

UND ENGINEERING

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BIG DATA: THE NEXT BIG THING

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DEAN EL-REWINI'S FINAL REPORT

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AFTER 30 YEARS, STILL PIONEERS

page 28

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WHAT WILL
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Mechanical Engineering | Petroleum Engineering | Unmanned Aerial Systems | Energy Engineering | Cybersecurity | Data Science | Electrical Engineering | Environmental Engineering | Geological Engineering | Systems Engineering | Biomedical Engineering | Chemical Engineering | Computer Science | Civil Engineering

UND ENGINEERING

Chemical. Civil. Computer Science. Electrical. Geology. Geological. Mechanical. Petroleum.

DEAN
Hesham El-Rewini
College of Engineering & Mines

EDITOR
Deb Austreng
Director of Alumni, Corporate,
& Public Relations

CONTRIBUTING WRITERS
Deb Austreng
David Dodd
Connor Murphy
Jan Orvik
Juan Miguel Pedraza
Milo Smith
Dima Williams

PHOTOGRAPHY
Deb Austreng
Jordan Eberhardt
IT Specialist
Paige Prekker
Graphic Design Intern
Ali Senger
Marketing & PR Intern

GRAPHIC DESIGNER
Paige Prekker

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Featured on the front cover is Babcock Hall, photographed by Paige Prekker.

MESSAGE FROM THE DEAN



“THANK YOU,
NORTH
DAKOTA!”

“Only in Grand Forks.” My kids have heard this phrase over and over since we moved here from Dallas, Texas in 2008. At the time, they were still unsure of life here, in this town so far and, seemingly, so different from the one we’d left behind. To try and help them with the transition, Sherine and I began pointing out good things that would probably be difficult to find elsewhere. It all started out in fairly trivial fashion:

Can’t sled in the snow like this in Dallas!
Have you ever seen such a blue sky?
And so on...

Each time, we’d end the comment by saying, “Only in Grand Forks!” Over time, though, we found that there really *is* something deeper—beyond just the weather—about the people, opportunities, and experiences here that is unique, but so ubiquitous that we often forget about it. So, even though the kids got past the transitional period long ago, we still find ourselves repeating the old maxim. It’s a frame of mind that constantly reminds all of us how lucky and privileged we have been in ending up with this community that is so unbelievably kind, hardworking, and generous. Over the past eleven years, our collection of “Only in Grand Forks” moments has grown enormously, as has our love for this city, this state, and this university. I’m sincerely grateful to the many wonderful people who have warmly embraced, encouraged, and supported me and my family. For all of them, we will always be in debt.

It has been one heck of a journey, and I’d like to take this opportunity to thank our College’s incredible faculty, staff, and students and express my immense pride in the work we have all achieved together. The College has seen unprecedented growth (see my final report on pages 17-26) that truly would have been impossible without the hard work and dedication of these incredible people in this incredible place. Of course, the support of alumni and friends, the state, and the College’s Executive Board was also crucial to our collective success. I am truly thankful for all of you.

Finally, I’d also like to congratulate my colleague and dear friend Brian Tande for his appointment as interim dean of the College. Brian is a talented and visionary leader, and I am confident that he will competently lead our very capable faculty and staff to more success and a brighter future.

I will always be grateful to the State Board of Higher Education and to UND for giving me the opportunity to spend eleven amazing years in this special place. I leave the University with countless fond memories and a sense of great optimism about the future.

Until we meet again,

Hesham El-Rewini, Ph.D., P.E.

Dean and Professor

LETTER FROM THE CEM’S EXECUTIVE BOARD



TERRY SEVERSON
BOARD CHAIRMAN

The CEM Executive Board is now in its seventh year of operation supporting Dean Hesham El-Rewini and the UND College of Engineering and Mines. We continue to meet semiannually—at UND during Homecoming and most recently in Bloomington, MN in April. We continue our support activities throughout the year through the Board’s four operating committees—Student Experience, College Relations, Research Promotion, and Resource Development—usually via periodic teleconferences and email among committee members and CEM faculty and staff. Our objective is to stay continuously engaged with the Dean, faculty, staff, and student leaders to provide real value to CEM.

This past year the board welcomed new members: Dean Anagnost (KLJ Engineering), Jacquelyn Crowhurst (Microsoft), Fred Schiller (3M), and Kristin McKenzie (DigiKey). Jacquelyn and Kristin are our first two Computer Science alumni to join the Board since Computer Science returned to CEM.

The Board has been and will continue to be fully engaged supporting the leadership transition from Dean El-Rewini to Interim Dean Brian Tande, and to Dr. Ryan Adams, director of the



STEVE BURIAN
BOARD VICE CHAIRMAN

newly established School of Electrical Engineering and Computer Science (SEECs), as well all the other CEM departments and initiatives. The theme of our recent spring meeting was CEM transition and future as we had sessions with all three of these leaders hearing and discussing their perspectives, thoughts, initiatives, and recommendations for CEM. It promises to be as interesting and rewarding for Board members going forward with CEM as it has been the last seven years. We’ve been privileged to see and support the very impressive growth record of CEM both in size and positive impact on UND and the state of North Dakota. There’s tremendous positive momentum in CEM that’s poised to continue. The “next big thing” for CEM is the combination of the Babcock Hall renovation, SEECs standup, and the Big Data investment. Engineering Distance Learning, now celebrating its 30th anniversary, is becoming an even more vital element of CEM. Few of us alumni realized that CEM was the vanguard in that discipline and is continuing to lead the way in the U.S. All of that, plus the other departments’ continuing strong engineering education and research programs, point to an active CEM in the future.

A LETTER FROM THE INTERIM DEAN PREPARING ENGINEERS FOR A DATA-DRIVEN WORLD



BRIAN TANDE
INTERIM DEAN

It is an honor to serve the College of Engineering and Mines as its Interim Dean. Dean El-Rewini's time here has been nothing short of transformative (see his final report on pages 17-26), and I know that our faculty, staff and students join me in thanking Hesham for all he has done for CEM and UND these past eleven years.

Perhaps one of Hesham's greatest legacies will be that he leaves us very well-positioned to tackle future challenges, particularly in the area of data science. The world has become inundated with data and it is increasingly important that today's scientists and engineers know how to use and make sense of that data. In response, the College of Engineering and Mines has launched several new programs and initiatives to help our students and the industries we serve thrive in our data-driven world. For example, last year we formed the new School of Electrical Engineering and Computer Science (SEECs), which will be the center of our activities in this area. However, our efforts will significantly benefit every department and degree program in the college.

SEECs now offers new programs in data science and cybersecurity, both at the undergraduate and graduate levels. These will eventually include undergraduate minors that students from other disciplines can couple with their degree. For example, a student earning a BS in Chemical Engineering can earn a data science minor and graduate with a unique set of skills to help him

or her draw additional insights from the wealth of process data collected in a refinery or chemical plant.

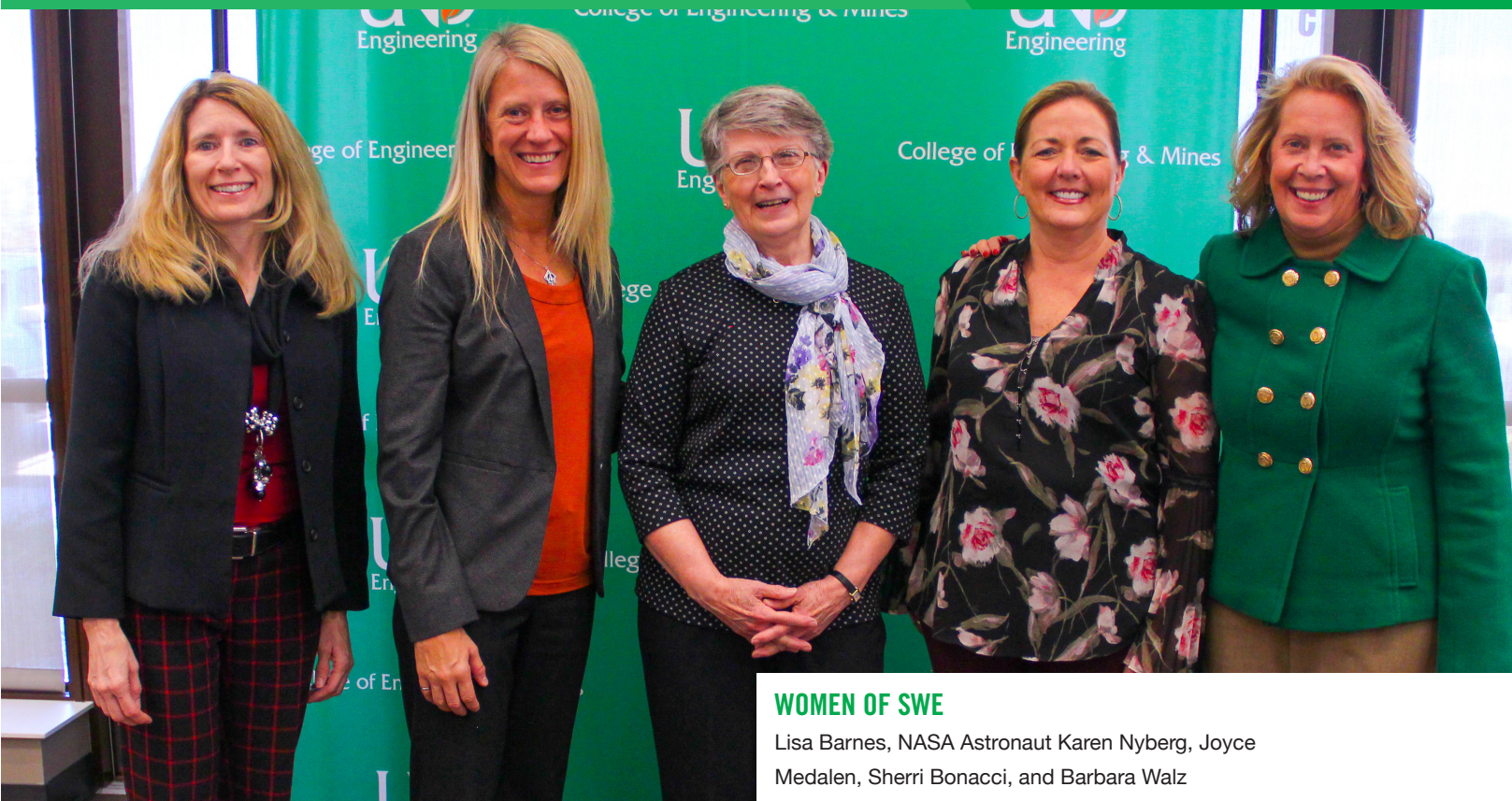
In addition to these programs, UND is investing significant resources to hire a cluster of data science faculty. These faculty will not only develop new courses to be taken by students across CEM, but they will also conduct research in artificial intelligence, machine learning and deep learning.

Through collaborations with others in CEM, across campus, and with industry, their work will impact many areas important to North Dakota and the region- energy, UAVs, healthcare, transportation, etc.

Finally, one of our biggest priorities in the near future is creating a modern and collaborative space to conduct these activities. We have recently kicked off a campaign to renovate the oldest academic building on campus to create the Big Data Hub at Babcock. This will provide much-needed space for the College, but will also serve as a highly-visible center of data science research and development for our region.

This is an exciting time for the College and I invite each one of you to be part of it. We are very grateful to our alumni for their generosity and continual support.

CEM ACADEMY INDUCTION HOMECOMING 2018



WOMEN OF SWE
Lisa Barnes, NASA Astronaut Karen Nyberg, Joyce Medalen, Sherri Bonacci, and Barbara Walz



CEM ALUMNI ACADEMY MEMBERS
Front Row: Barbara Walz, Charles MacFarlane, Jacquelyn Hiltz Crowhurst, Mark Bittner, Steve Martin, Jeffrey Vigen, Karen Nyberg
Back Row: Hesham El-Rewini, LeRoy Kuta, Jim Albrecht, Craig Olson, Terry Severson, Lisa Barnes, Steve Burian, Sherri Bonacci, Keith Moe, John MacFarlane, Dean Wieland

MARK
BITTNER
Class of 1973



UND College of Engineering and Mines
ACADEMY
Mark Bittner



Born: January 3, 1951, Langdon, ND
Education: University of North Dakota, BSCE, 1973
Magna Cum Laude

Career Experience
1973 Surveyor, William Clairmont Inc., Bismarck, ND
1974-1975 Design and Construction Engineer, North Dakota
Department of Transportation, Fargo, ND
1976-1991 Design and Construction Engineer, Engineering
Department, Fargo, ND
1991-2012 City Engineer, City of Fargo, ND
2012-2018 Director of Engineering, City of Fargo, ND

Achievements/Accomplishments

Cooperative committee of NDDOT and 13 ND city officials to update federal highway
funding formulas in response to new highway bill ISTEA (1992)
City representative for state legislative ND One Call excavation notification system; served
on the eight-member board for three four-year terms, eight years as chairman
Technical committee member on Fargo-Moorhead Diversion FMD 1997-2007
Leadership in basin wide multi-jurisdictional mapping initiatives, LIDAR, and digital mapping

Awards/Honors

1984 Recognition of Service as Chairman of City of Fargo Employees Association
1989 Outstanding Support of St Paul District USACE during 1989 Flood Fight of Red River
1997 Outstanding Support of St Paul District USACE during 1997 Flood Fight of Red River
1999 Fargo Heritage Society Landscape Design Award for the renovation of Midtown Dam
2001 Outstanding City Employee by the ND League of Cities
2012 Designation as a North Dakota Water Wheel by ND Water Users Association & ND
Water Resource Association
2012 River Keepers of Fargo-Moorhead Distinguished Service Award
2014 Inducted into the ND Highway Hall of Honors
2016 Conferred Lifetime Membership into the American Society of Civil Engineers
2018 City of Fargo proclaimed July 11, 2018 Mark Bittner Day

During his tenure, Fargo, ND grew from 75,000 people to more than 122,000.
The city's footprint nearly doubled from 29 square miles to 50 square miles.
This growth put Mark at the head of major road, water, and wastewater
infrastructure expansions.



Mark Bittner with wife Marilyn and Family Members

JACQUELYN HILTZ
CROWHURST
Class of 1994



UND College of Engineering and Mines
ACADEMY
Jacquelyn Hiltz Crowhurst



Born: October 22, 1971, Bemidji, Minnesota
Education: University of North Dakota, BSCSci, 1994
University of North Dakota, B.S. Math, 1994
Summa Cum Laude

Career Experience
1993-1994 Cooperative Education Student, Unisys, Roseville, MN
1995-2001 I/T Associate through Sr. I/T Technical Analyst, Cargill
Wayzata, MN
2001-2002 Consultant, Microsoft, Edina, MN
2002-2006 Architect Evangelist, Edina, MN

2006-2011 Customer Evangelism Director, Microsoft, Edina, MN
2011-2012 Developer Tools Director, Microsoft, Edina, MN
2012-2014 Central Regional Developer & Platform Evangelism Lead, Microsoft, Edina, MN
2014-2017 US Developer Tools General Manager, Microsoft, Edina, MN
2017-Present North Central Customer Success General Manager, Microsoft, Edina, MN

Professional Boards

- UND College of Engineering and Mines Executive Board Member
- Qajaq Camp Vice President Board Member
- Minnesota High Tech Association (MHTA) Board Member (2011-Present)
- MHTA K-12 STEM Committee Chair (2011-2013)
- Eden Prairie Figure Skating Club Board Member, Treasurer (2014-2017)

Awards/Activities

- Established the UND Crowhurst Family Women in Technology Scholarship Endowment
- Cargill: Gold, Silver, and Bronze Leo Awards
- Microsoft:
 - Gold Club Award Winner
 - Diversity Award Winner
 - Sharefighter Award Winner
 - High Potential Leadership Program
- Girl Scout Co-Leader for 8 Years
- Led DPE Women in Tech Group at Microsoft
- Microsoft DigiGirlz Presenter and Volunteer



Jacquelyn Hiltz Crowhurst, husband Christopher, and
parents Bob & Cheryl Hiltz

CHARLES S. MACFARLANE Class of 1987



UND College of Engineering and Mines
ACADEMY
Charles S. MacFarlane



Born: July 11, 1964, Garrison, North Dakota
Education: University of North Dakota, BSEE, 1987
University of St. Thomas, MBA, 1994
University of Minnesota Carlson School of Management, Executive Program, 2000
University of Chicago Booth School of Business, Advanced Management Program, 2015

Career Experience

1997-2000 Director of Delivery Construction and Field Operations, Xcel Energy, Minneapolis, MN

- 2000-2001 Director of Electric Distribution Planning, Engineering, and Reliability, Xcel Energy, Minneapolis, MN
- 2001-2002 Director of Financial Analysis and Planning, Otter Tail Power Company, Fergus Falls, MN
- 2002-2003 Vice President of Finance & Business Planning, Otter Tail Power Company, Fergus Falls, MN
- 2003-2007 President, Otter Tail Power Company, Fergus Falls, MN
- 2007-2014 Chief Executive Officer, Otter Tail Power Company, Fergus Falls, MN
- 2014-2015 President and Chief Operating Officer, Otter Tail Corporation, Fargo, ND
- 2015-Present President and Chief Executive Officer, Otter Tail Corporation, Fargo, ND

Professional Boards

- 2005-2014 Productive Alternatives Board of Directors
- 2007-2009 Empower North Dakota (ex officio)
- 2012-Present UND College of Engineering and Mines Executive Board
- 2015-Present Minnesota Business Partnership
- 2015-Present Edison Electric Institute Board of Directors
- 2015-Present Otter Tail Corporation Board of Directors

Activities

- UND Hockey Enthusiast
- Young Life Board Member
- Fergus Falls Community Arena Fundraising Co-Chair



Chuck MacFarlane with wife Linda and daughter Abby, and parents Eunice and John MacFarlane. Chuck and John are the first father/son duo to be inducted into the Alumni Academy. John was inducted in 2003.

STEVE MARTIN Class of 1989



UND College of Engineering and Mines
ACADEMY
Steve Martin



Born: May 5, 1966, Devils Lake, North Dakota
Enrolled Member: Turtle Mountain Band of Chippewa Indians
Education: University of North Dakota, BSME, 1989
Creighton University, Pursued MBA, 1991-92

Career Experience

- 1994-1997 GE Energy, Regional Manager of Sales/Field Service Representative, Turkey and the Region
- 1997-2003 GE Energy, Director of Sales, Central-Eastern Europe (Including CIS) France, Central Asia, and Israel
- 2003-2004 GE Energy Area Country Executive-Central & Eastern Europe

- 2004-2005 GE Energy Area Country Executive, Turkey, Israel, Greece & Cyprus
- 2005-Present Tuten Ltd., Istanbul, Turkey, Partner, Leading All Aspects of Project and Business Development for 50-300MW Size Gas Fired IPP Projects in Turkey, Central Asia, and Africa
- 2008-Present KS Energy Africa, Co-Founder/Chief Executive Officer and Board Director

Accomplishments

- 2003 Global GE Greenhouse Gas Team Founding Member
- 2016 Cheyenne River and Standing Rock Sioux Tribes Technical Expert on Dakota Access Pipeline
- 2017 Established UND Native American Culture Exchange Program for Engineering Students
- Sponsoring Internships with KS Energy Africa
- 2018 West Africa Power Summit Key Note Speaker
- 2018 UND Time Out Wacipi Week Keynote Speaker

Awards/Honors

- Pinky Thompson Scholarship for Campus Wide Personal Contribution
- Phi Delta Theta Fraternity - UND
- U.S. Army National Guard Gold Ring Recipient
- GE President's Award for Contributions to the Formation of the Business Growth Region of Central and Eastern Europe for Work at the 2004 Olympic Games in Athens
- 2012 Frost and Sullivan Africa Power Generation Competitive Strategy Leadership Award

Steve envisions new business models for Africa. He is targeting underserved power-generation markets, using mini/off-grid (solar and gas) technology he and his partners are developing.



Steve Martin pictured with his brother-in-law Frank and sister Virginia (GiGi) LaBlanc along with UND friends.

JEFFREY TODD
VIGEN
Class of 1986



UND College of Engineering and Mines
ACADEMY
Jeffrey Todd Vigen



Born: May 15, 1964, Grand Forks, North Dakota
Education: University of North Dakota, BSCE, 1986
Kappa Sigma Fraternity

Career Experience

1981-1986 Draftsman, Vigen Construction
1986-1997 Project Manager, Vigen Construction
1997-2002 Vice President, Vigen Construction
2003-2008 Secretary / Treasurer, Vigen Construction
2008-Present President, Vigen Construction

Professional Boards

1992-Present Associate Member of the International Association of Operative Millers
2003-Present Associate Member of the Grain Elevator and Processing Society
2009-2010 Community Bank of the Red River Valley
2010-2011 Frandsen Bank and Trust

Philanthropy

UND Eternal Flame Society: William Budge Circle
Jeff and Kim Vigen Civil Engineering Scholarship Endowment
Jeff and Kim Vigen Promise Scholarship Endowment
UND Athletics: Directors Club
Grand Forks Parks & Recreation Foundation: Maple Level
Sunshine Memorial Foundation: Galaxy Club

Awards

North Dakota Ready-Mix & Concrete Products Association
2003 Excellence in Concrete Award (Alton Grain Terminal-Hillsboro, ND)
2016 Gold Award (North Dakota State Mill Expansion-Grand Forks, ND)
Wisconsin Ready Mixed Concrete Association
2005 Concrete Design Award (River Barge Loading Facility-Lacrosse, WI)



Jeffrey Vigen, wife Kim, son Andrew, daughter-in-law Kim, mother Barb and family members.

BIG DATA: THE NEXT BIG THING



Proposed renderings

When you think of the Silicon Valley in Northern California, what readily comes to mind?

How about “Route 128” near Boston? Or the Research Triangle outside Raleigh-Durham, N.C.?

Most think of high-powered and often high-tech corporations clustered within an arm’s length of research universities, always on the cusp of the next big thing in a given field.

UND has its own grand vision to be the best it can be in areas it’s already good at. It’s based on its Grand Challenges research initiative — in biomedical science, rural health, energy & sustainability, unmanned and autonomous systems, and Big Data – and a growth mindset to diversify the state’s economy away from oil and soil.

And it all starts with Big Data.

During his “Wake up to UND” presentation to the Grand Forks-East Grand Forks business communities, UND President Mark Kennedy announced that UND, through its College of Engineering & Mines (CEM), is making the first of what could be a number of faculty hires to support Grand Challenges research.

The first set of hires could comprise as many as six computational scientists (three junior level and three senior level professors), all well-versed, and well-funded, in the Big Data expertise, such as analytics, machine learning, artificial intelligence and robotics.

UND is using money from one of its strategic priorities pools, made possible by its new incentive-based budgeting model, to co-invest with the CEM to fund the new hires.

“Big Data is vital to every field of study,” Kennedy said. “A lot of the professors that we would be bringing in would have this expertise to spark the education that will give our employers in the region the talent they need to succeed and flourish.”

FLEDGLING CLUSTER

UND Vice President for Research & Economic Development Grant McGimpsey said the new computational scientists, who will spend most of their time on Big Data research, will directly support the needs of the other Grand Challenge focus areas on campus.

“Big Data is a very different Grand Challenge than the others,” he said. “The way I look at it is that computational research, algorithm development, data analytics all underpin the other four Grand Challenges.”

McGimpsey said the most immediate off-campus impact of the beefed up computational expertise could be on the UAS side, a field where UND is pioneering in Detect-and-Avoid and Beyond the Line of Sight technologies and the integration of drones into civilian airspace.

UND, with its premier John D. Odegard School of Aerospace Sciences, is nestled in the heart of a robust UAS ecosystem, surrounded by small startups, established heavyweights, such as Northrup Grumman, General Atomics and Harris Corp., all with strong connections to the nearby FAA UAS Test Site, Grand Forks Air Force Base and Grand Sky, a new drone business park adjacent to the air base.

McGimpsey has talked to folks, such as Tom Swoyer, president of the Grand Sky Development Co., about the need for data analysts



THE BEST ENGINEERS CAN GO ANYWHERE AND EVERYWHERE, BUT THEY START HERE.

and computational scientists to help support the fledgling UAS cluster.

“Every company that (Swoyer) talks to, and that comes in and wants to take up space there, they have a need for information,” McGimpsey said. With more analytical fire power clustered nearby to give them what they need, private-sector innovators and firms may be more likely to stake a claim.

NURTURING CAMPUS

But it’s not just in the UAS realm.

Hesham El-Rewini, dean of the CEM, talked about a recent trip to Fargo to meet with executives of the Bobcat manufacturing company, and how the conversations were dominated by the company’s need to analyze data effectively and turn it into information they could use.

“Everybody now is trying to find ways to deal with this tremendous amount of data and how to collect it, store it and make sense out of it,” El-Rewini said.

That includes UND’s other Grand Challenges, which also would be nurtured by a computational surge on campus.

McGimpsey sees applications in everything from biomedical science and its work with complex genomes to energy studies and the exact computations it uses to coax more oil from the state’s tricky shale geology.

“What’s missing right now from all those is how to imaginatively and creatively and efficiently analyze all the data,” he said.

SYMBOLIC SETTING

Kennedy, along with McGimpsey and El-Rewini, recognized this deficiency early.

They created a more nimble and collaborative academic structure to allow the computational push to thrive. UND melded the departments of Electrical Engineering and Computer Sciences into the School of Electrical Engineering and Computer Science (SEECs), housed at the CEM. Next, came the hiring of Ryan Adams, from the University of North Carolina at Charlotte, to be the first director of the SEECs.

Along the way, a Big Data focus was established to provide the entire campus much needed data science support. Even the future headquarters for the new Big Data Hub,” at Babcock Hall, was meticulously thought out.

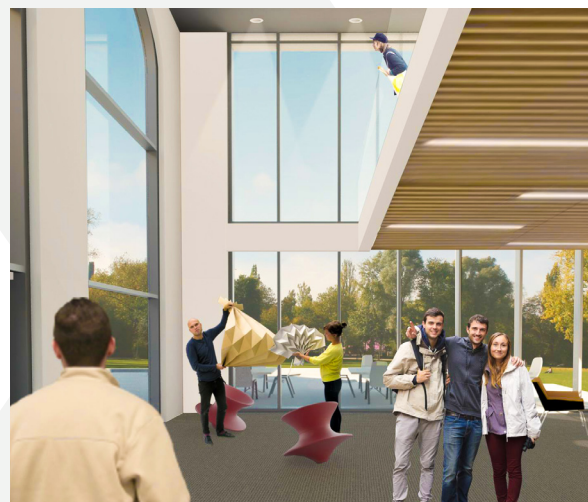
El-Rewini envisions Babcock, with its namesake ties to the first dean of engineering and its location at the heart of campus, to be a collaborative space for researchers from all parts of campus and beyond.

The idea is that each College would invest in their own new faculty hires to meet their individual needs and use the Big Data Hub as a collaborative space to conduct much needed high-level computational research.

“Symbolically, I am saying that with the Big Data Hub at Babcock – engineering will be the core but it will collaborate with the entire campus ... everyone can work

together to make a significant contribution to UND and to the State of North Dakota – this is the next big thing.”

– David Dodds
UND Today



Early rendering of interior space

As of press date, 22 candidates have applied for the positions and six have been invited to visit campus. During their on-campus interviews, candidates are meeting with UND leadership and are asked to give a presentation about their research to the campus community. The committee will collect feedback from these visits and expects to make offers by late June.



SINGAPORE

Dr. Surojit Gupta, associate professor, mechanical engineering, with Grand Challenge Scholars Program (GCSP) students Annie Miles and Margaret Ahmann, attending the 12th International Conference on Ceramic Material and Components for Energy and Environmental Applications in Singapore.

SOUTH AFRICA

Three engineering students made their way to Orapa, Botswana in Southern Africa. The UND Native American Cultural Exchange Program for Engineering Students offers internships with KS Energy in Africa. The program was established in 2017 by Steve Martin, BSME’89, KS Energy Africa, Co-Founder and CEO.

Pictured with Steve Martin are students Jaymz Wooden, Tanya McGrady, and Tyson Jeannotte.



INDIA

Martin Pozniak & Eli Vettel, EE students, stayed at one of India’s private engineering universities, BITS Pilani - Goa Campus, for one month to complete research projects, collaborate with international students, and experience a new country and culture to gain unique global experiences.

(Left to right): Mihir Kulkarni, Abhiraj Hinge, Nikhil Khedekar, Dr. Prakash Ranganathan (EE professor), Dr. Nina Goveas, Eli Vettel, Martin Pozniak, Sarthak Munjal.

MIND ON UND

Increasing college enrollment by 100 percent? Check. Increasing college research expenditures by 100 percent? Check. Increasing the college's endowment by 300 percent? Check. Moving from college dean to a university provost? Check.

It's a logical next step, said Hesham El-Rewini, dean of the College of Engineering & Mines, who has accepted a position as provost of Marymount University in Arlington, Va.

El-Rewini began his tenure at UND in 2008. Under his leadership, the enrollment increased by 100 percent, online enrollment rose by 140 percent, retention improved from 75 percent to 81 percent in five years, annual research expenditures increased by more than 100 percent, and the College endowment increased by more than 300 percent.

The College added a petroleum engineering program, which now enrolls more than 200

students. He guided the College through the construction of the \$15.5 million Collaborative Energy Complex, which was funded through private donations and nearly \$4 million from the North Dakota Higher Education Challenge Fund. UND has also announced plans to invest \$10 million over five years to hire computational science research faculty to bolster the University's standing in artificial intelligence, machine learning, and cyber security. Those faculty will be housed in a renovated Babcock Hall, which will also be the new home of the new Big Data hub.

"The College has witnessed unprecedented growth and success and gained the trust of alumni and the community," he said. "This would not have been possible without our hardworking faculty and staff, dedicated students, and the wonderful members of the College's Executive Board, all who I am privileged to call my friends."

In addition to his work as dean, El-Rewini served as senior vice provost between 2017 and 2018.

"I really enjoyed working with the teams I led in the registrar's office, Institutional Effectiveness & Research, UND IT, and Student Academic Services," El-Rewini said. He added that he equally enjoyed working with faculty from across the colleges as he oversaw faculty affairs.

"As a provost, I will be able to expand the scope of my service and contribution to cover units beyond my own college," he said.

"I will always be grateful for the opportunities that UND afforded me and will leave with many fond memories and a sense of optimism about the future of the University."

- Jan Orvik
UND Today
(Excerpt)



2008
-
2019

UNIVERSITY OF NORTH DAKOTA COLLEGE OF ENGINEERING AND MINES

April 29, 2019

Final Report

HESHAM'S FINAL REPORT

This document (pages 17-26) was first distributed on April 29th, 2019 at the College of Engineering & Mines Executive Board meeting.

Hesham El-Rewini, Ph.D., P.E.
Dean and Professor



SUMMARY OF COLLEGE GROWTH

Since 2008

	METRIC	GROWTH
PEOPLE	Number of Faculty Positions	93%
	Number of Staff Positions	136%
FACILITIES	Space (GSF)	48%
ENROLLMENT	Undergraduate Enrollment	119%
	Graduate Enrollment	158%
	Online Enrollment	285%
	Number of Ph.D. Students	420%
RETENTION	Fall-to-Fall Undergraduate Retention	4%
		(78% to 81%)
DEGREE COMPLETION	4-Year Graduation Rate	67%
		(18% to 30%)
	Number of Graduates/Year	132%
DEGREE PROGRAMS	Undergraduate Degree Programs	71%
	Graduate Degree Programs	178%
RESEARCH	Competitive Research Expenditure/Year	88%
SALARIES	% People making above 90% of average salary in other institutions — CUPA (2016)	75%
		(51% to 89%)
ENDOWMENT		30%
		(77% to 100%)
	Student Scholarship Endowment	221%
	Faculty Endowment	534%
	Total College Endowment	313%

FUNDRAISING

Since 2008

TOTAL MONEY RAISED	Over \$50 million
NEW CONSTRUCTION	Collaborative Energy Complex (2016)
NAMED PROFESSORSHIPS	Continental Resources (2012) Harold Hamm (2012) Ann and Norm Hoffman (June 2008)
NAMED UNITS	Harold Hamm School of GGE (2012)

SCHOOL NAME

Since 2008

2008	TODAY
School of Engineering & Mines	College of Engineering & Mines



ACADEMIC / RESEARCH UNITS

Since 2008

2008	TODAY
1. Dept. of ChE	1. Dept. of ChE
2. Dept. of CE	2. Dept. of CE
3. Dept. of EE	3. School of EECS
4. Dept. of GGE	4. Harold Hamm School of GGE
5. Dept. of ME	5. Dept. of ME
6. Surface Center	6. Dept. of PE
7. SUNRISE	7. Institute of Energy Studies (IES)
	8. Big Data Hub at Babcock (Hiring)
	9. SUNRISE



SUPPORT UNITS

Since 2008

2008	TODAY
1. Alumni Relations	1. Alumni, Corporate, and Public Relations
2. DEDP	2. Development
	3. Engineering IT Services
	4. Financial and Grant Services
	5. Solberg Family Student Success Center

SPACE

Since 2008

2008	TODAY
1. Harrington Hall	1. Babcock Hall (designated to CEM)
2. Leonard Hall (minus 3rd floor)	2. Collaborative Energy Complex (NEW)
3. Upson I	3. Harrington Hall
4. Upson II (minus basement & 3rd floor)	4. Jodsaas Center (Dean Watson's initiative)
	5. Leonard Hall (all of it)
	6. Student Study Area (NEW)
	7. Upson I
	8. Upson II (all of it)



UNDERGRADUATE PROGRAMS

Since 2008

2008	Today	
1. Chemical Eng.	1. Chemical Eng.	8. Environ. Geo Sc.
2. Civil Eng.	2. Civil Eng.	9. Geology
3. Electrical Eng.	3. Computer Sc.	10. Geological Eng.
4. Environ. Geo Sc.	4. Cyber Security	11. Mechanical Eng.
5. Geology	5. Data Science	12. Petroleum Eng.
6. Geological Eng.	6. Earth Sc.	13. Several Minors
7. Mechanical Eng.	7. Electrical Eng.	



MS/ME PROGRAMS

Since 2008

2008	Today	
1. Chemical Eng.	1. Biomedical Eng.	8. Energy Sys. Eng.
2. Civil Eng.	2. Chemical Eng.	9. Environ. Eng.
3. Electrical Eng.	3. Civil Eng.	10. Geology
4. Environ. Eng.	4. Computer Sc.	11. Geological Eng.
5. Geology	5. Cyber Security	12. Mechanical Eng.
6. Geological Eng.	6. Data Science	13. Petroleum Eng.
7. Mechanical Eng.	7. Electrical Eng.	14. Unmanned Sys. Eng.

PH.D. PROGRAMS

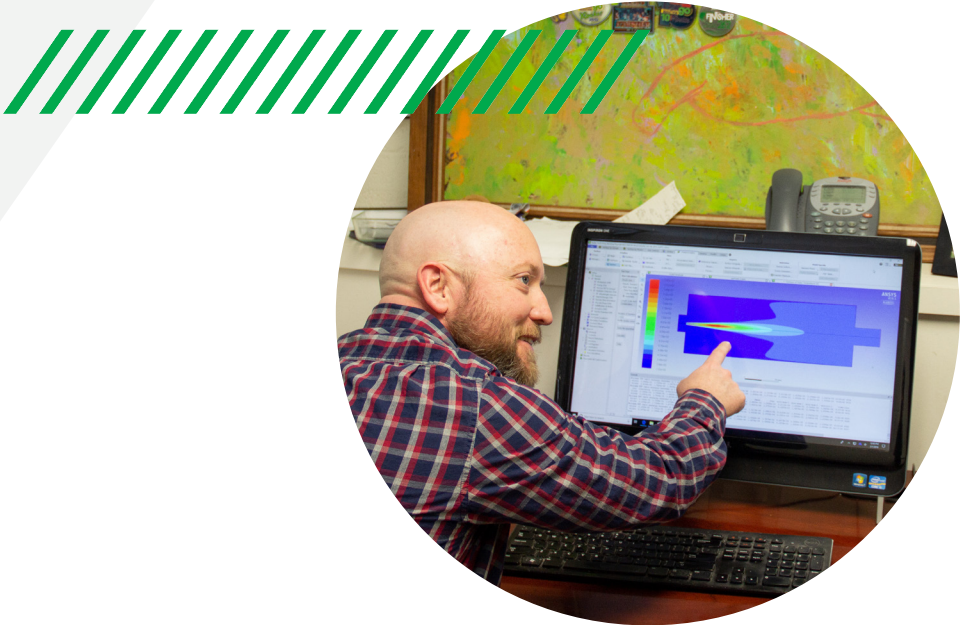
Since 2008

2008	Today	
1. Engineering (with Tracks)	1. Biomedical Eng.	7. Geology
2. Geology	2. Chemical Eng.	8. Geological Eng.
	3. Civil Eng.	9. Mechanical Eng.
	4. Electrical Eng.	10. Petroleum Eng.
	5. Energy Eng.	11. Scientific Computing
	6. Environmental Eng.	

EXTERNAL & INTERNAL ENGAGEMENT

Since 2008

	2008	Today
College Advisory Entities	1. Alumni Academy	1. Executive Board 2. Student Advisory Board 3. Staff Advisory Board 4. Alumni Academy
Publicity		1. Engineering Magazine 2. Social Media 3. Print & Digital Media



NEW INITIATIVES



Since 2008

Students	Alumni Perspective Series
	Big Ideas Gym (B.I.G.)
	BIG Challenge
	Conversation with the Dean (Campus & Online)
	Engineering Living Learning Community
	Escape
	Peer Mentoring
	Industry Mentoring
	Grand Challenges Scholars Program (GCSP)
	Skype/Tea/Walk with the Dean
	40+ renovation projects (Labs, Classrooms, Study areas)
Faculty and Staff	Diverse Leadership Development and Community Engagement Program
	Monthly Town Hall Meetings
	Monthly Lunch with Colleagues
	Dean's Afternoon Snacks (multiple times/semester)
	Weekly Tea with El-Rewini
	Weekly Walk with the Dean
	Wellness Programs
Recognition & Funding Opportunities	Numerous Professional Development Opportunities
	Outstanding Faculty Award
	Outstanding Staff Award
	Dean's Teaching Professorship
	Dean's Research Professorship
	CEM Recognition Parking
	Faculty Research Enhancement Funding
	Faculty Teaching Enhancement Funding
	Staff Service Enhancement Funding

MOST RECENT INITIATIVES

Since 2008

Research	An investment of \$10 million to hire a cluster of research faculty in computational sciences
	Agreement between CEM and UND was signed in December 2018. A search firm has been hired. Faculty interviews are being conducted April/May 2019.
Space	Renovation of Babcock An architecture firm specialized in historic buildings was retained by UND facilities. An exterior design has been finalized.
Fundraising	Naming the Department of Chemical Engineering Several meetings have been held with a donor. A proposal to name the Department of Chemical Engineering has been submitted and is under consideration by the donor.



CEM LEADERSHIP LEGACY

Since 2008



Earle J. Babcock
1897-1916
1916-1925



Calvin Crouch
1901-1916



Elwyn Chandler
1925-1932



L.C. Harrington
1932-1951



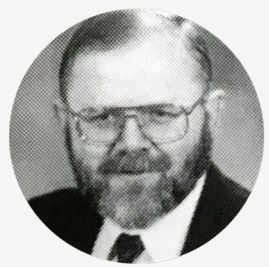
Elder Lium
1951-1963



Milton Larson
1964-1968



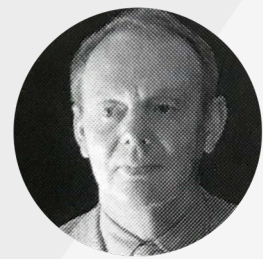
Alan Fletcher
1969-1989



Mogens Henriksen
1990-1994



Don Richard
1996-2000



John Watson
2001-2008



COUPLE POSTHUMOUSLY GIFTS \$1M FOR HAROLD HAMM SCHOOL



John & Ruth Carter

The UND Harold Hamm School of Geology & Geological Engineering, within the College of Engineering & Mines (CEM), received a \$1 million gift from the late John Carter, a 1959 UND grad, and his late wife, Ruth.

Their gift will establish the “Drs. John and Ruth Carter Endowment,” the revenue from which will be used to create the Geology & Geological Engineering Students and Faculty Excellence Fund. The endowment will promote excellence among faculty and students who major in geology or geological engineering through activities such as field trips, experiential learning and professional development.

CEM Dean Hesham El-Rewini says he is humbled by the Carters’ generosity.

“We are so thankful to Dr. John and Dr. Ruth Carter for their legacy gift

that will help the Harold Hamm School of Geology & Geological Engineering continue to promote excellence,” El-Rewini said. “I am very proud of Dr. John Carter’s accomplishments during his rich life journey.”

GIVING PEOPLE

John Carter, a Sisseton, S.D., native, received his bachelor’s degree in geology from UND in 1959 and his Ph.D. from the University of Cincinnati in 1966. During his 27 years as a curator of invertebrate paleontology at the Carnegie Museum of Natural History in Washington, D.C., he named more than 130 new species and 40 new genera. He enjoyed many explorations and archaeological digs throughout his career as a paleontologist and is world-renowned for his research on the 350 million-year-old-fossil brachiopods. He also wrote several books.

Ruth Carter earned a Ph.D. in history from the University of Pittsburgh. She spent most of her career working for the University Library System and concluded her professional endeavors as head of the Archives Service Center and curator of historical collection at University of Pittsburgh. She also authored and co-authored many books and articles on cataloging and classification.

John Carter was recognized by the UND College of Engineering & Mines in 2006 when he was the honored recipient of the Arthur Gray Leonard Award. The award recognizes outstanding achievement in geosciences in research, technical studies and projects applied to societal needs, teaching, educational development or leadership in conservation of earth’s resources and environment.

Christin Wengert, the Carters’ niece and spokesperson for the couple, said her aunt and uncle were extremely kind and giving people who loved supporting the causes important to them.

“They believed in higher education and learning and were very philanthropic,” Wengert said. “They felt honored to give back to higher education.”

- Milo Smith
UND Today



LOCK ON LEAKS

UND petroleum engineer develops novel methods to detect pipeline leaks before they wreak economic, environmental havoc.

Leakage is a major challenge in any technology that moves fluids from one place to another.

Think garden hose: how much water leaks along the path from faucet to nozzle? Unless it's all brand new and fits perfectly, you're just about guaranteed to lose water along the way.

Now think big hose – as in a coated carbon steel pipe upward of one inch thick and five feet in diameter and maybe hundreds of miles from well to refinery. Any leak in this vital system is economically and environmentally consequential.

So noted Kegang Ling, petroleum engineering professor and an expert in pipeline leak detection in the UND Department of Petroleum Engineering, part of the College of Engineering & Mines. Ling has been researching more cost-effective and more efficient algorithms that detect and precisely quantify leaks earlier than existing technologies.

“First, let's point out that pipelines are the surest, best, safest, and cleanest way to move oil and natural gas,” said Ling, who's been studying leakage challenges for more than a decade. He knows the problems firsthand—after graduating with his

petroleum geology degree in the People's Republic of China, he worked on Chinese offshore drilling rigs. He obtained his Ph.D. in petroleum engineering at Texas A&M.

SIMPLER, MORE PRACTICAL

But let's not downplay the risks: pipelines, key to the national economy, are a lot more than the big “garden hoses” in the petroleum industry. The Argonne National Laboratory, a federal Department of Energy facility in Lemont, Illinois, notes that the U.S. pipeline industry is large and diverse, comprising more than 2 million miles of pipes in all 50 states, daily ferrying millions of barrels of liquid petroleum and refined products, natural gas, and other fluids.

Thus, Ling is part of an elite global group of engineers and scientists looking at ways to mitigate leaks in this vast system.

“My research looks at how to detect a leakage after it occurs, and I use data to detect a leakage by drops in pressure and other parameters such as temperature,” said Ling, who's served as associate editor for the Journal of Unconventional Oil and Gas Resources and has published, often as part of a multi-institution research team, several key and often-quoted papers about pipeline leaks. “I provide methods of detecting leaks to energy and pipeline companies.”

In his Petroleum Engineering lab at UND, Ling and his team built a model pipeline system with sensors placed all along to detect the minute changes in pressure, temperature, and volume that signal a leak. His algorithms showcase a novel way to specifically pinpoint and quantify a leak so that a pipeline operator can immediately tell exactly how big the leak is – this facilitates timely and accurate response to the leakage situation.

“What this is all about is trying to find the most effective method of leak detection, and continually refine this detection process,” said Ling.

In addition to his leak detection R&D work, Ling's research interests include reservoir engineering, natural gas engineering, reserve evaluation, production optimization, and flow assurance.

“What we're looking for is simpler and more practical leak detection,” he said. “Detecting, locating, and precisely quantifying leaks is one of the energy industry's critical needs.”

- Juan Miguel Pedraza
UND Today



STOVE-TOP DIPLOMACY

UND College of Engineering & Mines and Education team up to assist rural, African trade school with novel invention.

Retired Lockheed Martin executive and CEM alum Ben Dove confirmed a long-held conviction over the past year:

“If you really want something done, ask North Dakotans, they'll come through for you,” he said. Dove, a 1983 mechanical engineering graduate, recently had his relationship with UND “reinvigorated” after an experience brought multiple colleges, professors and students together to address needs a world away.

GOING BACK IN TIME

The former Vice President of Performance Excellence at Lockheed Martin's Information Systems and Global Solutions division became familiar with UND's senior projects in mechanical engineering after sponsoring a drone research project in 2015. In 2016, he was asked to sit on the executive advisory board for the College of Engineering & Mines.

Friend Jeffery Lohr told Dove about the Moringa Community School of Trades. For the past decade, Lohr has worked with a rural Ghanaian village to establish a technical school; a means of extending education for middle to high school-aged students, equipping them with marketable skills. As Dove became more interested in this grassroots effort, he learned of issues

persisting after the school was established and operating.

“With their local education system, it's like going back in time in the United States,” Dove said. “Sometimes the smartest kid in the schoolhouse will become the teacher as soon as they graduate.”

Given the poor economic conditions of rural life in Ghana, teachers are few and available resources for teaching are fewer. Dove says the students learn by copying whatever the teacher writes on the board – aligning with the national curriculum is nearly impossible.

Food storage was another issue Dove noticed. While the area grows quality produce, villages lack the access to electricity required by refrigeration. People store food through canning, but the cost of fuel to keep water boiling and sterilize jars is high, says Dove. Deforestation is rampant in Ghana, making wood a rare commodity.

DESIGNING EFFICIENCY

Dove became inspired to reach out to UND. There had to be a better way.

“My suggestion to mechanical engineering was that there must be a better way to keep five gallons of water boiling for 45 minutes,” Dove said.

The result: the rocket stove.

For their senior design project, a team of six students developed a stove consisting of a metal ducting elbow – bent at 90 degrees – surrounded by a shell of bricks. The shell supports the elbow and keeps the stove insulated. Its crude design was purposeful, as it needed to be cheaply replicable for viability in rural Ghana.

“The students working on it did an excellent job, and the school is so happy with it,” Dove reported. “Any time somebody sees it, they think ‘we need one of those.’ There are all sorts of elegant solutions, but here was a fairly inexpensive method to use an abundant resource like bamboo.

Bamboo, a grass, is not typically used as a fuel due to its water content. If not split and treated before burning, bamboo's water pockets expand and cause explosions.

The Moringa Community School of Trades is now looking to sell a starter kit for a stove to anyone in the area who needs it, says Dove. The more people who have it, the greater the economic and environmental benefits.

- Connor Murphy
UND Today
(Excerpt)



30 YEAR CELEBRATION BBQ

Students, faculty, staff, and alumni gather together to celebrate the anniversary of Distance/Online Education.

AFTER 30 YEARS, STILL PIONEERS



In the late 1980s, Arnie Johnson had a new nickname:

Fuzzy Arnie.

The electrical engineering professor, who arrived at the University of North Dakota in 1988, earned the moniker because of a task that is now enshrined in the annals of the University and of the discipline.

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, rolled on videotape to be snail-mailed to students. Technology, at the time, was very much still in its grainy inception, capturing blurry imagery. Hence, to the engineering learners beyond the Grand Forks campus, Johnson became Fuzzy Arnie.

“When the students came for lab the first year, they got to see what Arnie really looked like,” said Johnson, who has since retired.

On June 6th, over 60 current online students met Johnson for the first time too, when they flocked to the College of Engineering and Mines’ Collaborative Energy Center to mark the 30th anniversary of the distance engineering program at UND.

A novel, outlandish and brazen idea in the 1980s, the program remains somewhat of a maverick, a unique opportunity in the academic and professional realms of engineering.

“We are the only university in the U.S. and as far as I know in the world that offers a full suite of programs, accredited programs, that are delivered via distance to undergraduate students,” said CEM Dean Hesham El-Rewini.

THE BEGINNING

In the fall of 1988, at the Conference for Industry and Education Collaboration, Jim Carter, then a manager at Minn.-based manufacturing corporation 3M, approached then CEM Dean Alan Fletcher with a proposition – a UND course for 3M’s full-time employees.

Thus, after some deliberation, arose UND’s distance engineering program. The first class, Johnson’s, had 11 students, nine of whom completed it.

For each lesson, they waited some three weeks to receive the cassettes after Johnson had recorded them. Assignments and exams would arrive at Johnson’s desk with a lag of almost a month, too.

Cameras would sometimes fail, and Johnson had to start over. Chalk on old-fashioned blackboards did not appear clear on camera, so Johnson scribbled with black markers on large sheets of white paper.

“There was a challenge in the early days when every year we had to go through improvements of technologies, hardware, software,” said Johnson, who also directed the program for a number of years. “Every year, there were improvements.”

And every year, the number of companies partnering with UND for its distance engineering offering grew. Hutchinson Technology, Cargill, Hewlett Packard and Sony, among others, joined.



Faculty secured national grants to develop the curriculum, parts of which – especially the Engineering 100 class – are still utilized today. The capstone course shifted from requiring on-campus work to on-the-job-site projects. The program expanded into various fields – petroleum engineering, geological, mechanical, civil, chemical. The list of attainments and enhancements swelled.

“The fact that we were the very first to offer such an innovative program was extremely exciting,” said Lynette Krenelka, executive director of TTaDA who used to provide technological and logistical support to the program through what was the office of continuing education. “We were serving a student population that was older than average.”

ACCREDITATION IN TIME OF FLOOD

The year of 1997 is etched into the psyche of UND. Spring delivered a record flood that shuttered campus only months before CEM succumbed to a rigorous accreditation audit by the Accreditation Board for Engineering and Technology, Inc (ABET).

UND was among three universities nation-wide to be evaluated.

“The accreditation was a big deal because the concern with accreditation was that the distance programs were different from on-campus programs,” said Tom Owens, chemical engineering professor and one-time interim dean.



Arnie Johnson, Hesham El-Rewini, and Tom Owens

Further compounding the process was ABET’s new approach that dictated the assessment of students’ outcomes rather than professors’ inputs. At the time, the distance program had no graduates yet, Owens said.

Still, it earned full accreditation, attesting that CEM, in the quality of its classes, did not distinguish between on-campus and distance students.

“That was a big deal,” Owens said. “It is still is a big deal.”

STUDENT FOCUS

Today, some 15 years after snubbing videotapes for online platforms, the distance engineering program boasts over 500 alumni – and hundreds more engineers in the making.

Through over 100 courses a semester, CEM offers fully online education – certificates or diplomas – in 28 engineering fields.

The last 30 years of pioneering “leaps and bounds” that have resulted in this array of options have a single impetus.

“This is about students,” said Owens. “It always has been.”

- Dima Williams
UND Today



DR. FENG XIAO
CIVIL ENGINEERING



DR. NAIMA KAABOUC
ELECTRICAL ENGINEERING

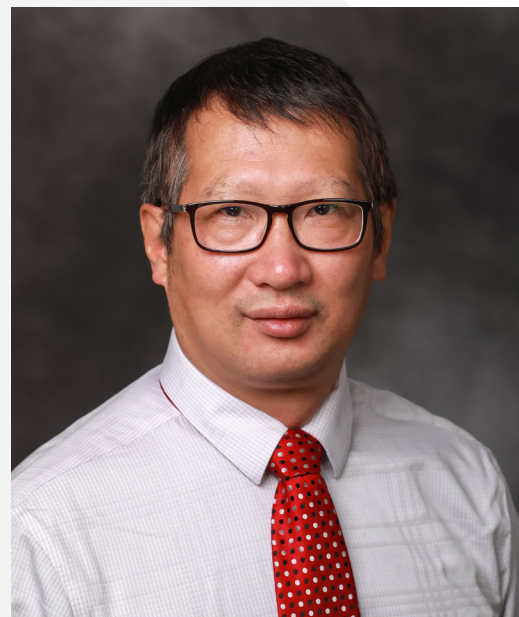
FIVE FACULTY RECEIVE \$600K INTERDISCIPLINARY NSF GRANT

Feng Xiao (PI) and Naima Kaabouch (co-PI) from the College of Engineering & Mines, Xiaodong Zhang from John D. Odegard School of Aerospace Sciences, and Julia Xiaojun Zhao and Deborah Worley from the College of Education & Human Development (all co-PIs) were recently awarded a 5-year grant of \$649,791 from the National Science Foundation (NSF) to support high-achieving and financial needy STEM undergraduate students at UND.

In North Dakota, limited financial support is cited as the top reason that students leave the University of North Dakota (UND), the state's flagship institution, prior to degree completion. In a project funded by the National Science Foundation, a group of UND faculty members initiates a project that promotes persistence for students with financial need and contributes to

solving the student retention puzzle by providing 90 scholarships over five years to academically talented students who intend to pursue careers in science, technology, engineering and mathematics (STEM) fields.

PI Xiao (Assistant Professor at Civil Engineering) said the overall goal of this project is to support highly-skilled STEM students to degree completion and to prepare them to meet state and national needs for more American scientists and engineers. By reducing or eliminating the burden of tuition, UND S-STEM recipients will be better positioned to spend more time in the class concentrating on their studies, engaging in research projects, and seeking out internships that are relevant to their long-term interests. Therefore, academic performance and UND retention rates are expected to improve as a result of the scholarship program.



DR. JUN LIU
ASSOCIATE PROFESSOR
COMPUTER SCIENCE



DR. MICHAEL MAN
EXECUTIVE DIRECTOR
INSTITUTE OF ENERGY STUDIES

CYBER SECURITY RECEIVES \$400K FOR DEVELOPMENT OF CS SYSTEM IN FOSSIL FUEL GENERATION SYSTEMS

A CEM team of researchers led by Dr. Jun Liu, Associate Professor Computer Science was recently awarded \$399,778 from DOE to develop a cybersecurity system to safeguard fossil fuel power generation systems. Dr. Liu, along with Hossein Salehfir, Professor Electrical Engineering and Michael Mann, Director of the Institute for Energy Studies together with Minnkota Power Cooperative will develop innovative ways of integrating blockchain technology into the power plant control system security. The UND team will work with the control center team at Minnkota's Milton R. Young Station near Center, N.D., to create a mock-up of how power data flows from point to point on the grid. The researchers will apply blockchain technology to those simulated

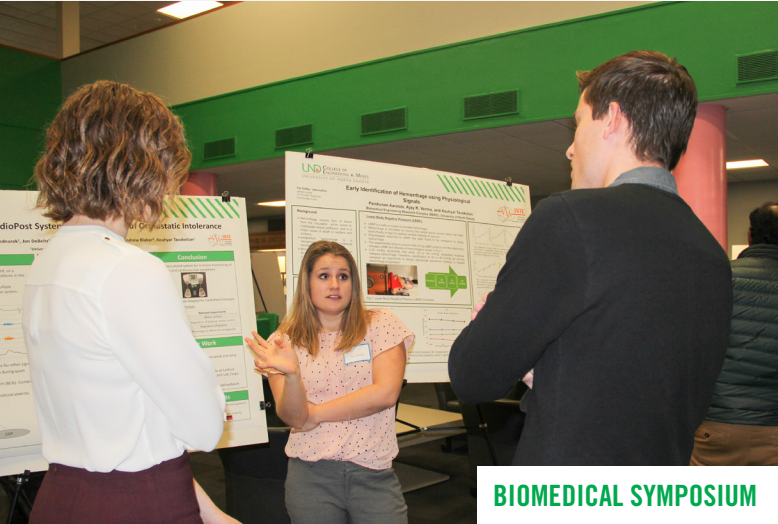
testbeds, using the data system of a real-world generation facility while maintaining the security integrity of Minnkota's actual data. The goal is to prevent a malicious data manipulator, also known as hacker, from getting into the system, creating false readings, and disrupting the operation of the power generation system. Ultimately, the project can have much broader reaches as blockchain technology can be applied to so many areas of utilities. Industry trends are moving toward more direct customer interaction, which involves a broad and sophisticated data system. It's going to take some years of research to come to that. This is a first step that will help utilities, internally, make their operations secure.

THE GOAL IS TO PREVENT A MALICIOUS DATA MANIPULATOR, ALSO KNOWN AS HACKER, FROM GETTING INTO THE SYSTEM, CREATING FALSE READINGS, AND DISRUPTING THE OPERATION OF THE POWER GENERATION SYSTEM.

AROUND CEM



BIG IDEAS CHALLENGE
Students present projects at the Big Ideas Challenge, a national GCSP program that encourages students to come up with the next big idea. The program is sponsored by the Margaret & Edson Larson Foundation.



BIOMEDICAL SYMPOSIUM



2019 SPRING BAKE-OFF
1st Place winner Jordan Eberhardt with Darin Buri



CEM HOSTS OPEN HOUSE FOR PROSPECTIVE STUDENTS



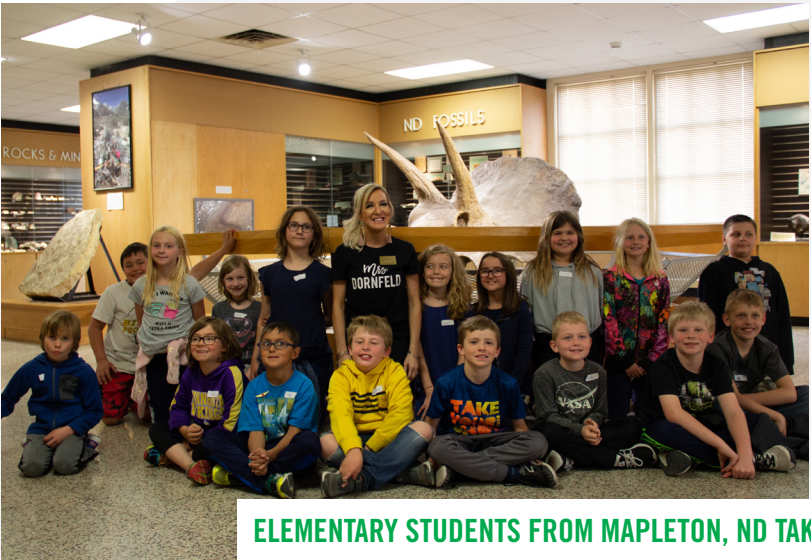
CEM HOCKEY NIGHT
Left: Brian Tande, Wally, EE'87 & Sharon Lang, Desiree Tande, Jay Evans, ChE'98
Right: Nettie & Jack, CE'71, Lindvig



A NEW MONUMENT
Tau Beta Pi members unveil their new monument located in front of the main entrance to Upson II.



CEM HOCKEY NIGHT
Brad Aafedt, Dean El-Rewini, Sherine Talaat, Gayle Aafedt, ChE'88



ELEMENTARY STUDENTS FROM MAPLETON, ND TAKE FIELD TRIP TO CEM





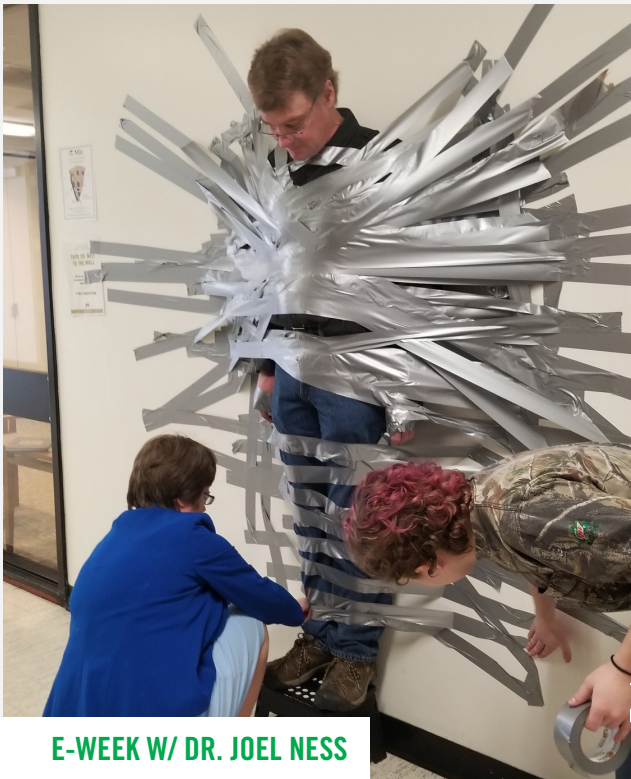
ENGINEERS WITHOUT BORDERS IN GUATEMALA



DECEMBER 2018 ORDER OF THE ENGINEER RING CEREMONY & PLEDGE OF THE COMPUTING PROFESSIONAL



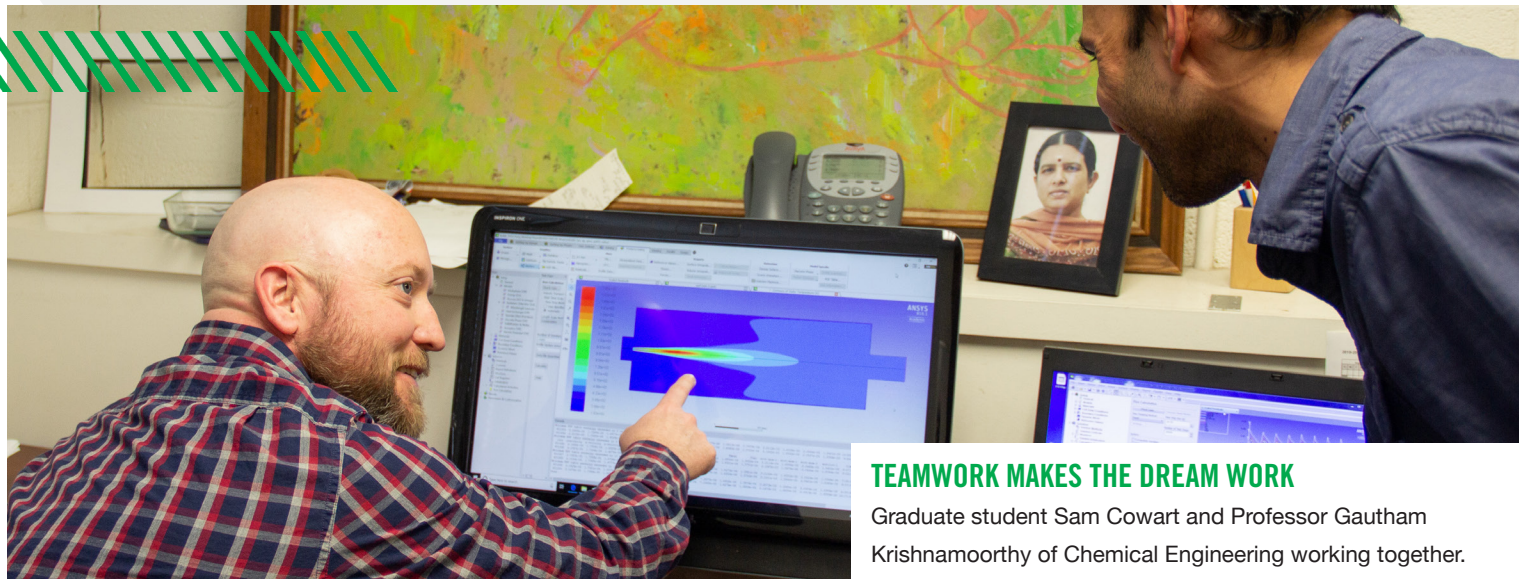
2018 ANNUAL SWE CONFERENCE
UND Society of Women Engineers' Chapter wins the SWE Mission Award and Bridget Hieland receives the NASPA IV-West Ring Star Award in Minneapolis.



E-WEEK W/ DR. JOEL NESS



2019 FREEMAN AWARDS
Brianna Bednarek, Abby Aymond and John DeBeltz's project was chosen as the 1st place winner of the 2019 Minnkota Power Andrew L. Freeman Innovation Award. Pictured with Brendan Kennelly, BSEE '02.



TEAMWORK MAKES THE DREAM WORK
Graduate student Sam Cowart and Professor Gautham Krishnamoorthy of Chemical Engineering working together.

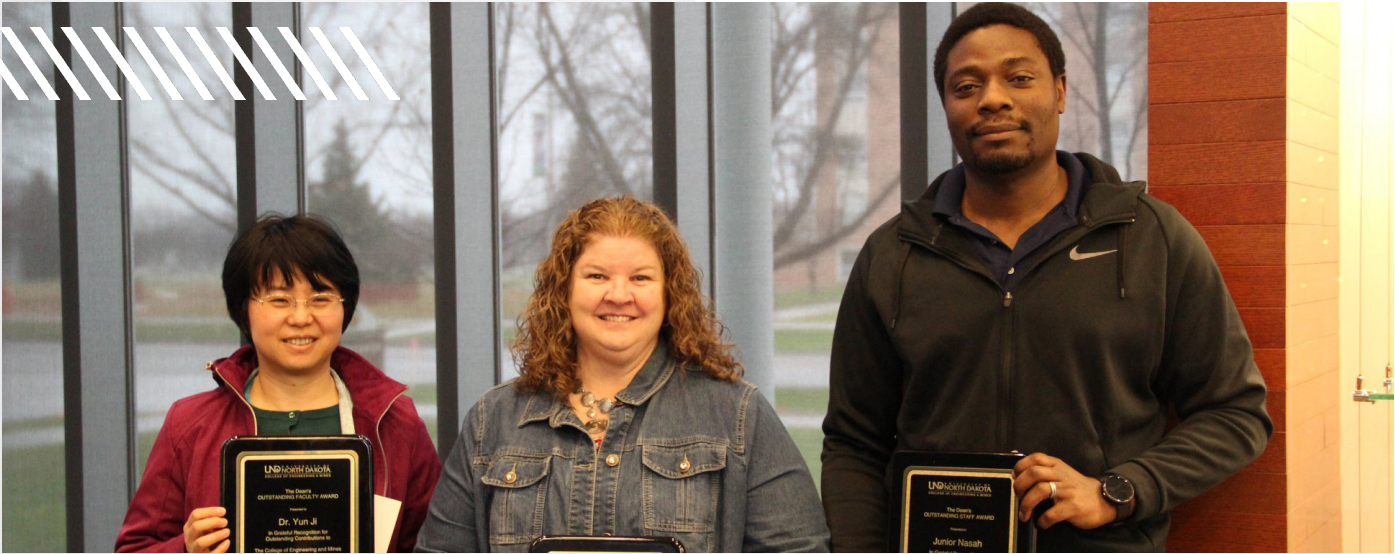


STOVE-TOP DIPLOMACY (P. 29)



CEM EXECUTIVE BOARD & LEADERSHIP TOUR 3M INNOVATION CENTER

2019 FACULTY & STAFF AWARDS



DEAN'S OUTSTANDING FACULTY AND STAFF AWARDS

Recipients: Dr. Yun Ji (Associate Professor & Graduate Program Director, Chemical Engineering), Mary Winters (Administrative Secretary, Civil Engineering), and Junior Nasah (Manager Major Projects, Institute for Energy Studies)



DR. DABA GEDAFA

Department chair, associate professor, and civil engineer Dr. Daba Gedafa was named UND's Outstanding Advisor for his leadership to the American Society of Civil Engineers (ASCE).



DR. SUKHVARSH JERATH

After over thirty years of teaching aspiring engineers at the College of Engineering & Mines, Dr. Sukhvarsh Jerath, civil engineering retires. He was presented a recognition award in appreciation for his years of service to CEM.

2019 FOUNDERS DAY AWARDS



DEPARTMENTAL EXCELLENCE IN TEACHING AWARD

Received by the Department of Mechanical Engineering. The department has seen a 60-percent increase in enrollment over the past 10 years, which now makes the department the second-largest on campus.



INTERDISCIPLINARY RESEARCH COLLABORATION AWARD

Received by the Research Institute for Autonomous Systems (RIAS). Shown above are Jason Jensen, Prakash Ranganathan (EE), Jeremiah Neubert (ME) and Mark Askelson.



EXCELLENCE IN ACADEMIC ADVISING

Mojdeh Mardani, lecturer, EE, received the UND Foundation/Karleen Home Rosaaen Award for Excellence in Academic Advising.

STUDENT SUCCESS STORIES

I'M EXCITED FOR WHAT THE
FUTURE HOLDS FOR ME.

MATHEW COX, MSCE 2019

ABBY AYMOND

B.S. in Electrical Engineering with Biomedical Focus (2019)
Hometown: Grand Forks, ND

"My college experience has been full of exciting opportunities for development and research, both on and off campus. After graduation I will start the Biomedical Engineering Masters program at UND, with an anticipated thesis defense in early Summer 2020, then will start medical school the following August."

MATHEW COX

B.S. in Civil Engineering (2018) M.S. Civil Engineering (2019)
Hometown: Olympia, WA

"I look back on my time here with pride and excitement for what the future holds. I came to UND in the Fall of 2013 to pursue my degree in Civil Engineering, as well as be a part of the football team. Over my time here, I have become a well-rounded student confident in my knowledge and skills in the engineering world. This can be demonstrated in my path towards a career. During the interview process, I felt confident in my skills and knowledge. I received offers from all of the companies that I interviewed with in Minneapolis, accepted a position with Kimley-Horn as a Water Resources Engineer. This position drew my interest for the potential of growth that I saw within the Water Resources team at Kimley-Horn and this fits exactly with my career goals. I am excited for what the future holds for me."

JON DeBELTZ

B.S. in Chemical Engineering with Biomedical Focus (2019)
Hometown: Grand Forks, ND

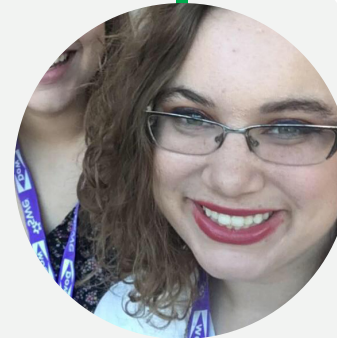
"Beginning college, I was not sure what degree program I wanted to do. I liked both Math and Science, but I also had an interest in Biology and Physiology. I decided to pursue a degree in Electrical Engineering with a Biomedical Focus to use Mathematics and Science to understand problems in Biology and Physiology. Throughout my time at UND, I learned the value of hard work, dedication, and perseverance. I enjoyed working on my senior design and getting to work in some of the labs."



JACOB GERITZ

B.S. in Chemical Engineering (2019)
Hometown: Casselton, ND

"At UND I have been involved with Pi Kappa Alpha, Dakota Venture Group, Student Relations Committee, AIChE, Student Government and Special Olympics. I worked a co-op at Cargill in Eddyville, Iowa and an internship at 3M at Brookings, SD. I have accepted a full time position at 3M as a Resident Project Engineer Medical Device Division at Brookings, SD."



KAIT DRAWZ

B.S. in Mechanical Engineering (2019)
Hometown: Minot, ND

"I started my mechanical engineering degree at UND in 2015. Soon after starting school I was able to become involved through many different organizations such as American Society of Mechanical Engineers, Formula SAE, and the Society of Women Engineers. After attending the career fair at the SWE national convention I got a position as a manufacturing engineer with Saint-Gobain in McPherson Kansas."



ALICIA KEELING

B.S. in Chemical Engineering (2019)
Hometown: Fergus Falls, MN

"My experience at UND has been a valuable chapter to my story. In and out of the classroom, the professors and faculty of the Chemical Engineering department have encouraged my success by teaching me leadership and communication. From meeting my husband in the engineering living-learning community to the opportunity of an on-campus interview with Hess Corporation which turned into a summer internship, I feel well-prepared for the next chapter. We will be moving to Minot, ND as I take on the position of Foundation Engineer with Hess Corporation."

THROUGHOUT MY TIME AT UND, I
LEARNED THE VALUE OF HARD WORK,
DEDICATION, AND PERSEVERANCE.

JON DeBELTZ, BSChE 2019

WELCOME DR. ADAMS

"The investments in data science and Babcock Hall are exciting," said Ryan Adams, the first director of the new School of Electrical Engineering & Computer Science (SECS) in the College of Engineering & Mines. Adams arrived January, 2019.

"My first impression was that the University is very well established. It's an old school for the United States. That history grounds things here, and it's a nice feeling," Adams said. He added that UND Alumni are a great resource, and noted the memorial in Upson II dedicated to electrical engineering alum Harry Nyquist, who worked for AT&T from 1917 to 1954 and won multiple awards for his work in communication systems.

"It's nice to see history and how it shapes us moving forward," Adams said.

He looks forward to building the School. Adams, who will teach antennas and radio frequency circuits, came to UND from the University of North Carolina-Charlotte.

I was in the Air Force for 10 years, and wanted to live in a city with an Air Force Base," said Adams. "I find Grand Forks appealing."



RETURNING TO ALMA MATER



An Alum makes a special trip back to CEM

Joe Skojde, BS'49 General Industrial Engineering, his son Kurt and daughter-in-law Kathe visit CEM. He is proud to say he is a 98 year old World War II pilot who has traveled the world and still holding on to a wish to skydive. He was a photographer (1948-49) for the *North Dakota Engineer*, a quarterly journal published by students from the College of Engineering. He enjoyed a 60 year career with Honeywell. During their visit, they met Brian Tande, Dean El-Rewini and current students working in their research labs.

GET CONNECTED.

On behalf of the College of Engineering & Mines, it is our pleasure to welcome you back to CEM whether you physically come to campus or visit virtually via our webpage, departmental newsletters, social media or through this ninth edition of *ENGINEERING*. We are excited to share the events, accomplishments, and future plans for the College with you at every opportunity. Much of our success depends on a thriving, energetic, and engaged alumni base in order to advance the best interests of the College and our students. Alumni are crucial to the present and, most importantly, the future of CEM. We would like to hear from you! There are a number of ways to get connected.

ATTENDING OR HOSTING AN EVENT

Events are scheduled on campus and throughout the country. We will notify you when we are coming to your area. Let us know if you would like to help host or coordinate activities in your area.

COME BACK TO CAMPUS

With a walk around CEM, you'll see your investments in our campus. We encourage you to let us know what's on your "must see" list.

HIRING CEM STUDENTS

We encourage you to highlight your company throughout the year by joining us on campus and holding an info session. It is the perfect opportunity to get to know the students and partner with us to make employment opportunities available to CEM graduates.

VOLUNTEERING

Your expertise and experience is of great value to the students. Please consider sharing that knowledge with our students by becoming a student mentor; joining students in the classroom or during informal lunches; or participating in our Alumni Perspective Series. We would appreciate your involvement.

SUPPORT

If you are considering lending your financial support to the college, there are numerous ongoing opportunities. It is our intention to work with you to ensure the stewardship of your gifts of time, talents, or treasures.

Scholarships create opportunities for talented students to earn a degree, regardless of their ability to pay.

Endowments provide the foundation for continued innovation, strengthening the educational experience over the long term.

Support for **faculty chairs and professorships** enables us to attract and retain top scholars who bring distinction to the College.

Unrestricted gifts to support the college's immediate needs provide resources to academic programs, faculty support, scholarships, facilities, technology, and laboratory equipment.

Legacy gifts to the College live on at UND forever.

Perhaps you wish to assist with the restoration of **Babcock Hall** and help transform this historic building into the **Big Data Hub** vital to every field of study.

Wherever you are, we hope you see yourself connecting to the College of Engineering and Mines very soon.



DEB AUSTRENG
DIRECTOR OF ALUMNI, CORPORATE
AND PUBLIC RELATIONS
☎ 701.777.4249
✉ debra.austreng@UND.edu



ROBIN TURNER
DIRECTOR OF DEVELOPMENT
☎ 701.777.1428
✉ robint@UNDfoundation.org
in LinkedIn.com/in/RobinTurner

Upson II Room 165
243 Centennial Drive, Stop 8155
University of North Dakota
Grand Forks, ND 58202-8155

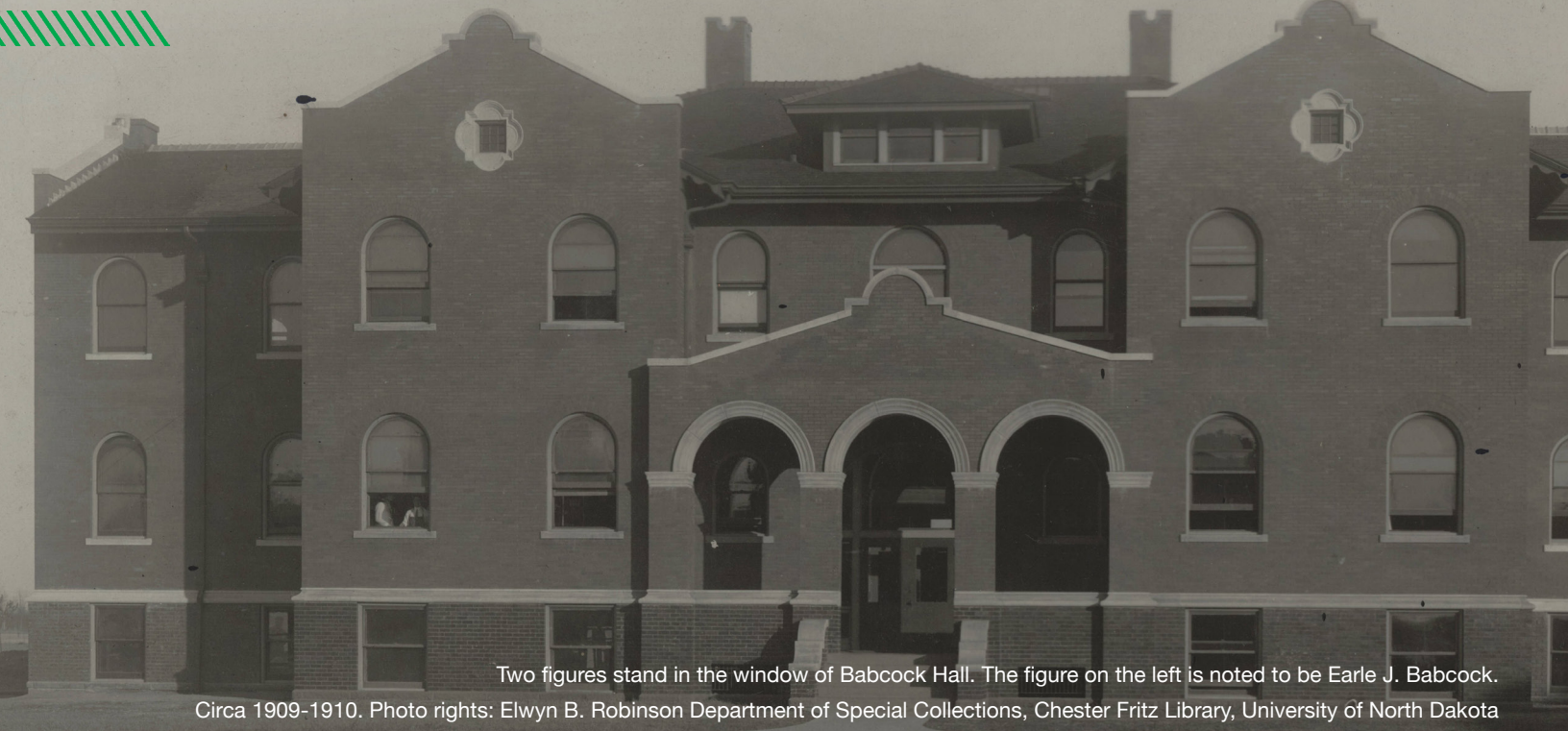
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TOGETHER, WE BUILD THE FUTURE

UND's oldest standing academic building is getting a new lease on life! Babcock Hall, the historic 110 year old building will undergo a renovation. Once the original home of the College, it bears the name of UND's first engineering dean Earl J. Babcock. The restoration will include collaborative research and laboratory spaces and innovation/tech transfer spaces as well as social and study spaces.

@UNDCEM



Two figures stand in the window of Babcock Hall. The figure on the left is noted to be Earle J. Babcock. Circa 1909-1910. Photo rights: Elwyn B. Robinson Department of Special Collections, Chester Fritz Library, University of North Dakota