides of the brain together to create great engineering designs.

TANDE: (laughs) My dad’s engineering degree was in electrical engineering.

ARMACOST: Yes, it’s interesting. I think many of the attributes that engineers have translate really nicely to management and leadership roles.

But you’re right, what separates engineering systems from human systems is the element of human behavior and unpredictability. And so, often we go from a deterministic system – at least, many undergraduates feel it’s deterministic where your engineering has nice, clean answers; in practice, it’s not quite that way. But at least in the classroom, sometimes you solve a problem and you get the right answer.

But when you’re dealing with human systems, there are emotions, there’s unpredictability; there’s just this dynamic component that’s quite a bit different.

I think the background that engineers bring to those systems, if they’re willing to make that jump and recognize and be comfortable in that uncertainty, the things that engineering brings are essential to being successful in that environment.

What comes to mind are things like being able to plan effectively. Good engineers, I think, are excellent planners. They think through problems, and they can think through a logical step of steps to get from the beginning to the end.

They can take systems that are somewhat unstructured and put some structure around them. And so that, I think, serves leaders very, very well.

But there has to be this propensity to make the jump to the world of uncertainty.

I also think about comfort with data. In leading most organizations these days, when we talk about organizational performance, we often talk about the data or the metrics that we use to judge ourselves. So, being facile with data and being able to analyze data and interpret data, I think is an important component of leading and managing effectively.

But there’s also a downside to data as well. And I think engineers, if well trained, will understand that – that there are limitations to the models and the mathematics that we use in our engineering systems, and that understanding those shortcomings and the limitations, the assumptions that you put into the models, is really important as well.

Because as a leader, as a manager, you’ll be presented with a lot of data and models from people who work for you or work with you. You have to recognize: OK, what are the limitations of this approach? And I think engineers can do that very well.

So, there are a lot of experiences that engineers can capitalize upon, when they move into the world of leadership and management.

In terms of specific advice, I think it’s important for our young engineers, in companies or working at universities or whatever else, should really study the human element of their organizations. Don’t shy away from understanding good communications and good ways to articulate your great ideas.

And how do you sell those ideas? Furthermore, how do people respond to the incentives that you give them? So, paying attention to that early on, I think, is really important.

It’s fascinating, actually. I’ve got friends who have gone from the engineering and the physics world into the worlds of – believe it or not – sociology and psychology. It’s just been their natural progression, because the cause-and-effect-type work they do as engineers translates really nicely to experimentation on sociological systems and psychology.

So there’s really a great connection.

I think what really serves engineers well is there’s this natural curiosity to solve problems. Engineers are problem solvers. And so, stepping into a world where the problems are ill-defined and the responses from the human beings are unpredictable, actually make it something that’s really worth studying and really exciting – and in some ways, harder than engineering systems, just because of the unpredictability.

So I think that sense of hope, that sense of optimism, that sense of innovation that engineers have – I mean, think about it: if you have Capstone students who are struggling and repeating and failing, and failing, and persevering, those are the same types of characteristics that we need in our leaders and managers.

I think our engineers are in a great place to be in the world of leadership and management.

TANDE: Good. So, in terms of your approach to management and leadership, I’m curious how you’ve had to adjust things as you’ve gone from managing a small group of people to managing a large enterprise to now being president of the university.

What are the adjustments in the way that you operate, if there are any that stick out to you?

ARMACOST: Right. Considering the transition from small groups to bigger groups to bigger groups, the biggest thing is just the general
ARMACOST: That's wonderful. That's a great initiative. And you're right: building culture within an organization is a challenging step, but one that you can deliberately take steps to do. I know the College of Engineering & Mines is going to do a great job there.

TANDE: It's interesting. You don't really think of "culture" as a process, but like you said, there is a process that you can go through to define and reinforce a culture.

ARMACOST: And of course, process doesn't always yield the perfect outcomes, right? That's where leading humans is a fun art, that's for sure.

TANDE: Right. Now, of the aspects of management and leadership that you mentioned, which do you think are most important – especially in a time like this, during a crisis?

ARMACOST: So, there's probably a blend of process issues and then personal issues; and the personal issues, I think, are probably the most important at a time like this.

TANDE: I think a leader should have a calming and optimistic look for the organization – or in this case, for the campus – and really be open to share their ideas about how we're going to get from the tough times to the better times. That sense of optimism, I think, is really a key component.

ARMACOST: And we're going to get you there. We're all going to get there together, is the idea. Optimism, I think, is a real key to this.

TANDE: Good. Well, those were the main points that I wanted to hit. I really enjoyed your answers, and I appreciate your time!

ARMACOST: Anytime, Brian! Thank you!

TANDE: I'm looking forward to our being a part of that as well. Within the College of Engineering, we've been talking quite a bit about culture, and we've been having some interactions with our alums who work for large organizations that have gone through a culture shift or at least a process of defining what is the culture that they want to encourage within their organization.

We hope to bring some of those elements to the College of Engineering, and they've obviously aligned with what's going on at the university as a whole.

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ARMACOST: Anytime, Brian! Thank you!
CEM ACADEMY INDUCTION
HOMECOMING 2019

RETURNING CEM ALUMNI ACADEMY MEMBERS
Front Row: Mark Bittner, Lisa Barnes, Al Hopkins, Allen Nordhagen, Dale Hartz, Sherri Bonacci
Back Row: Gary Hartz, Mike Lodoen, Terry Severson, Everett Sondreal, Tom Hamilton, Tom Owens, Steve Burian, Dean Wieland

2019 CEM ALUMNI ACADEMY INDUCTEES
The College of Engineering & Mines welcomed three new alumni to the Alumni Academy: (left to right) Allan Hopkins, Allen Nordhagen, and Dale Hartz. They were honored at a luncheon and ceremony in October.

CEM ACADEMY INDUCTION: HOMECOMING 2019

DALE E. HARTZ
CLASS OF 1984

Dale Hartz and wife Kay with family and friends.

UND College of Engineering and Mines

ACADEMY
Dale E. Hartz

Birth: October 13, 1961, Cavalier, North Dakota
Education: University of North Dakota, B.S.M.E., 1984
Defense Acquisition University, Fort Belvoir, VA
Program Management, PMT461, 2010

Career Experience
32 Year Career - The Boeing Company, Seattle, WA
1984-1990 Materials and Process Engineer & Research Lab Lead, Advanced Tactical Fighter Program
1990-1992 Project Lead, Fusion Welding & Repair of Composites Program
1993-2001 Manager, F-22 Parts, Material and Process Technology
1997-2001 Mid-Level Manager, F-22 Air Vehicle Technology
2000-2006 Senior Level Manager, F-22 Deputy Air Vehicle
2006-2009 Executive Director, F-22 Air Vehicle
2009-2016 F-22 Chief Engineer & Director Avionics Modernization

Awards
Special Invention Award, 2 Patents recognized by Boeing out of the top 25 Inventions (1997)
Numerous Commendable/Outstanding Performance Awards - Development of Honeycomb Structure, Aluminum Tube Welding, Thermoplastic Fusion, Resin Transfer Molding of Sinewave Spars, F-22 Material Readiness Document

Recognition
Inventor of 5 US Patents, The Boeing Company
Selected to present R&D Project to Corporate Technical Advisory Council & Industry Leaders
Led the development of Bismaleimide Sandwich Structure - 2 Patents, Aircraft Weight Savings
Special Department of Air Force Recognition for F-22 Life Support System Investigation

UND College of Engineering and Mines
**W. Allan Hopkins**

**ACADEMY**

**W. Allan Hopkins**

*Born: December 2, 1938, Calgary, Alberta, Canada*

*Education: University of North Dakota, BSCE, 1962*

**Career Experience**

1988-1990 Vice President of Sales, Stelco, Inc.
1991-1992 Senior Vice President, Stelco, Inc.

**Corporate Boards of Directors (1990-2010)**

Aldora Steel Inc., Canada
Atlas Steel Inc., Canada
Citation Metals Corporation, USA
Copperweld Corporation, USA
Intermetco Limited, Canada
Novamerican Steel Inc., Canada
RaiLink, Canada
Stelco SA, Switzerland
Tiercon Industries Inc., Canada

**Industry Affiliations**

American Iron & Steel Institute
International Iron & Steel Institute
Specialty Steel Industry of North America
Steel Service Center Institute

**Volunteer Service**

Ontario Neurotrauma Foundation, Executive Committee
Canadian Paraplegic Association

**Achievements/Accomplishments**

Completed Initial Public Offering on the New York Stock Exchange – 2015 (NYSE: NSA)
Founder & President – The Nord Foundation (1996 – present)
Founder & Principal of more than a dozen real estate and investment companies in past years
Current Director – Axion Healthcare, Inc. and ALN Medical Management, Inc.
Current Trustee – Denver Seminary
Private Pilot

**Honors/Awards**

Ruling Elder – Parker Evangelical Presbyterian Church, Parker, Colorado
Past Moderator – Presbytery of the West, Evangelical Presbyterian Church
Harvard Business School – George F. Baker Scholar
National Merit Scholar
U.S. Presidential Scholar

*Born: October 24, 1956, Crosby, ND*

*Education: University of North Dakota, BSEE, 1978 *

**ACADEMY**

**Arlen D. Nordhagen**

*Born: October 24, 1956, Crosby, ND*

*Education: University of North Dakota, BSEE, 1978*

**Career Experience**

1978-1980 Process Engineer, DuPont Company, Wilmington, DE
1980-1981 Business Analyst, DuPont Company
1982-1982 Business Consultant, DuPont Company
1983-1985 Sr. Production Supervisor, DuPont Company
1985-1986 Product Manager, DuPont Company
1990-1993 V.P. Principal, American Business Advisors, Englewood, CO
1993-1999 Founder & CEO, Nord Capital Group, Lone Tree, CO
1999-2013 Co-Founder, CEO & Chairman, SecurCare Self Storage, Lone Tree, CO
2013-Present Founder, CEO & Chairman, National Storage Affiliates (NYSE: SNH), Greenwood Village, CO

**Achievements/Accomplishments**

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Harvard Business School – George F. Baker Scholar
National Merit Scholar
U.S. Presidential Scholar
HOMECOMING WEEK 2019

REUNITING IN THE ATRIUM

Tom and Carolyn Hamilton made a special visit to the College of Engineering & Mines during Homecoming Week. Faculty, staff and students welcomed Tom and Carolyn back to CEM at a reception in the Tom & Carolyn Hamilton Atrium. The Atrium, located in the Collaborative Energy Complex and named in recognition of the Hamilton’s generosity and support to the college, hosts a variety of events throughout the year.

ANDREA HANSON, BSChE ’02 RECEIVES YOUNG ALUMNI ACHIEVEMENT AWARD

Before receiving her Young Alumni Achievement Award, a reception was held in Chemical Engineering in Andrea’s honor. Hanson grew up in Lake Park, MN, and studied chemical engineering at UND. She was a member of Alpha Chi Omega, the Society of Women Engineers and the Student Alumni Association. Hanson also worked as a counselor at Space Camp in Alabama during the summers, which influenced her decision to pursue a Master’s degree and Ph.D. in Aerospace Engineering with an emphasis in Bioastronautics and Microgravity Sciences at the University of Colorado. After post-doc work at the University of Washington, Hanson landed her dream job with NASA.

Al & Claire Hopkins visit CEC IES Laboratory

After the Alumni Academy Induction & Luncheon, Al and Claire Hopkins along with family and friends took a special visit to the Al & Claire Hopkins IES Laboratory located in the CEC.

Al & Claire Hopkins Tour Collaborative Energy Complex’s Laboratories

Andrea Hanson works at NASA’s Johnson Space Center as Manager for the Central Nervous System/Behavioral Medicine/Sensory Motor Portfolio. Hanson is especially involved in the planning for a manned Mars mission. Up until a recent promotion, Hansen spent most of her time at NASA as part of the team implementing the exercise program for astronauts on the International Space Station.
Enrollment in UND’s College of Engineering and Mines is on the rise, as are cross-campus collaborations. Total headcount for CEM was 1,889 students in the fall 2019 semester. It eclipsed the aerospace school by about 100 students this year and is now the second largest college behind UND’s College of Arts and Science.

But dean Brian Tande says there’s still room to grow and collaborations to add.

The college is involved with many aspects of campus, said Tande, who took over leadership of the college following the departure of Hesham El-Rewini. Engineering students and faculty assist the aerospace school with UAS research and help the Energy and Environmental Center with energy-related projects.

Tande said he wants to continue to grow those collaborations. “Gone are the days where UND consisted of a bunch of silos, and now it’s all about collaboration,” he said.

That collaboration stretches beyond just working on research together and is now going into data science. “We’re trying to really raise the profile of data science at UND and within this region,” Tande said. “And we’re doing that with a conscious effort to include all parts of campus.”

Earlier this year former UND President Mark Kennedy announced that UND would be investing a total of $10 million over the next six years in the College of Engineering and Mines, specifically for a Computational Data Science Initiative. The initiative will be led by Ryan Adams, director of the School of Electrical Engineering and Computer Science at UND.

The money will supplement college resources to hire new computational scientists. The new hires are intended to bolster the university’s standing in future-facing technologies, such as artificial intelligence, machine learning and cyber studies, technologies vital to the state’s economic health.

The investment over six years is more than just salary and benefits for the scientists. Each will come with expertise and resources to apply computational expertise to research in all fields across campus as well as provide fertile ground for more post-docs, doctorates and funded research opportunities.

The college’s biomedical engineering department recently made a joint hire with the UND School of Medicine and Health Sciences to do bioinformatics, which includes data science applications. While Tande said he’s not an expert in the field, the hire does research related to machine learning and deep learning to try and detect cancer. The college also made a joint hire with the EERC.

“We’re trying to identify other areas where there’s a common need,” Tande said.

Experts in big data are needed now more than ever as computing and data continue to advance, Adams said.

“You can only go so far when you’re an expert in the medicine,” he said. “You can only go so far with the computing stuff on your own and often you need that support from an expert that really understands the computing.”

Adams notes that the concept of “big data” and computational science can be difficult for a lot of people to understand. But as the internet has become more and more vast, the amount of data available is endless, Adams said.

“We now have access to so much data, it’s very, very difficult to sift through it all. There’s just too much information to digest at one time. So, we go to trusted sources that give us data that … I can interpret.”

Ryan Adams | Director of SEECS

Adams likened the growth in data to the way a physician’s office works. A person goes to the doctor with an issue, the doctor runs a bunch of tests, or “data,” that all work together to provide a diagnosis.

Now, the physician’s office takes that data plus the data of hundreds or even thousands of patients to better interpret what the likelihood is of people developing certain diseases and what treatments are available and best suited to treat those patients.

That’s where data scientists and data experts step in, to help interpret that data to better inform doctors and the public. The same sentiment can be applied to countless other applications.

Adams said UND has the resources — with its number of colleges and schools, such as aerospace, medical and energy, active researchers and physical space — to bring data research into the fold and “contribute to the advancements throughout the country and the world.”

Written by Sydney Mook | Grand Forks Herald
November 5, 2019
The University of North Dakota will soon host the world’s largest – and only – full scale oil drilling and completion lab.

“This drilling and completion laboratory, when fully completed, will be a $40-million experimental facility that does not exist anywhere else in the world,” said Vamegh Rasouli, Continental Resources Distinguished Professor of Petroleum Engineering and department chair.

Petroleum engineering students will be able to simulate general drilling and deep drilling, along with testing different rocks, including shale. They will also be able to simulate oil reservoir conditions, including temperature, pressure and fluid flow. Doctoral students will be able to perform research that benefits the state of North Dakota.

“This is the only full-scale rig in the world, and it’s been used by industries worldwide for research,” Rasouli said.

After an agreement is signed, the rig will be housed inside the old Minnkota Power Plant building in Grand Forks, which has the height and space to accommodate the derrick.

Industry and other universities will be welcome to use the lab, Rasouli said, adding that the lab will also allow UND to apply for external research funding.

“For example, if a company wants to validate a bit-drilling mud designed to drill in a given formation, we can conduct real, full-scale drilling to confirm the designed rate of penetration,” Rasouli said. “There are so many applications. We can serve students, perform research and help industry.”

CONNECTIONS COUNT

The basic equipment was donated by Sidney Green, an entrepreneur, founder/president of Enhanced Production, Inc. in Salt Lake City, Utah, and a research professor at the University of Utah. Rasouli said that when Green retired from Schlumberger, the largest international oilfield services company, he acquired the equipment, which was the former TerraTek Drilling and Completions Laboratory. His intention was to find a new home to reestablish this unique research equipment.

Green said he considered a number of research universities, national laboratories, and international companies, but after visiting with Rasouli, he was convinced that the University of North Dakota was the right location.

“A lot of universities are disappointed they didn’t get this lab,” Rasouli said. The only problem was transporting it from Utah and finding somewhere large enough to install it. It cost about $100,000 to move the lab to North Dakota, Rasouli said, and the old Minnkota Power building is one of the few structures with the height to accommodate the derrick.

The new lab will join 10 existing labs in the department, including a smaller-scale automated drilling rig simulator, a “conventional” drilling simulator, slurry loop, multiphase flow and pipeline simulation lab, and a virtual reality lab.

“UND can do things no one else can,” Rasouli said. “We’re working to simulate horizontal drilling, simulate fluid movement into the rocks and its transportation to the surface. All our labs were built in the last three years, and we’re running out of space.”

STATE SUPPORT

The North Dakota Oil & Gas Research Council and the North Dakota Industrial Commission voted to approve $2.78 million in financial support over three years. Additional funds are expected from industry and governmental research to support students and laboratory development.

“Without the support of the Research Council and the Industrial Commission, as well as the UND Energy & Environmental Research Center, it would be very difficult to continue all our programs,” Rasouli said. “All of this support and encouragement is key.”

“Our mission is to educate hands-on and practical petroleum engineers who can work in the state’s oil and gas industry with a minimum of on-the-job training. We also perform practical research to help industry solve drilling problems, mainly in the Bakken.”

UND’s petroleum engineering program began in 2010 in response to demand for engineers in the Bakken Oil fields. A doctoral program began in 2016 to fill oil and gas research needs. UND’s Energy & Environmental Research Center, which houses the State Energy Research Center, supports many of the petroleum engineering students by offering graduate research assistantships, as well as hiring graduates.

Petroleum engineering graduates find jobs quickly, Rasouli said.

“We produce quality undergraduates, and companies want to hire UND students,” he said, adding that the department has formed an Industry Advisory Council, comprised of more than 25 companies, that comes to campus every semester for two days to help improve the program.

“The oil and gas industry wants to hire people from North Dakota,” Rasouli said. “Our education is hands-on and practical, and we appreciate the assistance from industry. Our problem is that we don’t have enough students to supply the Bakken. If you want to be a practical engineer, UND is the place to go.”

Written by Dima Williams | UND University Letter
SUROJIT GUPTA
Young Professional Award
American Ceramic Society

Surojit Gupta, associate professor of mechanical engineering at the University of North Dakota, has received the 2019 Du-Co Ceramics Young Professional Award from the American Ceramic Society.

Gupta is an active researcher in sustainable materials, high temperature ceramics and alloys, nanotechnology, additive, and green manufacturing. He teaches fundamental and applied courses related to materials science and engineering. He holds six patents and has published more than 53 technical papers, over 90 peer reviewed abstracts and/or contributed presentations, and one book chapter.

The Young Professional Award was established in honor of the late Reldon Cooper, co-founder of Du-Co Ceramics, to recognize a young professional member of the American Ceramic Society who demonstrates exceptional leadership and service. Gupta received an honorarium check, a certificate of recognition and lifetime membership in the Society.

FENG XIAO
Early Career Award
U.S. EPA STAR Program

UND Assistant Professor of Civil Engineering Feng “Frank” Xiao has been named one of only three researchers in the country to receive a highly competitive Early Career Award from the U.S. Environmental Protection Agency’s (EPA) STAR program to address a key national health-pollution issue.

The EPA, as part of its Science to Achieve Results, or STAR program, sought proposals to analyze and treat a class of contaminants called PFAS in the waste stream. PFAS (per- and polyfluoroalkyl) substances are a group of human-made chemicals that have been used for decades in many products including nonstick cookware, fast-food wrappers, stain-resistant sprays and certain types of firefighting foam.

Xiao joined the UND’s Civil Engineering Department in 2015. He earned bachelor’s and master’s degrees from Harbin Institute of Technology in China and a doctorate from the University of Minnesota, all in Civil/Environmental Engineering. This is his second federal award this year.

MARIE BERGELIN
3-Minute Thesis Competition
2nd Place Winner

On Jan. 29, UND graduate students condensed years of work into a three-minute talk at the fourth annual Three Minute Thesis competition, at the Gorecki Alumni Center. College of Engineering & Mines’ student Marie Bergelin, took second-place at the competition. Marie is a graduate student in Geology & Geological Engineering.

The Three Minute Thesis (3MT) is an international competition whose goal is improving graduate students’ ability to communicate the significance and value of their research to a non-specialist, public audience, in no more than three minutes.

NIDHAL BADROUCHI
Graduate Research Achievement Day
1st Place Winner

The Graduate Research Achievement Day (or GRAD, for short) is a one-day celebration of our graduate students’ work over the past academic year. Students presented their work in a poster format and were judged by faculty. Cash prizes were awarded to those students whose work and presentation were deemed best. This year, Petroleum Engineering Ph.D. student Nidhal Badrouchi came in first place with his presentation: “Evaluation of CO2 Enhanced Oil Recovery Potential in Bakken”.

2019 FACULTY BOOK PUBLICATIONS

AN INTRODUCTION TO COMRESSIBLE FLOW
Written by Forrest Ames
Professor, Mechanical Engineering

EARTH MATERIALS - COMPONENTS OF A DIVERSE PLANET
Written by Dexter Perkins
Professor, Geology & Geological Engineering

DESIGNING CONTROLS FOR THE PROCESS INDUSTRIES
Written by Wayne Seames
Chester Fritz Distinguished Professor
Several of them were enrolled in UND’s College of Engineering and Mines. Most of the students were freshmen and sophomores; the other major component of the tour took place in Theodore Roosevelt National Park. The park’s northern unit served as the group’s camping site for two nights before the members made a last-day foray into the southern portion.

In the park, which is close to North Dakota’s repository of dinosaur relics near Dickinson, N.D., the students hunted for fossils. Because the rocks and boulders that make up the region are soft clay, they cleave easily—without the need of special tools—sometimes to expose remnants of bygone eons.

“We did find some really cool fossilized leaves,” said Bergelin. “They were roughly 60 million years old. The students got very excited about that.”

Another thrilling moment had little to do with geological formations. It involved the park’s wildlife.

Saturday afternoon, the students hiked on a trail—until their single file came to a stop. At first, Budziszewski didn’t know why she was asked to keep quiet, turn around and climb up a knoll, which was still muddy and slippery from recent rains.

It turned out that two bison rested on the trail, blocking their path.

“That was exciting,” Budziszewski said.

GEOLOGISTS FOR THREE DAYS

CEM Geology graduate students organize trip to expose undergraduates to the discipline

Marie Bergelin wanted students to come to her office: the great outdoors.

“One of the things about being a geologist is that our office is outside most of the time, we get to go out and do field work,” said the Ph.D. candidate at the University of North Dakota’s Geology and Geological Engineering Department. “So, Bergelin, together with two peers, set out to organize a field trip to introduce undergraduate students to the world of geology.

The idea also stemmed from a troubling decline in the number of students keen on studying Earth’s physical shell and the processes that shape it. The fall in enrollment figures plagues many geoscience departments across the nation, Bergelin said.

“Hopefully, by showing the students what geology is all about, they’ll get excited about it and choose it as their major,” Bergelin said of the outcome she hoped to achieve with the trip.

NORTH DAKOTA UP CLOSE

For Sarah Budziszewski, a second-year student in composite science education from Karlstad, Minn., the outing—which initially lured her with its promise of camping—presented a trove of new information.

“We did tour a lot of oil production facilities in western North Dakota,” said Budziszewski. “And I didn’t know anything about how they work. I learned a lot about subjects that I had no idea about.”

The three-day tour began with a four-hour drive to Tioga, N.D., where the group of 10 visited Neset Consulting. That’s where North Dakota State Board of Higher Education member Kathy Neset, the company’s owner and president, gave the students an overview of the Bakken’s geology.

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The students, most of them freshmen and sophomores, also toured an oil extraction and production facility.

A stop at Neset Consulting in Tioga, N.D., offered a Bakken geology lesson by owner Kathy Neset.

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“That was exciting,” Budziszewski said.

A leaf imprint, about 60 million years old, preserved in layers of clay rocks.

Still, having received the grant in late August, Bergelin had only a few weeks to coordinate the trip with the University and market it to students, who needed to bring only a sleeping bag with them.

She aimed for 19 students; seven joined—still a good turnout, considering the short notice and the fact that the fall semester on campus teems with academic and social events.

Already planning a trip for next year, which the grant will cover, Bergelin hopes not only to attract more students to geology, but also to show what their “office” could be like if they decide to pursue a career in the field.

“When they’re out hiking or out in nature, or visiting new places, I want them to think of why Earth looks like it does,” Bergelin said.

And, why is the Grand Canyon where it is?

“If they’ve seen this trend of decreased interest,” Bergelin said, “So, they thought it was a really interesting project and wanted it to succeed. The commission helped by reaching out to a few people who helped us make this happen.”

Written by Dina Williams | UND Today

PLANNING STAGE

As exciting as the trip was, its organization was quite a feat. To secure funds for it, Bergelin crafted a grant proposal to the North Dakota Oil and Gas Research Council within the state’s Industrial Commission.

After three rounds of approvals, Bergelin received $5,300. The commission also helped arrange the tour.

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A NEW SOURCE OF SUPPLY
Currently, the U.S. imports 100 percent of rare earth elements, mostly from China. Finding domestic sources is a priority to ensure national security.

“This project has the potential for a commercial plant to be built using UND technology,” said Mann. “That will benefit the state, nation, and national defense, and it could make new energy technologies available, such as electric vehicles, wind turbines and solar cells.”

The project, now in its third phase, builds on previous awards.

A 2017 award of $2.75 million enabled researchers to scale up the lab, which was funded with a prior award. The goal was to produce a 2 percent concentrate of REE from lignite. Instead, researchers exceeded the goal and were able to produce a concentrate with 65 percent of rare earth elements and other critical materials, such as valuable germanium and gallium.

There will be more research as the technology advances.

“Right now, all the rare earths are combined into a mixed concentrate,” said Theaker. “They’re not yet refined. We want to get to a salable product, and we can do that with strong support from industry and the federal government.”

PILOT PLANT
The pilot plant, which will be located in Grand Forks County, will be able to process a quarter-ton of lignite per hour, yielding one to two tons per year of rare earth elements, said Mann.

The process, which is both patented and patent pending, is an environmentally friendly chemical extraction that leaves higher quality lignite behind.

“We mix coal in tanks with chemicals, filter the coal out, filter the solids, rinse and repeat,” said Mann of the proprietary process.

The Department of Energy is sponsoring approximately 80 percent of the $6.5 million award, with the remainder from partnerships with the North Dakota Lignite Energy Council and private industry, including North American Coal Corporation, Minnkota Power Cooperative, BNI Energy, Great River Energy, and Great Northern Properties.

“This technology creates a ‘value chain,’” said Mann. “It takes the lignite, extracts rare earth elements — which are of considerable value — and returns lignite that has higher value. Our goal is to commercialize the technology and get a company involved to build a facility in North Dakota. Our success will be measured by a plant that processes rare earth elements in the state.”

Written By Jan Orvik | UND Today

RARE EARTH PROJECT HAS NATIONAL SECURITY POTENTIAL

At one time, North Dakota’s lignite coal deposits were considered a liability because they didn’t burn “clean.” Today, they’re an asset that could lead to a new industry for North Dakota.

As the United States seeks a domestic source of rare earth elements – critical for everything from defense to cell phones – scientists at the UND Institute for Energy Studies believe they’ve found an efficient, environmentally friendly way to extract them from North Dakota lignite, which is particularly rich in rare earth elements.

The U.S. Department of Energy and other sponsors are investing $6.5 million to fund a pilot plant to test that technology.

“This project’s goal is to create domestic sources of rare earth elements,” said Mike Mann, executive director of the UND Institute for Energy Studies and one of the principal investigators of the project. “We want to build a plant in North Dakota that commercializes the technology and benefits UND, the state of North Dakota, and the nation.”

“Rare earth elements are not made equally,” said Nolan Theaker, research engineer with the Institute, which is part of the College of Engineering & Mines, and the project co-investigator. “North Dakota lignite has more than other coals, and we have an advantage, because it’s relatively easy to extract.”

The 17 rare earth elements are all metals, and “rare earth metals ... are used in many devices that people use every day such as computer memory, DVDs, rechargeable batteries, cell phones, catalytic converters, magnets, fluorescent lighting and much more,” Geology.com reports.

The elements “are not as ‘rare’ as their name implies,” the website continues. “However, these metals are very difficult to mine because it is unusual to find them in concentrations high enough for economical extraction.”

That’s why the days when lignite coal was sold at a discount because of its “impurities” are over. Today, those impurities add value. And as the rare earth elements are extracted, the lignite coal that’s left behind burns cleaner.

“We’ve developed a chemical process that leaves the lignite as a better fuel,” said Theaker. “Better coal fetches a premium price.”
UND students’ year-long project delivers mobility to children with developmental delays

To understand this story, one needs to know a few things about early childhood development. “There is a huge part of child development that is based on independent mobility and the child’s access to his or her environment,” said Alcira Bullinger, a physical therapist at the nonprofit Anne Carlsen Center in Grand Forks, N.D. “So many skills are dependent on children being able to explore safely and freely.”

Toddler cause and effect through their exploration, according to Bullinger. Independent mobility is a crucial cognitive stepping stone in childhood development. And that, Bullinger said, is why the work of a small team of UND students has the potential to change her team’s work in a big way.

Bullinger is a member of an early intervention team working with infants and toddlers to help transport and test its capabilities. Fortunately, according to Steinhauer, most projects are fabricated before Spring Break to allow for fine-tuning and more of a focus on writing and presenting before the end of the semester. Even so, some teams have had to make alternative arrangements for their projects’ completion. Due to the coronavirus removing students from campus, Eades completed the assembly’s finishing touches from her apartment and recruited her mom to help transport and test its capabilities.

“Our team was lucky to have our project able to be completed amidst this pandemic,” Eades said. “This was our whole year of work, in this design, and to see it all come together was pretty special.”

MEASONS TO BE PROUD

Now that the semester is finished, and the devices have been handed off to the Anne Carlsen Center, Eades has assured Bullinger and her team that she will be able to help show how the powered platforms are used, how they can be adjusted and what to do should problems arise.

The next-highest grad has made plans to stay at UND and pursue a master’s degree, which will let her keep working with the Center, should they need assistance.

Gunderson commented that she’s looking forward to seeing the results in action, as soon as they’ve able to start interacting in person once again.

“Like Alicia said, this device’s applications affect so many areas of development and open up a whole new world for these kids,” Gunderson said. “We’re just very excited to get started with them and provide support to families and their children.”

Bullinger already has an idea of how they will be implemented into a 12-week training period comprised of 60-minute sessions where kids learn how to explore using their newfound mobility. Overall, she is entirely pleased with the work done by Eades, Unruh and Merila.

“I hope that they are proud of their work, because we’re really happy,” she said. “I hope they’re proud of what they’ve done for the lives that they’re affecting.”

Written by Connor Murphey | UND Today
Press reported that students at several U.S. universities “are filing
“For years, it has been a huge part of what we do.”
we do here, so that even before the pandemic, roughly half of our coordinator — because it’s everybody. You know, it’s just part of what they’ve spent the semester designing. This year, the project is to build a quad copter — shown in a computer-aided design or CAD representation — using components made on a 3D printer. Students will submit files to be 3D printed at UND. Those files will then be mailed to each group member for assembly (along with some electronics to test out that part of the design), then forwarded to the next team member to add his or her components to the unmanned aerial vehicle. The final student will conduct the test flight.

LONG EXPERIENCE WITH DISTANCE LEARNING HELPS COLLEGE OF ENGINEERING & MINES SUCCEED

When COVID-19 pushed classes fully online, UND’s 31 years of training engineers remotely helped ensure a smooth transition.

Brian Tande paused. The dean of UND’s College of Engineering & Mines, he’d been asked: was there anyone else — an online program administrator, for example — whom a reporter who’s interested in UND’s distance engineering program should talk to? Then Tande laughed. “In the college? No, and I think that brings up a middle of the semester. But in our case, most of our faculty have had a lot of experience teaching remotely, and that has served them well.”

The College’s history with distance education stretches back to the 1980s, when a 3M manager proposed a UND engineering course for the company’s employees nationwide. The College said yes; and last year, on the occasion of the 30th anniversary of UND’s distance engineering program, UND Today chronicled the result.

A terrific anecdote from that article paints a picture of the program’s origin: “In the late 1980s, Arnie Johnson had a new nickname: Fuzzy Arnie. …

“(UND Professor) Johnson, who would also chair the Department of Electrical Engineering, taught the first ever distance-education class in engineering at UND, and ostensibly across the country.

“Lectures, led in empty auditoriums that resembled TV studios more than college classrooms, were promised." The lesson of the above is clear, Tande said. “But I really feel that we have been much better prepared than most. And as I mentioned, our faculty have had a lot of experience teaching remotely, and that has served them well.”

Several degrees can be earned entirely online. Others — such as chemical, civil and mechanical engineering — ask remote-learning students to come to campus for intensive, one- to two-week long lab experiences in the summer.

“Things are really going well this semester, even though the transition that has taken place over the past few months,” said Noa Lopez, a UND senior who’s pursuing a B.S. in mechanical engineering.

“I’m proud to say that UND has done such a top-tier job ensuring that the transition to online classes has been a smooth one. … UND is a gem, and I’m so glad I followed the advice of my mentors early on who suggested I receive my education from the University of North Dakota.”

Steven Tkach agreed. “The distance learning is absolutely great,” said Tkach, whose UND degree will be in civil engineering.

“The quality of education I am receiving online is the same as if I was sitting in a classroom. I would debate that online delivery in effectively teaching a subject is actually better than being in a classroom. I have the ability to pause, rewind, or fast forward a lecture to make sure I understand the subject matter.”

The lesson of the above is clear, Tande said. And if Tande were to address an audience of his fellow engineering deans, most of whom would be wondering how to succeed at distance learning, he’d sum that lesson up in four words: It can be done.

“We’ve definitely proven that,” he said. “Of course, the pressure is now on, because a lot of schools are learning that they can teach online, so we’re probably going to see more competition. But that just means we’ll need to be even more innovative — and we’ve proven we can do that, too.”

Written by Tom Dennis | UND Today
On February 28, Hamm received an honorary degree from UND in recognition of his standout career and his support for the University and its students. Just hours after he received an honorary doctorate, Harold Hamm sat down to visit with engineering students at a “fireside chat.”

College of Engineering & Mines Dean Brian Tande introduced Dr. Hamm, executive chairman and founder of Continental Resources, which was one of the first oil companies to initiate horizontal drilling in the Bakken. The Harold Hamm School of Geology and Geological Engineering is named after Hamm, who has also endowed two professorships—one each in petroleum geology and petroleum engineering—at UND.

Tande thanked Hamm for his generosity, then turned the program over to Hamm and the students.

“It’s good to be here,” said Hamm, who grew up in rural Oklahoma, worked in oil fields, and established Continental Resources in 1967 at the age of 21. “Anytime I come on campus, my favorite part is talking to students. I hope I inspire you a little bit. You inspire me a great deal. Being on campus is a treat for me. It reminds me of my schooling and training and spending 40 hours a week in an ‘ology’ lab.”

Hamm answered a variety of questions from students, most of whom thanked Hamm for his support of the School and its students.

**ON OIL FIELD EXPERIENCE**

Hamm emphasized that students need field experience.

“Learn as you go,” he said. “Field experience is really important. Later, when you’re in the office doing math, you’ll know what you’re doing. We have 300 people in the field, and are always needing more folks.”

**WHAT UND CAN DO**

UND turns out some really good people, Hamm said, adding that basic training is important.

“A degree in engineering means a lot, and field training makes you valuable. Get the basics down. We have some good geologists from UND working in Oklahoma.”

**ON “SOFT SKILLS” FOR ENGINEERS**

“Too many people hire for skill, not quality and character,” Hamm said. “We’re looking for people who are ethical and work hard. Quality of character means more to Continental than anything else. We run lean, and don’t hire more people than we need. We want them to learn the business and have loyalty. Do you love the industry? If not, you’re not the right person for us.” He added that his company tries to protect employees and avoid layoffs during down cycles.

**ON DOWNTIME**

When asked what he does for fun, Hamm said he likes to hunt and fish. He added that he enjoyed visiting with the students.

“It’s good to be here with you,” he said. “We’ve talked fun and serious stuff. It’s wonderful to be in the position we are.”

Excerpt: Hamm shares hard-won knowledge with UND students

Written by Jan Orvik | UND Today

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Honorary doctoral-degree recipient Harold Hamm visits campus and shares advice with UND’s engineering students.
MECHANICAL ENGINEERING STUDENTS POWER PROJECT TO DETECT PIPELINE LEAKS

Imagine a bright orange sensor, about the size of a golf ball, that can travel through pipelines and detect potential leaks and other problems.

Those “smart” golf ball sensors, called Pipers® and made by Ingu Solutions, are now a reality. They can be placed inside a pipeline and flow with the product stream.

Pipers®, now being used in the oil fields, are just one solution to North Dakota Gov. Doug Burgum’s 2017 challenge to the oil industry to find new ways to prevent pipeline leaks and protect the environment.

The UND Energy & Environmental Research Center (EERC), is leading an industry consortium, called Intelligent Pipeline Integrity Program (IPiPE), which is also working to develop new technologies to detect and prevent pipeline leaks.

The challenge is launching and receiving the Pipers® without stopping product flow and executing the design without any cutting or welding in the field or during fabrication.

That’s where UND mechanical engineering students come in. Four seniors were tasked to design a prototype launcher to deploy and retrieve Pipers®. The project is sponsored and supported by Hess Corp., which gave students a budget to order materials.

“Hess has a strong partnership with UND,” said Reuben Gates, a Hess Corp. employee who is overseeing the project and is also a UND alum with bachelor’s and master’s degrees in mechanical engineering. “We’ve worked with them on the IPiPE Consortium and with the UND Energy & Environmental Research Center. It made sense to keep it within UND’s sphere.”

It’s a big project, with big benefits for North Dakota and the oil industry.

“This is an important project,” said Gates. “It will minimize leaks, and it will make North Dakota a better place by minimizing leaks and protecting the environment. The challenge is the infrastructure.”

UP TO THE CHALLENGE

Challenge, indeed.

The problem is that Pipers® are so small – between 1.5 and 2.2 inches – that they’re hard to “catch” inside the pipeline.

The students designed a solution – much of which is proprietary – which was recently approved by Gates. Now they are working to build it.

“The design is there,” said Dominik Steinhauer, senior lecturer in mechanical engineering and instructor for the project. “I’m thoroughly impressed with this team.”

“If you can’t catch the Pipers®, you can’t read the data,” said Zach Reinholdt, a mechanical engineering senior from Williston, who designed a solar-operated sensor that will send a signal when it’s caught. “I really enjoyed figuring out a solution to the problem.”

TEAMWORK AND TECHNOLOGY

The key has been teamwork.

“This is a unique challenge from Hess and a good opportunity,” said Noe’ Lopez III, a distance mechanical engineering senior from Houston. “Everybody contributes. This team gelled very well, and there is no other feeling in the world than when you have a strong team.”

Lopez added that technology have helped him and fellow distance mechanical engineering senior Karen Rodig, from Glenrock, Wyo., feel as though they’re right on campus.

“It is a good experience,” said Redig, who works full-time at a privately owned oil company. “The team meets a lot, and once a month meetings turn into two hours. I enjoy working with everyone and getting to know them.”

Now that the design is approved, Riley Monson, a mechanical engineering senior from Bottineau, N.D., is looking forward to building the launcher and receiver prototypes, which will be transported on a test stand he designed along with a pump and water tank.

“This has been a huge learning experience,” Monson said. “We kept in touch with texts, Zoom meetings, and share ideas. I’ve enjoyed learning more about oil and gas.”

SOLVING REAL-WORLD PROBLEMS

“The students have not only gotten the opportunity to work through the design cycle of a product, but also to collaborate with working professionals on a project that can impact public safety and the environment,” said Anjali Sandip, senior mechanical engineering lecturer and a faculty advisor for the project. “The skills acquired by the students would place them in a highly competitive position in the job market.”

“This senior design project provides students with a very challenging real-world problem,” said Cai Xia Yang, assistant professor of mechanical engineering and a faculty advisor. “They learned totally new technologies from Reuben Gates at Hess and Brad Stevens at EEERC, and they came up with new ideas. I can’t wait to see the prototype.”

“Projects like this help students get a taste of the real world,” said Steinhauer. “It’s good, practical, hands-on experience that lets them apply all they’ve learned. Reuben and Hess have been amazing to work with.”

“Although Karen and I are working at a distance, we feel right there,” said Lopez. “Hess has given me an opportunity to better ourselves as project professionals. My favorite part of this project has been the team collaboration and innovating a new concept to help keep North Dakota’s environment clean.”

Even though all students are now meeting remotely because of the COVID-19 pandemic, the work continues.

“It’s been fantastic working with the students,” said Gates. “We’re working on something that can make North Dakota even better.”

Written by Jan Orvik | UND Today
This spring, CEM hosted the annual ceremony virtually through Zoom and Facebook Live. With 78 students participating remotely, the ceremony reached over 700 viewers.

“It will also be your responsibility to pass on the skills you have acquired to those coming along after you. You will have mentors in the workplace, and with time you will give back by mentoring others. I have found it very rewarding to give back to others through mentoring. Promote STEM programs where possible, encourage the next generations of engineers and promote UND where possible.”

LISA BARNES
ADDRESS TO THE CLASS OF SPRING 2020
CEM EXECUTIVE BOARD MEMBER, UND ALUMNI ASSOCIATION FOUNDATION BOARD MEMBER, CEM EE ALUMNAE, RETIRED EXECUTIVE, HONEYWELL
ON THE ROAD

BOEING PRODUCTION FACILITY, EVERETT, WA.
Representatives from UND CEM, JDOSAS and UND AAF tour facility.

COLLINS AEROSPACE, CEDAR RAPIDS, IA
Ryan Adams & Will Semina view flight simulators.

IN MEMORY OF
LARRY JODSAAS

It is with our deepest sympathy that we announce the passing of Larry Jodsaas, BSEE’62, 2003 Alumni Hall of Fame Inductee and generous benefactor and friend to the College of Engineering & Mines. Larry lost his battle with Alzheimer’s on April 27, 2020 in the peacefulness of his Summit Hill home in Saint Paul, Minnesota. He was born May 11, 1935 in Lisbon, ND. He completed his Bachelor of Science degree in Electrical Engineering from the University of North Dakota in 1962. That same year, Larry began his career at Control Data with an engineering position. During his 25 years there, he discovered he liked managing electrical engineers better than being one himself and became the Senior Vice President of Quality and Operations Effectiveness. In 1988 Larry became President and CEO of VTC, Inc., a subsidiary company of Control Data, and two years later, he purchased VTC from Control Data for $1 plus its added financial encumbrance.

In 2008 Larry received the UND Alumni Association Sioux Award. Through his very generous gift to the UND College of Engineering & Mines, opened the Jodsaas Center for Engineering Leadership and Entrepreneurship that same fall. The interior design and décor of the Center reflects Larry’s passion for boating. A 2012 Yachts International article describes in detail Larry’s 102 ft. custom momentous exhibitioner, and quotes Larry, “I want to be able to go anywhere in the world, and to stay any length of time, in any port.”

AGC SCHOLARSHIP AWARDS

The Associated General Contractors of North Dakota team, Russell Hanson, Dan Swingen and Paul Dietrich, were on campus to present 2019 scholarships to Tyler Vonasek (Walt Swingen Scholarship), Raphael Schill (John Jardine Scholarship), and Aaron Kermeitz (Don Lindberg Scholarship). Congratulations to the recipients and thank you to AGC! The AGC awarded the first John Jardine Scholarship in 1964 and the Walt Swingen scholarship in 1988. Both are full-tuition scholarships.

BOEING PRODUCTION FACILITY, EVERETT, WA.
Representatives from UND CEM, JDOSAS and UND AAF tour facility.

COLLINS AEROSPACE, CEDAR RAPIDS, IA
Thank you to our hosts: Paul Heyd EE’95, Corri Block EE’03, James Jamrud EE’08, Kevin Kovar EE’97, and Nikki Heyd Geography ’95 (not pictured).

PHOENIX, AZ CEM ALUMNI SOCIAL
Pictured are Lisa Barnes EE’88, Jody Lindbo ME’00, Al Larson Geology ’88.

MUSEUM OF FLIGHT, SEATTLE ALUMNI SOCIAL 2019
(Left to right) Carol Orr, Curtis Orr EE’53, Andrea Dickason ME’11, Brian Tande, Deb Austreng, Ryan Adams, Rick Carter ME’77.

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IN MEMORY OF
LARRY JODSAAS

It is with our deepest sympathy that we announce the passing of Larry Jodsaas, BSEE’62, 2003 Alumni Hall of Fame Inductee and generous benefactor and friend to the College of Engineering & Mines. Larry lost his battle with Alzheimer’s on April 27, 2020 in the peacefulness of his Summit Hill home in Saint Paul, Minnesota. He was born May 11, 1935 in Lisbon, ND. He completed his Bachelor of Science degree in Electrical Engineering from the University of North Dakota in 1962. That same year, Larry began his career at Control Data with an engineering position. During his 25 years there, he discovered he liked managing electrical engineers better than being one himself and became the Senior Vice President of Quality and Operations Effectiveness. In 1988 Larry became President and CEO of VTC, Inc., a subsidiary company of Control Data, and two years later, he purchased VTC from Control Data for $1 plus its added financial encumbrance.

In 2008 Larry received the UND Alumni Association Sioux Award. Through his very generous gift to the UND College of Engineering & Mines, opened the Jodsaas Center for Engineering Leadership and Entrepreneurship that same fall. The interior design and décor of the Center reflects Larry’s passion for boating. A 2012 Yachts International article describes in detail Larry’s 102 ft. custom momentous exhibitioner, and quotes Larry, “I want to be able to go anywhere in the world, and to stay any length of time, in any port.”
2020 FOUNDERS DAY AWARDS

THE UND FOUNDATION/B.C. GAMBLE FACULTY AWARD FOR EXCELLENCE IN TEACHING, RESEARCH OR CREATIVE ACTIVITY & SERVICE
Awarded to Michael Mann, Chester Fritz Distinguished Professor & Executive Director, IES

UND FOUNDATION/McDERMOTT FACULTY AWARD FOR EXCELLENCE IN UNDERGRADUATE TEACHING
Awarded to Dexter Perkins, Professor, Geology & Geological Engineering

HONORED RETIREEs
George Bibel | Professor, Mechanical Engineering
Philip Gerla | Associate Professor, Geology & Geological Engineering
Janet Honek | Student Academic Advisor, College of Engineering & Mines
Sukhvash Jerath | Professor, Civil Engineering

DR. JOEL NESS
Assistant Professor | SSSC

DR. HOSSEIN SALEHFAR
Professor | SEECS

DEPARTMENTAL EXCELLENCE IN RESEARCH AWARD
Awarded to the Department of Chemical Engineering

25-YEAR HONOREES
In 2013, he began to feel restless, trapped in an industry for which he found little enthusiasm. He shifted gears, earned a computer-aided design degree from a local technical college and started a job at a construction company that devises solutions for concrete walls. “I can walk around Seattle and see a building I worked on, see the details I worked on,” he said. “How much cooler would it be if it was something that I actually decided rather than something I took off from someone else’s work?”

But there were no local universities where Blades could study and work at the same time. UND’s accredited distance engineering program, which recently marked its 30th year, offered what Blades sought — quality, flexibility and engagement.

Pursuing civil engineering online, however, is no small feat. After he leaves his cubicle at 3 in the afternoon, Blades spends hours doing homework. Amid work obligations and family duties, he grinds through classes such as calculus, differential equations and fluid mechanics. These are subjects that once intimidated him. But his efforts are paying off, backed with the support he needs professionally and academically.

“You are not going to find [these classes] online anywhere else, you are not going to find them accredited anywhere else,” Blades said. “UND made such an effort to put infrastructure in place. There is a resource for everything. There is someone you can ask. I find people that are so helpful.” Balancing a couple of classes into his routine each semester, Blades plans to graduate in about two or three years.

“Finishing this degree should be a life-transforming event,” he said. It would also be a step toward what he hopes to be his own engineering wonder: a skyscraper in downtown Seattle.

For more Leaders in Action stories like these, visit und.edu/leaders.

The pyramids in Egypt. Stonehenge in Britain. Roman bridges. The Great Wall of China. These everlasting architectural and engineering wonders fascinate Brendan Blades. It’s a fitting allure for him, one that marries his long love of history with his more recent interest in engineering.

Blades holds a bachelor’s degree in history, which was supposed to lead to a career in education. Today, however, it kindles his passion for civil engineering, which he is studying online at the University of North Dakota. “I enjoy reading about how different cultures practiced engineering in the past, practiced architecture,” said Blades. “Civil engineering is a chance to meld that passion with something more practical.”

It is also a chance for Blades to follow a calling that took years to crystallize. Blades’ undergraduate education took him from his native Seattle to Arizona and later to northern Mongolia with the Peace Corps. In a village with no running water and intermittent electricity, where temperatures dropped to 40 below zero Fahrenheit in winter, he taught English for two years. It was a time of little physical comfort but tremendous intellectual and emotional reward. It was a time of simple living and communal bonding.

“There is a saying that Peace Corps volunteers have,” Blades said. “They say that you get a lot more from the culture you serve than you can ever give them.” Teaching, though, proved to be a poor fit for him. So, upon returning to the West Coast, Blades leaped into the restaurant business for five years.

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When Colin Sabie – fresh out of high school – first arrived at the University of North Dakota a decade ago, he felt unready for college. “I didn’t declare a major. I didn’t put the work that I should have put into classes, and I didn’t do well,” said the Minneapolis native. “I knew that I was capable of getting decent grades, and I wasn’t doing that.”

Sabie spent three semesters on campus “spinning his wheels,” he said, before leaving the classroom for the U.S. Army. He thought the military would provide the structure and direction he was seeking. And he was right.

For the next six years, Sabie served as an Unmanned Aerial Vehicle (UAV) mechanic, stationed in New York and deployed twice, once to Afghanistan and the other time to Iraq. “I spent a lot of time doing maintenance,” Sabie said. “On the specific type of UAVs I worked on, there were a lot of very small spaces that I had to get my hands into in order to test a component or replace a component or fix something. And a lot of the setup seemed very counterintuitive to me.”

So, instead of pursuing a career in the military, Sabie decided to go deeper into his craft. He sought to understand the reasons behind the design oddities that had caused him so much frustration in the field. Coming back to UND was an easy choice. He knew the University had quality programs at affordable tuition rates. Mechanical engineering was the degree Sabie wanted to pursue.

As a veteran with GI Bill benefits, Sabie found enrolling back in classes to be effortless, thanks to the support of the Admissions Office and the Office of Veteran & Military Services.

“When I first got here, it was a struggle,” Sabie said. “I got a lot of help from people. And when I was given the chance to tutor, that was my chance to do the same for someone else. I know it can be hard for some people who, like me, might not have a traditional way of understanding things because I’ve taken a seven-year break from school.”

Although it took him that long to find his calling in mechanical engineering, a span that included leaving college and serving his country, Sabie does not regret the journey. “If I had to do it all over again, including picking a school and a major, I would do exactly the same thing,” he said. Next on his mind is a master’s degree from UND.

Returning to UND was one thing. But adjusting to student life – despite Sabie’s determination to succeed at his second try in Higher education – came with its challenges. Some classes were hard. Physics was one of them – mostly because it heavily relied on calculus. Seven years after taking calculus in high school, “I was back doing this very hard math again,” Sabie said. “A lot of my skills … I mean, they were rusty, to put it lightly. The course moved very fast and I had to do a lot of catching up.” But he succeeded. He asked professors for help. He got some math tutoring. And in the end, he earned a pretty good grade.

Today, Sabie is a junior, tackling courses with intimidating titles such as finite element analysis, differential equations, materials science and intermediate thermodynamics. He is also a math tutor.

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The past few months have been nothing short of immense change in our everyday lives. We find ourselves in a completely different world than the last time the UND College of Engineering & Mines magazine landed in your mailbox. The coronavirus pandemic has impacted all of us in ways we never could have imagined. While we are unable to be near many of you, there are two facts that continue to unite us: we love the university and we are inspired by you, our alumni and friends.

In light of the pandemic, support for our students is critical now more than ever. The CEM Annual Excellence Fund is an important resource for the college in supporting our outstanding students. I encourage you to consider a gift to the Annual Excellence Fund. Together, we can all make a difference in the lives of our outstanding students.

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The Annual Excellence Fund makes a tremendous difference for everything we do for our students. Our students’ experience is dependent upon your generosity and support of our students, faculty and programming.

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A MESSAGE TO OUR ALUMNI & FRIENDS

HONOR DR. TOM OWENS AND DOUBLE THE IMPACT
A donor has provided a dollar for dollar match of up to $250,000 through Dec 31, 2020, that will elevate the Thomas C. Owens Endowed Chair of Chemical Engineering to the next level.

ADVANCE TOM’S GOOD WORK
Take this opportunity to honor Dr. Tom Owens, longtime faculty and leader in UND’s College of Engineering & Mines, and ensure a position for high caliber faculty. Many have reaped the benefits of Tom’s passion for education. Today, we are calling on those who have been touched by Tom’s unprecedented service to take up this match challenge. Time is of the essence. Will you help us secure the funds and advance the good work Tom started? Your gift today will make a difference for tomorrow’s engineers.

DR. THOMAS C. OWENS
Dr. Tom Owens taught at the University of North Dakota College of Engineering & Mines for 33 years, serving as a department chair in Chemical Engineering for 23 years from 1974 to 2000. He also served as the interim dean of the College intermittently from 1988 to 2001. In addition to being an outstanding teacher, Tom developed strong relationships with students and went out of his way to help them achieve success. Tom retired in 2001, but his enthusiasm for excellence continues on through the Thomas C. Owens Endowed Chair of Chemical Engineering.

THE ENDOWED CHAIR IMPACT
As leading scholars in their fields, endowed chairs are influential thought leaders whose expertise and leadership draw top-notch faculty and students. Their influence has a lasting effect on learning inside and outside the classroom. Endowed chairs secure research grants and private support, bring in national conferences, and foster media attention and partnerships. This is one of the few endowed chair positions at the University of North Dakota.

TO MAKE A GIFT OR GET MORE INFO:
Robin Turner, ’89
Director of Development,
College of Engineering & Mines
701.777.1428
robin@UNDfoundation.org

Use this QR code or visit UNDalumni.org/owens

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“Things are really going well this semester even through the transition that has taken place over the past few months. I’m proud to say that UND has done such a top tier job ensuring that the transition to online classes has been a smooth one. Additionally, the CEM faculty’s assistance and guidance have proven to be resilient during these times. UND is a gem, and I’m so glad I followed the advice of my mentors early on who suggested I receive my education from the University of North Dakota. It has been a wonderful decision and I intend to give back to the University who made it all possible. I’m proud to be a part of the UND tradition and will continue to represent the University with professionalism and excellence.”

NOÉ LOPEZ | B.S. MECHANICAL ENGINEERING

“I am thoroughly impressed with the professors that I have had at UND. The distance learning is absolutely great. Everybody that I have interacted with (advisors, professors, and others) in pursuit of my degree has been awesome. When I began my online degree with UND I quickly learned that the quality of education I am receiving online is the same as if I was sitting in a classroom. I would debate that online delivery in effectively teaching a subject is actually better than being in a classroom. I have the ability to pause, rewind, or fast forward a lecture to make sure I understand the subject matter.”

STEVEN TKACH, P.E. | B.S. CIVIL ENGINEERING