2015

# Engineering

CHEMICAL CIVIL ELECTRICAL GEOLOGY GEOLOGICAL MECHANICAL PETROLEUM



GROWING AND EXPANDING

# NEW DEGREES/PROGRAMS APPROVED FOR FALL 2015

Ph.D. Civil Engineering
Ph.D. Electrical Engineering
Ph.D. Energy Engineering
Ph.D. Environmental Engineering
Ph.D. Geological Engineering
Ph.D. Mechanical Engineering
On-line MS. Electrical Engineering
Minor in Biomedical Engineering (B.S.)

# PROGRAMS CURRENTLY UNDER REVIEW AND PENDING APPROVAL

Ph.D. Petroleum Engineering
M.S. Energy Systems Engineering
M.S. Petroleum Engineering
M.Engr. Petroleum
Certificate in Petroleum Engineering

UNIVERSITY OF NORTH DAKOTA
COLLEGE OF ENGINEERING & MINES







Hesham El-Rewini, Dean,
College of Engineering & Mines

Editor: Deb Austreng, Director of Alumni, Corporate, & Public Relations

Content Coordinator: Jessica Mann

Contributing Writers:
Deb Austreng
David Dodds, University Relations
Juan Miguel Pedraza
Luke Griever

Photography:
Jackie Lorentz
Jessica Mann
Jeremy Malheim
Cassandra Van Dell
Deb Austreng
Shawna Schill
Kari Suedel

Engineering is publishes by the College of Engineering & Mines at the University of North Dakota. Please send comments and address changes to Deb Austreng at deb.austreng@engr.und.edu or call 701.777.4249



# Engineering

CHEMICAL CIVIL ELECTRICAL GEOLOGY GEOLOGICAL MECHANICAL PETROLEUM

## FEATURES

**Message from the Dean** 2
Raising the beam

**UND Collaborative Energy Complex** 6
Dignitaries preside over ground breaking

**Dean's Tour Renovation** 10
New spaces

**CEM Academy Induction** 14
Academy inductees

**Energy Research Day** 20
Inaugural event a success

**Biomedical Engineer Fazel-Rezai** 26
Solving tomorrow's problems today

**NDDOT's Go-To Guy Nabil Suleiman** 27
Asphalt expert

**ME Students Place First** 30
2014 International Design Competition

## DEPARTMENTS/STORIES

From the Executive Board 4
Capturing Young Minds 12
Epicenter of Innovation 18
New PE Chair 19
Exchange Agreement with China 19
Fulbright Awards 22
Nyberg Visits Campus 24
Student Expo 25
Saleh Faruque Featured Online 28
Alumni Perspectives 29
Seattle Alumni Event 32
Founder's Day 33
Outstanding Faculty/Staff 33
Rockwell Collins Tour 34
Get Connected 36

UND UNIVERSITY OF NORTH DAKOTA
COLLEGE OF ENGINEERING & MINES


## MESSAGE FROM THE DEAN

# Raising the Beam – A Reflection on a Remarkable Journey

Last week we celebrated the placement of the last steel beam in *The Collaborative Energy Complex (CEC)*, the newest addition to our Engineering compound. The beam was signed by hundreds of students, faculty, staff, alumni, donors, and friends. It highlights our accomplishments and symbolizes the collaborative spirit that has guided the development of this project from the first day. I am grateful to the numerous individuals and organizations that have worked collaboratively to help us make a distant dream a nearing reality. The signed beam, which will remain exposed after the building is complete, will always be a reminder that only through collaboration can we find grand solutions to the grand challenges facing our future.

As I was standing outside the construction site with dozens of colleagues and students watching the raising of the beam in sub-zero temperatures, I could not help but reflect on the incredible journey that has taken us to this important milestone. I went back in time and space to September 30, 2011 in Seattle, when the idea of the Collaborative Energy Complex was first born. On that day, I presented the CEC to the ND Spirit

Campaign Steering Committee as the Next Big Thing in Engineering. The idea was to combine several of our strategic initiatives into what we called then the WICO (Wildly Important Combo Initiative). The goal of the WICO was to create a new ecosystem that included a compelling vision, state of the art facilities, needed programs, quality people, an enabling organizational structure, and a collaboration strategy that could help UND become a real leader in the Energy area. The support and buy-in that we received from many constituents inside and outside of UND has been remarkable.

Watching the beam being raised also made me reflect on all the great work that our faculty, staff, students, and executive board members have been doing during the past seven and half years since we started working together in 2008. Our College has witnessed tremendous success, advancement, and growth during those years. The annual college expenditure increased by more than 90%; student enrollment increased by more than 84%; annual research expenditure more than doubled in FY 12; faculty positions grew by over 32%; staff and engineer positions increased by over 66%; number of academic units increased by 40%; and number of degree programs increased by 42%. All eligible programs received ABET accreditation in 2010, and initial reports from the renewal visit in November 2015 are very positive. We have also renovated more than 26,000 square feet of existing space and built a new lounge and study area for students. When the CEC is finished in the summer of 2016, the College's physical space will have grown by almost 35%.

In addition, we raised more than $42 million to support the major initiatives of the College. We named the "Harold Hamm School of Geology and Geological Engineering" and established several new endowed faculty positions. We have developed several new degree programs including seven Ph.D. programs and a B.S. in Petroleum Engineering. We also established the Department of Petroleum Engineering and the Institute for Energy Studies to support the continued growth of North Dakota's energy industry. The student scholarship endowment grew by over 79%, and professorship endowment grew from zero to $9.5 million.

I am so proud of our faculty and staff, who work hard each day to advance the College and to provide our students with the richest possible learning experience. I am also extremely grateful for the generous support of our alumni, corporate friends, and the College's Executive Board. I look forward to our bright future and to the excitement awaiting us as we continue the journey that we started together.

Hesham El-Rewini, Ph.D., P.E.
Dean and Professor
January 18, 2016

# From the CEM's Executive Board

## An update by Board Chairman Terry Severson and Board Vice Chairman Steve Burian

*Terry Severson*

*Steve Burian*

The Executive Board has completed its third year of operation. College of Engineering and Mines (CEM) Dean, Hesham El-Rewini, established the Board to provide him, his faculty and staff ideas, recommendations, reactions, experiences, and abilities to augment the College from the Board members' collective diverse experiences, insights, and relationships. Each member has a special commitment to the success of CEM based on alumni, community, government, or industry ties.

The Board meets annually during Homecoming. For the first time this past year the Board also met mid-year with the objective of maintaining the momentum of the activities and initiatives with which Board members have become involved. We met in the Platinum LEED-certified Great River Energy facilities in Maple Grove, MN, as guests of Great River CEO and UND alum, David Saggau. The Board is planning to continue to meet semi-annually.

Based on the experience of the first two years of Board activity and the evolving priorities of the College, the Dean adjusted the committee structure. We still operate through four committees now structured as follows:

College Relations (Larry Wiken, Kayla Effertz, Co-Chairs) - Focus on the CEM story to bring together all the differentiators, e.g., Student Experience, Accessibility, Professor/Student Relationships and other "pillars" of the story. It looks for engagement opportunities that allow alumni, friends and corporations to become part of our story and is inclusive of students, alumni, friends, community/ state/region, and Government audiences.

Student Experience (Lisa Barnes, Chair) - Combined former Curriculum and Student Programs Committees to facilitate a focus on the total experience of CEM students—both in class and outside the classroom—and enhance those experiences to student and college benefit.

Research Promotion (Chuck Kummeth, Barbara Walz, Co-Chairs) - Advocate CEM basic, applied, commercial research interests with primarily industry resources, but also, companies and individuals that may have similar interests in CEM research work being done, e.g., partners in research, fund research, commercialize research.

Resource Development (Steve Burian, Chair) - Advise, augment, and assist the Dean and the UND Foundation to develop the resources needed to achieve CEM goals and objectives for new and improved facilities, equipment, faculty endowments, and scholarships to satisfy immediate, near and mid-term needs and initiatives.

The Board has added student members this year to add a needed dimension—it's been a long time for most Board members since they've been students. We've been joined by the Dean's Student Advisory Board Chair, Levi Lewis, and Vice-Chair, Michael Wegerson. Levi and Michael will provide the Board a ready student's perspective of needs, benefits, and impacts.

The Board is exceedingly pleased to note the achievement of the Dean's #1 objective—groundbreaking for the $15.5M Collaborative Energy Complex (CEC)—and proud to have assisted in that achievement. Other initiatives of note include: increasing student-alumni interaction and alumni interest in the college through the Alumni Perspective Series, supporting a mentor-protégé program between students and alumni, and addressing college research efforts to potentially interested alumni in industry and government. We look forward to supporting the major new college initiatives, Grand Challenges and Pathways to Innovation.

The Alumni Perspective Series, developed and led by Board member Jim Albrecht and Dr. Matt Cavalli, is an example of what can be accomplished with Board efforts. During the previous academic year in a series of 6 events, the initiative engaged 900 students and 35 alumni from 24 different graduating years representing 11 different degree types/disciplines from 27 different companies. Some alumni have not been back to campus since they graduated.

We even had one NDSU Engineering graduate participate. He said that he enjoyed the experience and the students were pleased to interact with an engineer from beyond CEM. The alumni feedback has been very favorable; almost all volunteered to participate again this year. They were impressed with attentive, engaged students in the classrooms and group events. Students liked hearing from alumni from different engineering disciplines, e.g., not just ME graduates talking to ME students and classes.

CEM alumni know that the key to business success is recruiting top talent. There's an opportunity through the Alumni Perspective Series, to initiate or improve contacts with CEM students and faculty that will likely lead to the hires we all need for our companies, organizations, and agencies to succeed. The events are themed; e.g., recent graduates, development, professional services, and executive prospective; to provide students a very wide breadth of exposure to what they might want to do in their own professional careers. Our first event was September 17 bringing back recent graduates to whom students could most closely relate. Dusty McNally is coordinating the events inside CEM along with Jim Albrecht from the Board. Want to join in? Contact Dusty at dustin.mcnally@engr.und.edu or Jim at jim.albrect@comdelinc.com.

Based on last year's alumni feedback, we can almost guarantee you will enjoy the experience.

## Executive Board Members

**Jim Albrecht,** *President, ComDel Innovation, Wahpeton, ND*

**Lisa Barnes,** *Director of Engineering Business Management, Honeywell Aerospace Engineering Technology, Phoenix, AZ*

**Steve Burian,** *CEO, Advanced Engineering and Environmental Services, Inc (AE2S), Grand Forks, ND*

**Karl A. Bollingberg,** *Executive Vice President and Director of Banking Services, Alerus Financial, Grand Forks, ND*

**Ben Dove,** *Vice President of Performance Excellence, Lockheed Martin, Besthesda, MD*

**Kayla Effertz,** *ND Governor Dalrymple's Senior Policy Advisor, Bismarck, ND*

**Thomas A. Erickson,** *CEO, UND Energy and Environmental Research Center, Grand Forks, ND*

**Robert (Bob) Harris,** *Founder/Chairman of the Board, Harris Group, Inc., Seattle, WA*

**Mike Jones,** *Vice President of Research and Development, Lignite Energy Council, Bismarck, ND*

**Charles (Chuck) Kummeth,** *CEO and Director, Techne Corporation, Minneapolis, MN*

**Charles (Chuck) MacFarlane,** *President and CEO, Otter Tail Power Company, Fergus Falls, MN*

**Sherri Bonacci McDaniel,** *President, ATEK Products, LLC, Minneapolis, MN*

**Robert (Mac) McLennan,** *President/CEO, Minnkota Power Cooperative, Inc., Grand Forks, ND*

**Keith E. Moe,** *Chairman of the Board, MediGLIDER, Inc., Austin, TX*

**Kathleen Neset,** *President, Neset Consulting, Tioga, ND*

**Craig Olson,** *Vice President and General Manager, Business and Regional Systems, Commercial Systems, Rockwell Collins, Cedar Rapids, IA*

**Judi Paukert,** *Community Relations Manager, Xcel Energy, Grand Forks, ND*

**Fernanda Philbrick,** *Area Manager, Intel Resale Corporation, Excess Inventory, Metals Reclaim, NTM and Equipment Ops, Phoenix, AZ*

**Terry Severson,** *President, Trace Systems Inc., Tysons Corner, VA*

**Robert A. (Bob) Solberg,** *Chairman, JDR Cable Systems LTD, Houston, TX*

**Klaus Thiessen,** *President and CEO, Grand Forks Region Economic Development Corporation, Grand Forks, ND*

**Barbara A. Walz,** *Senior Vice President, Policy & Compliance/Chief Compliance Officer, Denver, CO*

**Lawrence F. Wiken,** *President and CEO, Coalition Works, LLC, Wiken International, Inc., IN Marketing, INC., Wayzata, MN*

# Dignitaries, Private Industry Break Ground on UND Collaborative Energy Complex

The next great petroleum engineering breakthrough could someday be linked to a University of North Dakota parking lot. UND's College of Engineering & Mines officially broke ground on its Collaborative Energy Complex, a unique facility the school first pitched to public and private donors more than three years ago. Once built, the CEC will connect the Bakken shale play with a talent pool of engineers trained by UND experts that will be working alongside industry representatives. The 37,000 square foot facility will replace an existing parking lot with a modern building designed to house multiple labs, classrooms and meeting spaces.

The groundbreaking ceremony included a "who's who" of North Dakota dignitaries and big-name company representatives. The dignitary group included Lt. Gov. Drew Wrigley, Sen. John Hoeven, R-North Dakota, Rep. Kevin Cramer, R-North Dakota, Michael Bast of Hess Corp., Steve Burian, CEO of AE2S, Bob Solberg, formerly with Texaco, Robert Kelly, UND president and Hesham El-Rewini, dean of the College of Engineering & Mines.

After a welcoming from Kelley that explained the many attributes of the new facility, Wrigley addressed the large crowd and explained his personal connection to UND. Wrigley's father attended the school, along with Wrigley himself, and both were proud to say they were apart of UND. When El-Rewini and his team first approached Wrigley about raising state funds for the CEC, Wrigley said the state was able to apply a great matching program called the N.D. Higher Education Challenge Fund that provided one dollar of state funding for every two gained from the private sector. Once complete, the facility should cost roughly $15 million. Wrigley believes the CEC will help the state continue to play a huge role in shaping global politics, "What happens here impacts the nation and the globe," he said.

Cramer offered a specific thank you during his speech

about the center and its role in the state. "To the private donors, thank you," he said. "You have made a really good investment."

Burian, one of the first donors to the CEC, seemed to agree with Cramer. As a UND graduate and an executive that regularly hires talent from the existing UND pool, Burian told the crowd that part of AE2S' future success will hinge on the success of the CEC.

According to both Cramer and Hoeven, the facility is happening not just because of UND's role in researching and advancing the Bakken shale play, only five hours away from the campus, but because of the "can-do spirit" seen in North Dakota. "It is happening here because we are making it happen here," he said.

Bob Solberg, formerly with Texaco and the lead donor of the CEC, said his donation to the center and his alma mater, will help the college become known for its work on the Bakken much in the same way schools like Louisiana State University has become linked to offshore oil exploration and production.

For El-Rewini, the CEC's groundbreaking ceremony marked a major milestone on the timeline that began years ago after he was hired to lead the college's engineering efforts. His help in growing the petroleum engineering department from four to more than 350 students has already been well documented. "CEC will provide our students and researchers with access to cutting edge laboratories and equipment. Students' educational experience will be enriched through industry interactions, personalized mentorship, professional development opportunities and outreach activities," he said.

For Hess Corp., one of the main donors and partners in the facility, the CEC will help to apply the best approaches to the oilfield with proven talent, according to Bast.

"We look forward to tremendous, innovative discoveries that are sure to follow," he said.

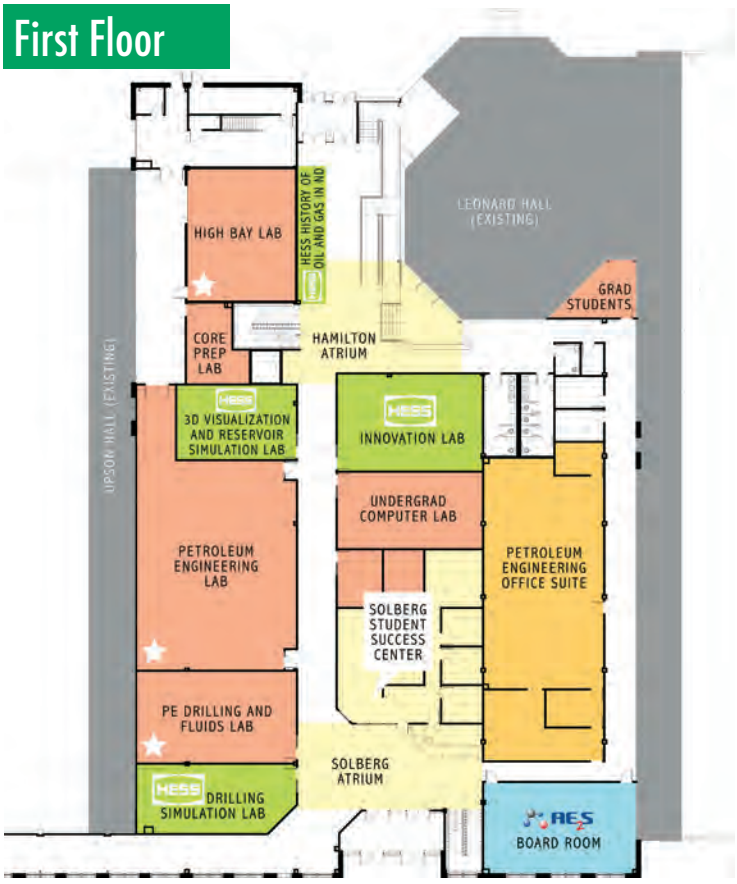
*Luke Geiver*
*Bakken Magazine*


*Local, state and national dignitaries spoke at the groundbreaking ceremony, including from top left to right: Rep. Kevin Cramer, R-ND; Hesham El-Rewini, dean of the College of Engineering and Mines; Senator John Hoeven, R-ND; Michael Bast of Hess Corp.; Bob Solberg, Lead Donor; Steve Burian, CEO of AE2S; UND President Robert Kelley; Jared Lennon, Asst. to Senator Heidi Heitkamp, D-ND; Lt. Gov. Drew Wrigley and DeAnna Carlson Zink, Executive Director of UND Alumni Association and Foundation.*

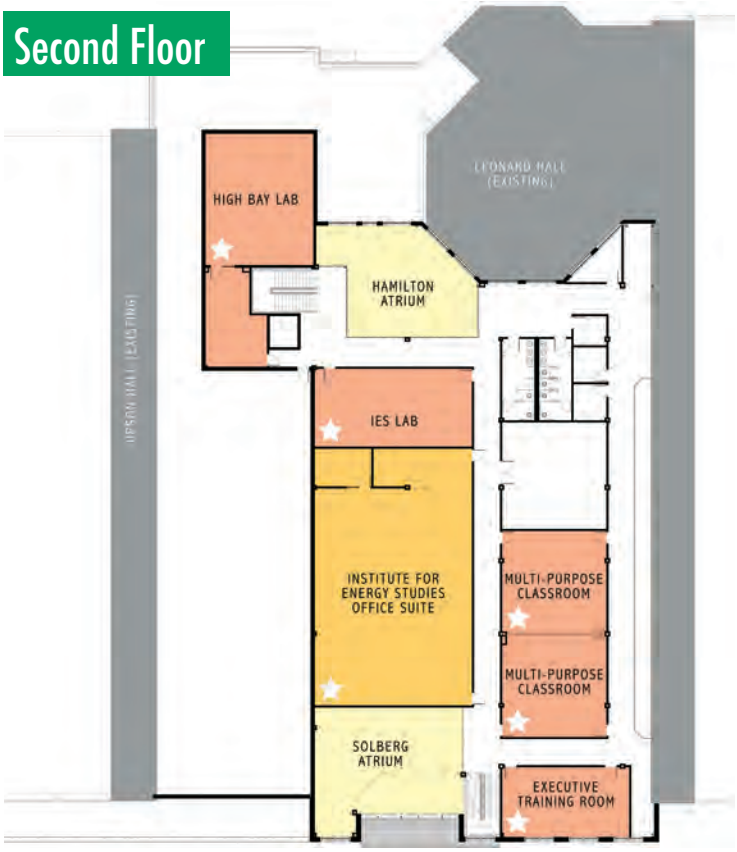
## Upon finalization of construction, the Collaborative Energy Complex will feature:

- Nearly 37,000 square feet of research/ teaching labs and customized spaces for students, faculty, and industry
- More than 7,500 square feet of new lab space for the College of Engineering and Mines
- A 40-vertical-foot High Bay Lab equipped with a two ton bridge crane
- Solberg Family Student Success Center for all Engineering and Geology Students, with mentoring, advising, internships, industry interaction, enrollment services, and more
- Hess Innovation Lab for students to explore innovative ways to solve challenges facing our state, nation, and the world
- Hess 3D Visualization and Reservoir Simulation Lab
- Hess Drilling Simulation Lab
- Solberg and Hamilton Atriums with displays designed to educate students and visitors
- Student study space and gathering areas
- Physical connection to the Harold Hamm School of Geology and Geological Engineering
- Easy access to the Wilson M. Laird Core and Sample Library

## First Floor




## Second Floor




☆ - Available naming opportunities at time of printing


Students Levi Lewis, Madeline Bahmer, Rachel Musielewicz and Michael Wegerson join President Robert Kelley and Dean El-Rewini to cut the ribbon to the new student study center, Upson II.


*Outside view of construction*

# Dean's Tour Renovation

On Oct. 9, 2015, Dean Hesham El-Rewini was honored to host the Dean's Grand Tour of the College. The event began with a ribbon cutting ceremony and dedication of the new student study center located at the main doors of Upson II. He was joined by UND President Robert Kelly, State Board of Higher Education (SBHE) Chair Kathleen Neset, CEM board members, students, alumni, faculty and staff. The new study space was dedicated to the senior students who will not be able to utilize the Collaborative Energy Complex, which is currently under construction.

The tour began in the lower level of Upson II which was totally remodeled this past summer and now includes new cutting-edge laboratory space as well as student work areas for both undergraduate and graduate students.

The new Materials Characterization Laboratory with its state-of-the-art equipment enables CEM to offer a wide variety of studies and services that include a full range of advanced materials characterization and data interpretation. Another new laboratory for material testing will allow Mechanical Engineering faculty and students to collaborate with material scientists from other disciplines to conduct world-class research in this area. The new Biomedical Engineering Research Complex acquired new equipment as well and is currently conducting studies on sleep apnea. This new lab will also be used in collaboration with UND's medical school and aerospace programs. The area also offers a new conference room as well as office space. Moving upstairs to the 3rd floor of Harrington Hall, the group stopped at another summer renovation project, a chemical engineering laboratory which received a floor to ceiling makeover. And another stop, just down the hall to a computer lab for chemical engineering students where we were able to double the number of computer work stations and equipment.

On the 2nd floor a new active learning classroom or "smart room" in Harrington Hall replaced a traditional classroom setting of rows of desks with adjustable furnishings. Students can now utilize an open learning environment which fosters teamwork through small group seating.

The Grand Tour wrapped up with a stop at the construction site of the Collaborative Energy Complex. Once completed, it will be home to CEM's Student Success Center, the Petroleum Engineering Department, the Institute for Energy Studies and will link Leonard Hall to Upson I & II. The building will feature new laboratories including a unique high bay lab, classrooms, conference rooms, and gathering spaces for students.


*Updated Classroom*


*Smart Classroom*


*CEM Collaborative Computer Lab*

Upson II
Room 17

*Sample Preparation Lab*

Upson II
Room 16

*Materials Characterization Lab*

Upson II
Room 12

*Materials Testing Lab*

Upson II
Room 11

*New Conference Room*

Harrington Hall
Room 321

*Chemical Engineering Lab*

Harrington Hall
Room 360E

*Chemical Engineering Lab*


Upson II
Room 360

*AE2S Civil Engineering Lab*

# CAPTURING YOUNG MINDS

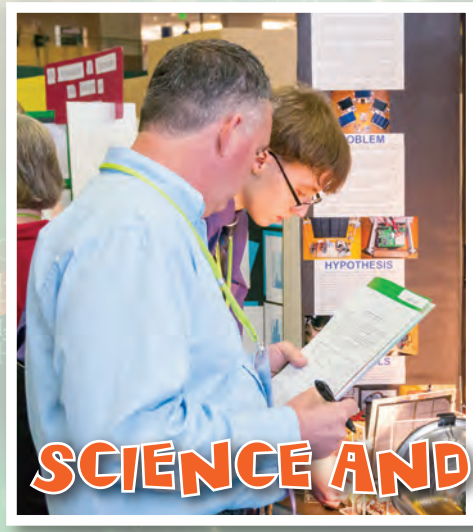


CEM Outreach introduced nearly 2,100 young students to engineering with programs and events such as:

- FIRST LEGO League State Tournament
- STEM Day
- Youth Science and Engineering Academy
- TEAM Testing
- North Dakota State Science and Engineering Fair
- Various Power On Appearances

STEM


FIRST LEGO LEAGUE


HYPOTHESIS


SCIENCE AND ENGINEERING FAIR

# CEM Academy Induction

## Steve L. Burian, BSCE '90, MECE '92

Steve, a Bismarck native received his Bachelor of Science in Civil Engineering in 1990, and a Master of Engineering in Civil Engineering with Environmental Emphasis in 1992. He was also a four-year letterwinner in track and field at UND, an All American, and was inducted into the UND Athletic Hall of Fame in 2006.

Steve is the Chief Executive Officer (CEO) of Advanced Engineering and Environmental Services, Inc. (AE2S), a firm he co-founded in Grand Forks in 1991 while in graduate school. AE2S has grown from a two-person environmental, civil, and geomatics firm into a company that employs nearly 300 people with offices throughout the Upper Midwest and Upper Rocky Mountain Region. Steve has devoted his career to consulting for drinking water and wastewater systems and is a recognized leader in the industry. Steve has received several regional and national awards recognizing his leadership and dedication to the engineering profession, including the UND Young Alumni Achievement Award in 2005.

*Barb, Steve and Tiahna Burian.*

Steve is active in the community and his profession. Steve currently serves on the UND Alumni Association and Foundation Board of Directors, the College of Engineering and Mines Executive Board as Vice Chair, he is the Chair of the Grand Forks Region Economic Development Corporation Board of Directors, and is a Co-Chair of the Valley Prosperity Partnership. He serves on the North Dakota Legacy Fund Initiative Committee and served on the North Dakota Governor's 2020 & Beyond Advisory Committee. Other leadership and advisory positions have been held with the American Water Works Association, the City of Grand Forks Mayor's Task Force on Population Growth, and the Greater Grand Forks Young Professionals.

Despite his hectic schedule, Steve makes spending time with his wife Barb, his daughter Tiahna, and his son Tyler a priority and enjoys watching Tiahna and Tyler participate in school activities and youth athletics. Steve also enjoys attending UND sporting events, hunting, and fishing.

*Dean El-Rewini, Harvey Gullick, Chair, Civil Engineering and Steve Burian.*

# CEM Academy Induction

## Keith E. Moe, BSME '65


*Keith Moe pictured here with his sister JoAnn Gorder, wife Karen and niece Jeanene Swartz.*

Keith, a native of Hoople, ND, received his Bachelor of Science degree in Mechanical Engineering in 1965 and later, an Executive MBA from the University of Minnesota.

Keith grew up working in his father's shop. He knew he wanted to be an engineer and that he would have to put himself through college. He bussed at the fraternity house for his meals and held a jobs all while working towards his degree.

After graduating, Keith went to work for Standard Oil India, as an Industrial Sales Representative. In 1967, his more than 30 year career began with 3M starting in technical service for the Duplicating Products Division and spanning leadership and management roles in numerous 3M divisions worldwide, including: Managing Director of 3M Venezuela, Technical Director of the Industrial Abrasives Division, Technical Director of the Process Technologies Lab and Manufacturing Manager of Graphic Systems and Health Care-Europe, just to name a few.

He retired from 3M in 2000 and is currently Chairman of the Board of MediGLIDER, Inc., Austin, TX. The company manufactures patient handling devices for hospitals and nursing homes.

Keith is a business consultant and advisor for several early stage technology companies and industry organizations which include or have included: Critical Connection, Inc., Smarter Solutions, Inc., FlightLock, InvestLinc, Innovalight, Agile Planet, and Mindflow Technologies. He currently serves on the CEM Executive Board, the CEM Student Experience sub-Committee and the University of Texas at Austin Engineering School Board. He is an IC2 Institute Fellow.

Keith has 2 daughters with his late wife Jane. Robin Ann of Austin, TX and Jill Jane, Weinheim, Germany. He is the proud grandfather of 6 grandchildren. Keith and his wife Karen celebrated their first wedding anniversary on November 12, 2014.


*Dean El-Rewini, Matthew Cavalli, Chair, Mechanical Engineering and Keith Moe.*

# CEM Academy Induction

## Charles S. Vein, BSCE '76

Charlie, a Grand Forks native and University of North Dakota graduate, received his Bachelor of Science degree in Civil Engineering in 1976. While attending UND, Charlie also competed on the cross country and track and field teams, noting he spent most of those years at the "field house," Upson, or the Library. Directly after graduation Charlie began working for KBM, Inc., a Grand Forks-based engineering firm, and remained there until 1991 when he co-founded Advanced Engineering and Environmental Services, Inc. (AE2S).

Charlie is the President of AE2S, a firm that has grown from a two-person environmental firm into a multi-discipline engineering company that employs nearly 300 people, with offices throughout the Upper Midwest and Upper Rocky Mountain Region. Charlie's primary technical specialty is in the area of water supply, treatment, and distribution. Throughout his career, he has managed a wide variety of projects including multi-million dollar, multi-year water projects for municipalities and regional water systems across the region as well as flood protection and recovery projects in Grand Forks, Fargo, Williston, and Hillsboro. As AE2S President, he emphasizes and models strong positive relationships and team building.


*Charlie and Leeza Vein.*

Charlie is a recognized leader in the engineering industry who has received several prestigious awards, including: the Environmental Achievement Award from the EPA in 1997; the Kenneth J. Miller Founders award from the American Water Works Association in 2006 for outstanding volunteer service to Water for People, the George Fuller Award from the American Water Works Association in 2007; and the 2013 Water Wheel Award from the North Dakota Water Users Association.


*Hesham El-Rewini, Harvey Gullick, Chair, Civil Engineering and Charlie Vein.*

In addition to his career achievements, Charlie is a man of strong faith who is a devoted husband to his wife Leeza, and his daughters, Laura, Jennifer, and Michelle. All three of Charlie and Leeza's daughters received their undergraduate degrees from UND. In his limited spare time, Charlie enjoys riding his Harley Davidson motorcycle.


*Pictured above are current Academy Members: (seated) Theodore Galambos BSCE'53, Bob Solberg BSCE'69, LeRoy Kuta BSME'64, Tom Hamilton MSGeo'67/PhD'71, Bob Harris BSGE'60, Chuck Kummeth BSEE'83; (standing) Dean Wieland BSCE'67, Mike Lodoen BSCE'65, Terry Severson BSEE'65, Howard Wrigley BSME'61, Charlie Vein BSCE'76, Keith Moe BSME'65, Steve Burian BSCE'90/MECE'92, Sherri Bonacci-McDaniel BSEE'89 and Walt Swingen BSGIE'53.*




# UND: Epicenter of Innovation

## Timothy O'Keefe, Brian Tande Developing Ways for Non-business Students to Pursue Dual Degrees in Entrepreneurship

Timothy O'Keefe and Brian Tande want more students to think entrepreneurially in their pursuit of an education at UND.

They are leading an effort on campus to make it easier for nonbusiness majors to add entrepreneurship as a second major. The initiative stems from the National Center for Engineering's (Epicenter) Pathways to Innovation Program, which recently selected O'Keefe and Tande to be part of its second cohort that is developing unique undergraduate experiences in engineering and entrepreneurship.

They've already started a process that would allow UND mechanical engineering students to obtain dual degrees in entrepreneurship and still finish in five years or less, according to Tande, associate professor and chair of the UND Chemical Engineering Department.

"So we will continue to look for ways to mesh the two programs as much as possible," he said.

But they're not stopping there.

"The School of Entrepreneurship is hopeful that the process we learn through the Pathways program can be replicated at other colleges at UND, potentially elsewhere as well," said O'Keefe, who serves as the executive director and chair of the UND entrepreneurship school. "Ultimately, we hope to create an environment of innovation and entrepreneurship that permeates the University. We envision UND as the epicenter of innovation and entrepreneurship—an ecosystem that encompasses the entire region."

They are being supported by Margaret Williams, dean of the UND College of Business and Public Administration (CoBPA), and Hesham El-Rewini, dean of the College of Engineering and Mines (CEM).

"Both deans have been very engaged in the process," Tande said.

Other universities chosen to participate in this program include New York Institute of Technology, James Madison University, University of Alabama in Birmingham, Washington State University and the University of Texas at Arlington. UND's strong entrepreneurial and engineering presence on campus—exhibited primarily by its School of Entrepreneurship, Center for Innovation (both part of the CoBPA) and CEM—gives UND a solid foundation to build upon.

"We hope the program helps us take it to the next level," Tande said. "We've got a great entrepreneurial culture on campus … we think there is more we could do together."

O'Keefe, with the help of grant writer, Della Kapocius, from the Center for Innovation, was instrumental in UND's selection for the Pathways program. He and Tande were notified last November.

Tande already has successfully developed a certificate program through the Jodsaas Center for Engineering Leadership and Entrepreneurship, part of the CEM, to help engineering students develop business savvy to go along with their engineering knowledge. He thinks initiatives like that could serve as a springboard for what they are trying to do with the Pathways Program on campus.

*Timothy O'Keefe (left) and Brian Tande are leading UND's participation in the pathways to innovation program. Photo by Jackie Lorentz.*

Still, they know not all UND students are destined to start and run successful businesses after they graduate. For those students, there's still value in developing an "entrepreneurial mindset," Tande said.

"What that means is the ability to find new ways of solving problems, to challenge conventional wisdom, and evaluate new opportunities—all while considering the technical, social and financial aspects of a problem," he said. "Those are the skills that any employer would value and that will set our graduates apart."

*David Dodds*

# New PE Chair—Vamegh Rasouli

Dr.Vamegh Rasouli received his Ph.D. from Imperial College in London and has 20 years of experience in both industrial and academic settings. He played a major role in the establishment and development of curriculum for undergraduate degree programs and expansion of research through industry collaborations in Amirkabir University of Techneology, Iran and at Curtin University, Perth, Australia (2006-2015). In 2007, he established the Curtin Petroleum Geomechanics Group (CPGG), working on drilling and geomechanical aspects of unconventional reservoirs. Dr. Rasouli served as professor and head of the Petroleum Engineering Department at Curtin University before coming to UND.

*Dr. Vamegh Rasouli*
*Chair and Continental Resources Distinguished Professor*
*Department of Petroleum Engineering*

# CEM Sign Student Exchange Agreement with China University of Petroleum (UPC)

In furtherance of their mutual interests in education, a desire to strengthen mutual contact, and as a contribution to increased international cooperation, the College of Engineering and Mines, and China University of Petroleum (East China), UPC, signed a collaboration agreement. Based on this agreement, the CEM will receive up to 5 top undergraduate visiting students per year supported by China Scholarship Council (CSC) for up to 6 months. During their stay at UND, the students will be working with faculty and graduate students towards a research project. The program starts initially with the Petroleum Engineering Department, however, this can be extended to other departments within the College. The agreement was signed in July 2015 by Dean Hesham El-Rewini and Professor Shan Honghong, president of UPC.

## About UPC

China University of Petroleum (UPC) is a national key university directly affiliated to the Ministry of Education and a member of the "211 Project"and "985 innovation platform for preponderant discipline" universities. China University of Petroleum is a higher education institution co-constructed by the Ministry of Education, four leading petroleum and petrochemical companies (CNPC, SINOPEC, CNOOC, and CHEMCHINA) and the People's Government of Shandong Province. Honored as "the cradle of scientific and technological talents for petroleum industry", UPC is an important base of training high-level talents for petroleum and petrochemical industry and has already developed into a multi-disciplinary, well-rounded university focusing on petroleum and engineering. (Source: http://english.upc.edu.cn/)


# Inaugural UND Energy Research Day a Success

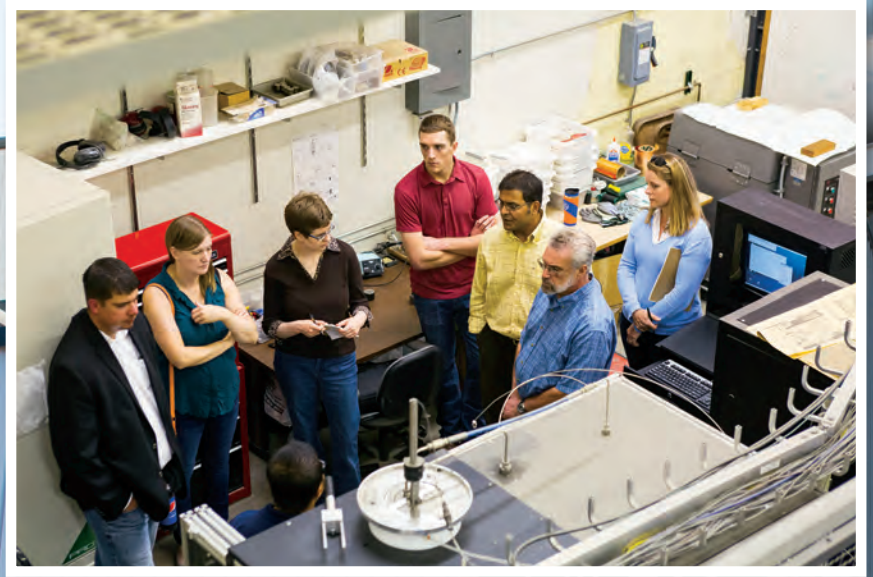
The Energy & Environmental Research Center (EERC), in collaboration with the University of North Dakota (UND) College of Engineering and Mines (CEM), presented an Energy Research Day on Thursday, September 4, 2014.

Energy Research Day was an opportunity for UND students, faculty, and staff to learn about current CEM and EERC projects and to explore the potential for collaborative activities regarding energy-related research. The Energy Research Day featured tours and project exhibits at CEM and the EERC.

Areas highlighted included the EERC's Bakken Production Optimization and Bakken $CO_2$ Enhanced Oil Recovery Programs, the Plains $CO_2$ Reduction Partnership Program, analytical and physical characterization for the petroleum industry, the Natural Materials Analytical Research Laboratory, and renewable energy activities.

The CEM featured the CACHYS $CO_2$ Capture Program, the autolab for testing of cores for oil recovery, the energy and environmental test facilities, and the Advanced Material Characterization Laboratory.

More than 200 people from around the campus community participated in the events.




A CO2 Capture Technology Project
ENERGY
Project Sponsors and Participants:
SOLEX
NETL

# Two Professors Receive Fulbrights

## Dr. Sukhvarsh Jerath

Sukhvarsh Jerath, Ph.D., P.E., F.ASCE, Professor and the Graduate Program Director in the Department of Civil Engineering at the University of North Dakota, was given a Fulbright prestigious award. He was selected as a Senior Scholar to teach and conduct research at the Indian Institute of Technology Bombay (IITB), Powai, Mumbai, India from December 2014 to May 2015. The awardees are selected by the Foreign Scholarship Board (FSB) in Washington, DC. The FSB is the Presidentially appointed 12-member board that is responsible for establishing worldwide policies for the Fulbright Program and for selection of Fulbright recipients. The Bureau of Educational and Cultural Affairs of the United States Department of State oversees the operations of this program throughout the world. The award is given to U.S. citizens to share their knowledge and in turn learn from their association with the host institutions. The program is also intended to spread goodwill and enhance friendship between the U.S. and the host countries.

During his stay as a Fulbright scholar at IITB, Dr. Jerath taught a graduate level course CE 619 Structural Stability. The course was not taught there for a long time due to unavailability of faculty to teach a higher level course in that area. Usually about twenty five students attend that level of course at IITB. Since the course was not taught for some time the number of students taking the course jumped to nearly seventy. The students gave an average score of about 93% (excellent to very good) to the core, curriculum, course, and instructor related questions at the end of the semester. Dr. Jerath helped two Ph.D. and one dual degree (BS and MS combined) students in their dissertation and thesis. He gave seminars in the area of structural engineering and structural mechanics ( bridges and storage tanks) on three different topics at three institutions, IITB, Powai, Mumbai, India; Indian Institute of Sciences (IISC), Bangalore, India; and Indian Institute of Technology Kanpur (IITK), Kanpur, India. The IITB, IISC, and IITK are ranked number 1, 2, and 3 engineering institutions respectively in India. Overall it was an excellent academic and professional experience as a Fulbright scholar representing U.S.A. in another country.

*Dr. Sukhvarsh Jerath, Ph.D., P.E., F.ASCE, Professor and Graduate Program Director, Department of Civil Engineering*

## Dr. Wayne Seames

Chemical Engineering Chester Fritz Professor Wayne Seames spent a sabbatical year at the University of Leeds in Northern England after being named 2014-2015 Fulbright Distinguished Chair Scholar. The Distinguished Chair Awards are designed for eminent scholars with substantial experience and publications in their respective fields. Awards in the Fulbright Distinguished Chairs Program are viewed as among the most prestigious and highly competitive appointments offered by the Fulbright Commission.

One of only three distinguished chairs sponsored in the U.K. each year, the Fulbright Foundation awards one Distinguished Chair fellowship to a U.S. citizen to contribute to the intellectual life of the University of Leeds through seminars, public lectures and curriculum development in any discipline. Candidates are selected by the Fulbright Commission and the Council for the International Exchange of Scholars (CIES) for a 6 month appointment.

*Chemical Engineering Chester Fritz Professor Wayne Seames*

Seames sabbatical was sponsored by the University of Leeds (UoL) Energy Research Institute (ERI), which is housed in the Faculty of Engineering, School of Chemical and Process Engineering (SCAPE). The mission and many of the research topics conducted by ERI aligned well with Wayne's personal areas of research as well as the mission and research areas of the SUNRISE center at UND which he helped to found in 2004.

Seames identified a series of research and education projects that he wanted to work on during his leave.

He initiated a series of collaborative research projects with a number of ERI researchers:

- Fundamental studies of the co-combustion of coal with

glycerin. Collaborative studies are being performed by one graduate student at UoL of the synergistic effects observed when glycerin, a bio-waste product, is sprayed onto coal just prior to combustion. He is adapting an explosion test chamber coupled with high resolution photography in order to perform novel fundamental studies of the combustion process.

- Merging fast pyrolysis experimental approaches to advance the production of fuels and chemicals. The goal is to add a staged condensation fast pyrolysis system and design and build an improved fluidized bed reactor for the UoL fast pyrolysis reaction system based on the successful design of UND's fast pyrolysis system. One post-doc has been assigned to oversee the design and construction of experimental equipment at Leeds. The UoL partner is waiting for a student who wants to do the project as part of their doctoral studies. He hopes to have one in this fall.
- Renewable Fuels and Chemicals from Algae-derived Oils, three separate projects were initiated:
  3a.) Novel methods to extract lipids from algae. Status: The UoL partner is waiting for a student to work on this project, he hopes to have one in this fall.
  3b.) Evaluating the UND COCT process for algal oil conversion to fuels and chemicals. Status: Algal oil samples were produced in the UoL lab in April and May and shipped to UND where they will be studied using UND's crop oil conversion technology process; the goal is to perform this work using a UoL post-graduate on a secondment assignment at UND next summer.
  3c.) Heterotropic algae for the production of lipids for fuel production. Status: Based on the composition of the oils, there is a good collaboration potential of this Leeds-derived algae system with the conversion technology developed at UND. We will be looking for joint funding opportunities to conduct this work in the future.

Wayne is still developing other projects and proposals with UoL researchers based on his time at Leeds.

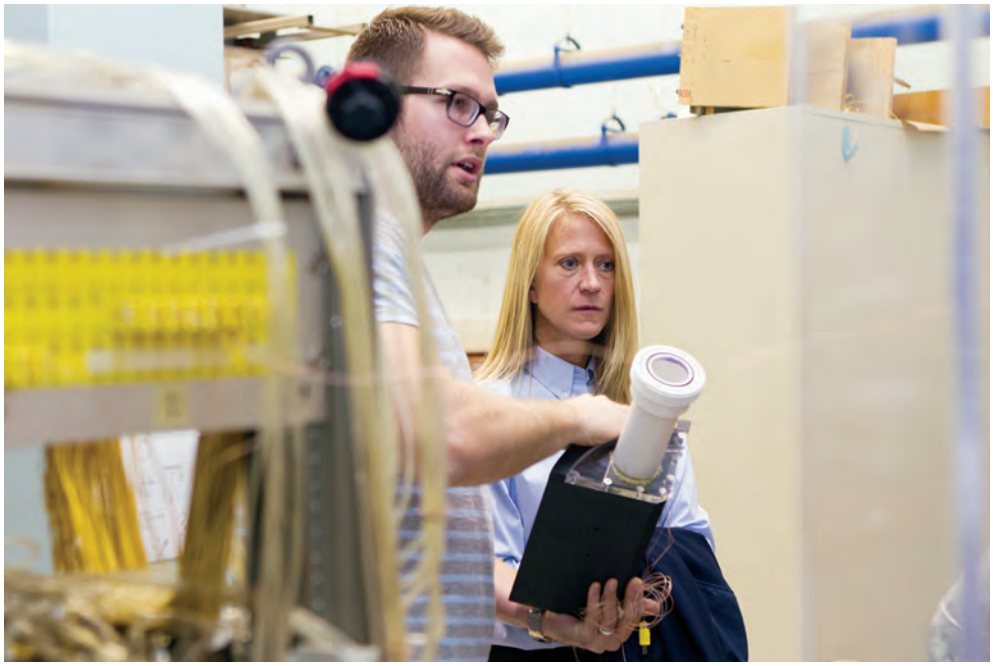
Seames' education projects included:

- Curriculum Evaluation for Two Highly Rated Chemical Engineering Programs. Scope: A study was conducted of the differences in how undergraduate chemical engineering was taught at UoL and UND. The study report was then distributed to faculty and administrators at both universities and presentations were given at each university for those interested in further discussion of my findings.
- Engagement Teaching Methods Workshop (for faculty). Scope: A 3 hour workshop was developed to teach engagement instructional techniques to academic staff (faculty) in Engineering and the Physical Sciences. The materials include a participant workbook, powerpoint slides, and instructor lecture notes. Four workshops were held at UoL for 44 total attendees. An additional 177 faculty attended these workshops conducted at Queens Belfast (Northern Ireland), Bath, Sheffield, Newcastle, Nottingham, and Strathclyde (Glasgow, Scotland). A version of this workshop will be conducted for UND CEM faculty fall 2015.
- A New Paradigm for Process Control Instruction. Two years ago Seames began designing and writing a textbook that would transform how the subject of process control is taught to chemical engineering undergraduate students. He used the time available during the sabbatical to complete the first draft of the book and will be using it as the primary teaching resource at UND Fall Semester 2015.

# Karen Nyberg and Doug Hurley Visit UND

Astronaut couple Karen Nyberg, (BSME'94) and Doug Hurley visited UND on October 24. Karen and Doug met with Dean El-Rewini, toured CEM labs spaces and spoke to students and faculty about their personal experiences working at NASA and the future of the space program. More than 100 CEM students attended Karen's presentation entitled, "Life on the ISS: Investing in Our Future".

Karen's NASA experience began with a co-op at Johnson Space Center while she was a mechanical engineering undergraduate student at UND. She worked at Johnson Space Center from 1991 to 1995 and received a patent for work she completed in 1991 on Robot Friendly Probe and Socket Assembly. In 1998, upon completing her doctorate, she accepted a position with the Crew and Thermal Systems Division, working as an Environmental Control Systems Engineer to improve space suit thermal control systems and evaluate firefighter suit cooling technologies. She also provided conceptual designs of the thermal control system for the Advanced Mars and Lunar Lander Mission studies, and environmental control system analysis for a collapsible hyperbaric chamber.



**Karen is the recipient of numerous honors and awards, several here at UND including:**

- **UND School of Engineering and Mines Meritorious Service Award in 1992**
- **Joyce Medalen Society of Women Engineers Award in 1994**
- **UND Young Alumni Achievement Award in 2004**
- **UND Sioux Award in 2009**
- **She was inducted into the College of Engineering and Mines Alumni Academy in 2009**

She was selected as an Astronaut Candidate by NASA in July 2000 and after two years of training and evaluation, she qualified as a Mission Specialist and was assigned for technical duties in the Astronaut Office Station Operations Branch where she served as Crew Support Astronaut for the Expedition 6 crew during their six-month mission aboard the International Space Station. In 2006, Nyberg took part in NEEMO 10, a deep-sea training and simulation exercise at the Aquarius Underwater Laboratory to help NASA prepare for the return of astronauts to the moon and eventual manned missions to Mars.

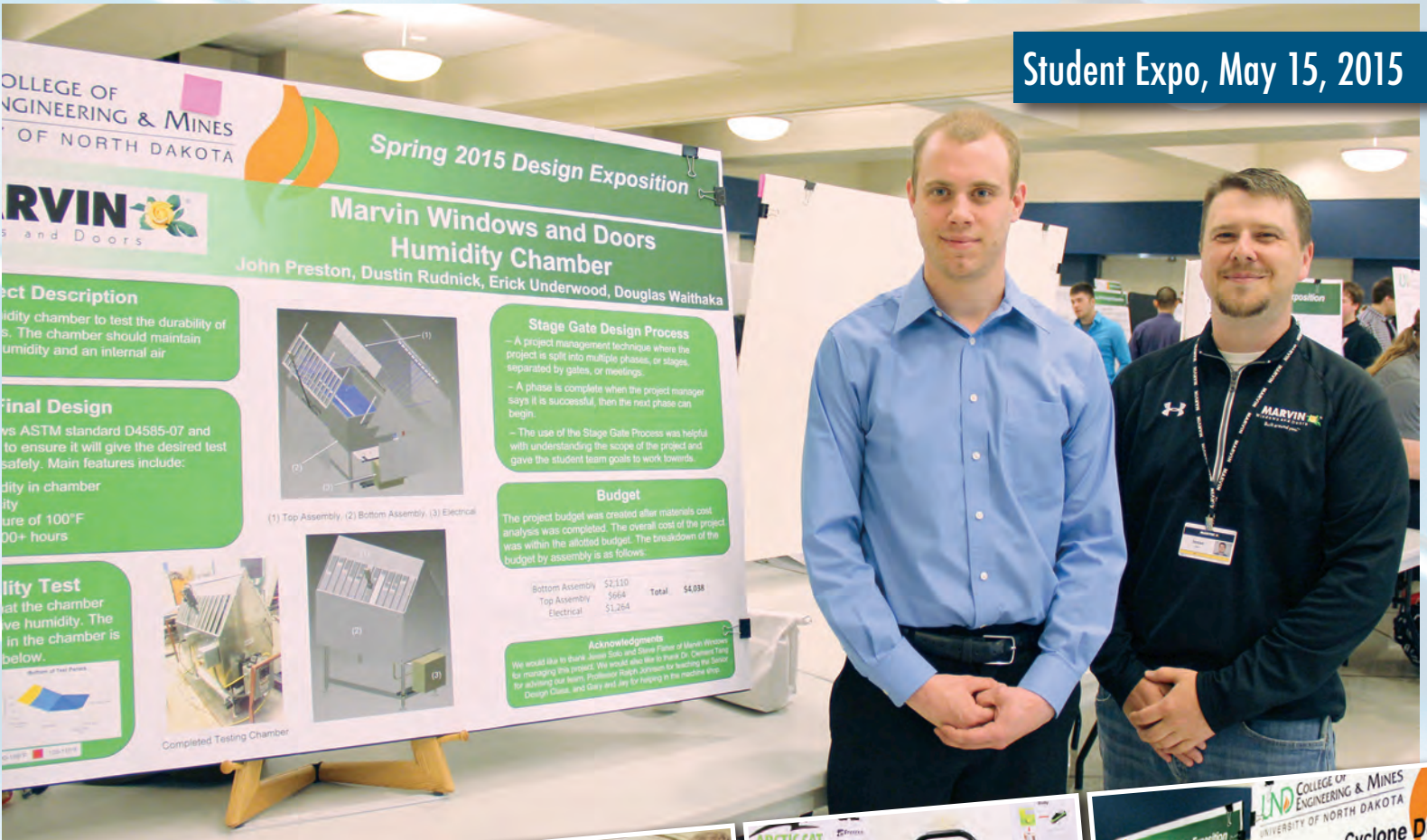
A veteran of two spaceflights, as Mission Specialist on STS-124 and a Flight Engineer for Expedition 36/37, she has accumulated 180 days in space over the course of the two missions.

She returned to campus to receive her Honorary Doctorate of Letters in summer 2014.

Doug began his career as a United States Marine fighter pilot. He was then selected in 2000 to be a pilot for NASA and had the honor of flying the shuttle Atlantis for the last mission in 2011. Doug's presentation, "End of an Era: The Final Space Shuttle Mission," was presented to UND School of Aerospace and Space Studies students and faculty.

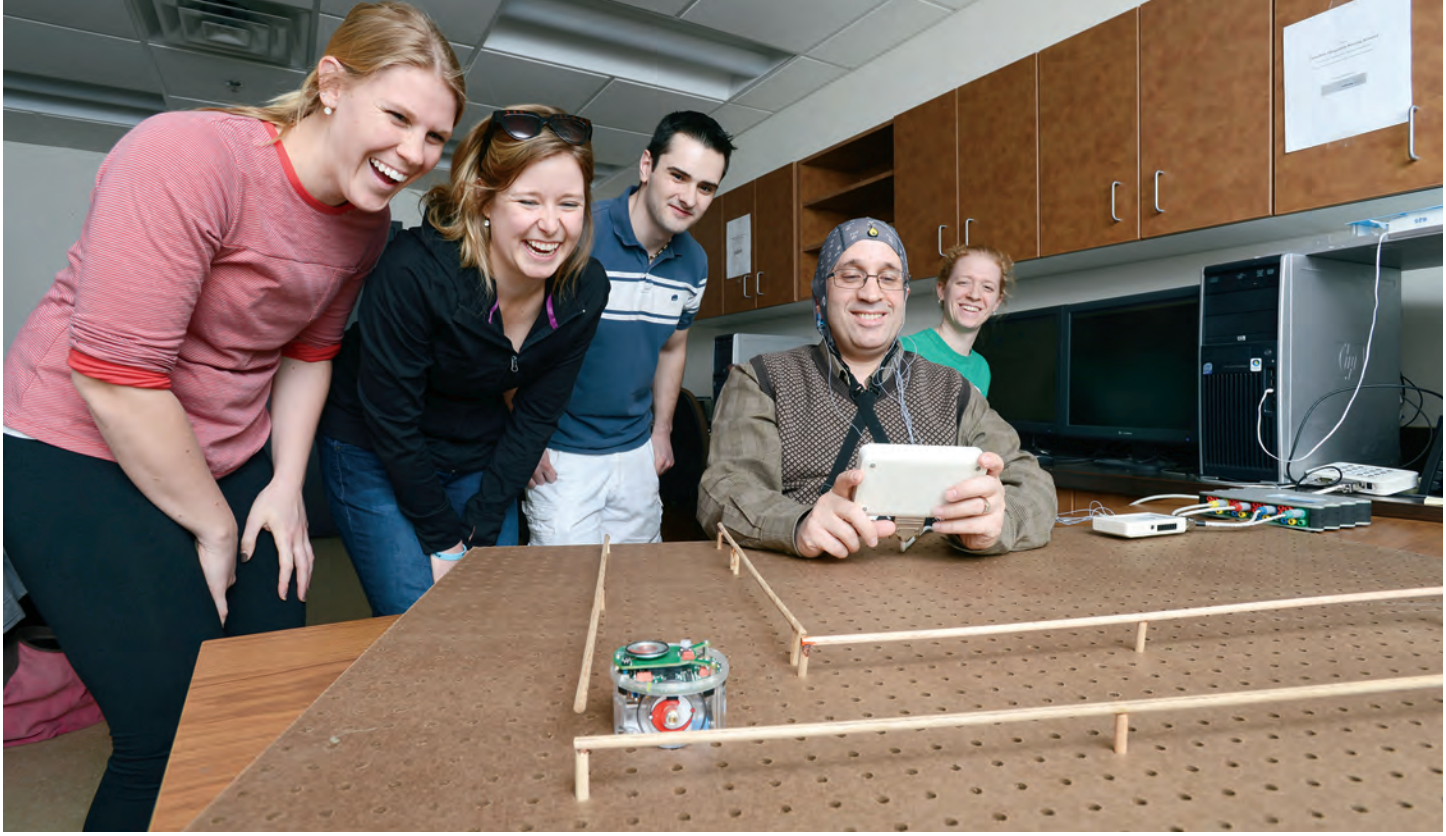
Karen and Doug met by being in the same NASA class of 2000. They married years later and have a four-year-old son, Jack.

# Student Expo, May 15, 2015






Twenty 8th grade students from Cheney Middle School, West Fargo, ND, were invited to display their work alongside CEM's students at the Sr. Design Expo. Their projects focused on North Dakota Oil Solutions. Their instructor is Candida Braun, 8th Grade Science Teacher, Cheney Middle School, NDSU Governor's School Science Coordinator.



# The Future is Now for Fazel-Rezai

## Biomedical Engineering Specialist Uses Technology of Tomorrow to Solve Today's Problems

Reza Fazel-Rezai is as ambitious as his research is exciting. Fazel-Rezai, an associate professor of electrical engineering, specializes in biomedical engineering techniques that provide innovative solutions for a better tomorrow.

His goal is to expand and strengthen biomedical engineering at UND, in the process, build the University's Biomedical Engineering Research Complex into an important and well-known research hub.

"I have passion for conducting research where the human quality of life is improved and consider myself blessed to make a living conducting research in the area that I enjoy so immensely," Fazel-Rezai said. "If there is no challenge conducting research, there is no fun."

His projects would seem to be the stuff of the future, more at home in the realm of science fiction—but for Fazel-Rezai—the ideas are very possible, very real, and in many cases, they're already in motion.

We're talking things like brain-computer interfaces allow people to type words without touching a keyboard, make smart-home systems even smarter, computer games more fun and lie detectors more reliable. It could also restore direct voice capabilities to people afflicted with ALS, brainstem strokes, cerebral palsy, multiple sclerosis and other brain or spinal cord afflictions.

He's also trying to develop new diagnostic applications that could revolutionize epilepsy management by tapping into brain signals to predict and detect the onset of seizure much earlier. In still another project, Fazel-Rezai is working on low-power and noninvasive ways to monitor human health, such as a tiny electronic tattoo placed on a subject's chest.

Fazel-Rezai is working with researchers in UND's Space Studies Department to use brain and heart signals to measure how newly developed UND spacesuits impact human physiological performances. He's also involved in a study on brain signal recordings and other neuropsychological assessments to more accurately determine the severity of and projected recovery time for sports-related concussions. For this study, Fazel-Rezai will work with Associate Professor of Physical Therapy Mark Romanick and athletes from Grand Forks Central and Red River High Schools.

"The University is a prime site for collaborative research that crosses disciplinary boundaries," he said.

Fazel-Rezai received his Ph.D. from the University of Manitoba, and after several years working in industry and other universities, he joined UND in 2008. He and his wife, Sima Noghanian, associate professor and chair of the UND Electrical Engineering Department, have two sons, including their oldest who attends the Massachusetts Institute of Technology.

*David Dodds*

# UND Professor a Go-To Guy for NDDOT When it Comes to Research on Roadway Surface Materials

It's a late summer afternoon, clear, breezy—perfect for an outing. For University of North Dakota Civil Engineering faculty member Nabil Suleiman, that means a road trip—to a work site a few miles north of Manvel, N.D., on U.S. Highway 81, where contractors for the North Dakota Department of Transportation (N.D. DOT) are rolling out a thick, fresh overlay of asphalt.

"It's heated to at least 280 degrees," says Suleiman, pointing to the smoking, single lane track of the mixture pouring out of the paving machine, led by dumper semis unloading in the machine's front hopper. As a regular at road work sites such as this one, Suleiman knows the gamut of jokes about the two Northern Plains seasons—winter and road construction.

Suleiman makes such site visits regularly—sometimes with groups of students from his pavement engineering classes—as part of his work as an asphalt consultant and researcher. His lab in the College of Engineering & Mines includes the latest equipment to test asphalt pavement cores, prepared right at the school.

"Really, there's a lot more to it than asphalt," says Suleiman. "Asphalt, a sticky petroleum by-product, is really the glue that holds many ingredients together to make an effective pavement. You can do it in many different thicknesses, depending on what kind of traffic uses the road you're paving."

Trucks account for most of the wear and tear on roads, Suleiman said.

"No doubt about it, in addition to this region's challenging weather, it's the truck traffic that causes most of the problems that require repair or repaving," Suleiman said. He notes that one truck imposes loads and wear on a road equivalent to 5,000 cars—you read that right, 5,000.

"We don't even consider cars when we design heavy traffic roads—we look only at what the expected truck traffic will be," said Suleiman, who came from Jordan/Palestine to study engineering here. "When I first came to the United States, I was fascinated and impressed by the roads here—then I knew that's what I wanted to work with."

In addition to his consulting work for N.D. DOT, Suleiman also conducts research projects for the agency.

Today, out on the road as the big rollers rumble by, he smiles broadly under his hard hat and blaze chartreuse vest—this is what he does.

*Juan Miguel Pedraza*

# UND Professor is Featured Engineer in Web-Based Electrical Engineering Magazine

University of North Dakota Electrical Engineering Associate Professor Saleh Faruque was highlighted as the "feature engineer" in a recent interview with the *Web-Based Electrical Engineering Magazine.*

*Electrical Engineering Associate Professor Saleh Faruque*

Faruque, a native of Bangladesh who has been with UND's College of Engineering & Mines since 2002, teaches undergraduate and graduate courses via traditional and distance-learning in UND's Department of Electrical Engineering. His current research addresses challenges presented by the rapid growth of wireless communication use.

Here are excerpts from the online interview:

## Faruque on His Current Research

Cellular communication has brought the world community closer than ever before; it is indispensable in even our everyday lives. Its use is increasing every day. However, it is unfortunate that existing technology cannot keep pace with this because of customer growth and high speed data communication. Recently, it has come to our attention that cellular technology may also contribute to Global CO2 pollution, which is expected to rise because of current explosion in wireless data. Almost all countries around the globe face this dilemma, giving rise to ever-increasing Global RF& CO2 pollution.

In an effort to address these issues, I am currently conducting a graduate research program, in which my students are looking at various spectrum management techniques currently in progress, to identify limitations if any, and to propose future research areas to improve spectral efficiency and reduce RF and CO2 pollution. We believe that transition to green cellular technology could be an effective solution to the spectrum crunch we are facing today.

## On Teaching

I believe teaching is a comprehensive effort that brings students up-to-date in key concepts, underlying principles and practical applications of the respective subjects. I consider myself as a surrogate parent to my students, who bring theory and practice into the classroom. When I find that they have grasped this, my spirit soars with joy and I feel that my efforts have been amply rewarded.

## More About Faruque

Faruque received his bachelors and master's degrees in Physics in applied physics from Dhaka University in Bangladesh in 1969 and 1970, respectively. He also received a master's and Ph.D. in electrical engineering from the University of Waterloo in Ontario, Canada, in 1976 and 1980, respectively. Upon completion of his degrees, Faruque worked in the telecom industry for more than 20 years in various capacities and contributed extensively in cellular communications and related areas.

In 2011-12, Faruque was the recipient of the prestigious U.S. Fulbright scholarship. In addition, the UND College of Engineering & Mines awarded him its Outstanding Professor of the Year in 2008 and 2012. Faruque has authored a book and contributed several chapters to three others. He has published more than 70 papers for various technical journals and conferences. In addition, he has secured 15 U.S. and three Canadian patents, and has several U.S. patents pending.

# Alumni Perspective Series

The Student Experience Committee, Jim Albrecht, Chair, supporting the Dean's initiatives for CEM, initiated a program called the Engineering Alumni Perspective Series for the 2014-2015 academic year. The aim of this program is to engage UND alumni to return to campus and talk with engineering students, providing perspective on the importance of the students' educational experience and what to expect as they enter the workforce. The Alumni Perspective Series was set up to bring 5 to 8 alumni to CEM on 6 different dates (3 each semester) during the academic year. The alumni were provided an agenda for each session, which included a meeting with the Dean, time in several classrooms, a luncheon panel discussion and a wrap up meeting at the end of the day.

The series was a success with participations from 35 alumni, representing 27 employers, 24 graduating years and 11 degrees/disciplines, attended the Alumni Perspective Series over the 6 sessions. Alumni were in front of over 900 engineering students. The response from the students and alumni was overwhelmingly positive. Some of the alumni had not been back to UND since graduation, so it was meaningful for them to come to campus and have a chance to share their experiences and stories with current CEM students. The students appreciated that the alumni were accessible and open to questions and provided direct answers. The alumni helped the students understand the opportunities that are in front of them in the engineering field.

Overall the Alumni Perspective Series was successful in connecting alumni with students. We thank Jim Albrecht for his efforts in getting the series organized and implemented.

*Jim Albrecht '84, Charlie Vein '76, Jeff Brungardt '84, Patrick Madsen '93, Dean Hesham El Rewini, Joseph Oliver '06 and Terri Zimmerman '85*

# ME Students Place First in International Competition

## The 2014 Student Design Competition Finals Held In Montreal

The 2014 Student Design Competition finals were held November 17 at the ASME International Mechanical Engineering Congress and Exposition in Montreal, Canada. UND's team of students from the Mechanical Engineering 201 course dominated the field to take first place.

Eighteen teams of young engineers-in-training competed for the right to call themselves world champion drone builders at the 22nd annual ASME Student Design Competition (SDC) finals at the International Mechanical Engineering Congress & Exhibition at Montreal's Palais des Congres.

The international slate of teams—including squads from universities in China, France, India, Peru, Turkey and across the United States—brought their talent and training to bear on one of today's hottest mechanical technologies: Unmanned Aerial Vehicles (UAVs) or as they are better known, drones. Each team had designed and built a powerful, maneuverable, remotely-piloted drone to fly in this year's competition.

Today, drones are one of the world's hottest technologies. Though an industry still in its infancy, drones and their potential have captured the imaginations of leaders in business, government and academia. They promise new solutions for difficult, dangerous or time-critical tasks in industries from agriculture to emergency medicine, from energy to journalism and beyond.

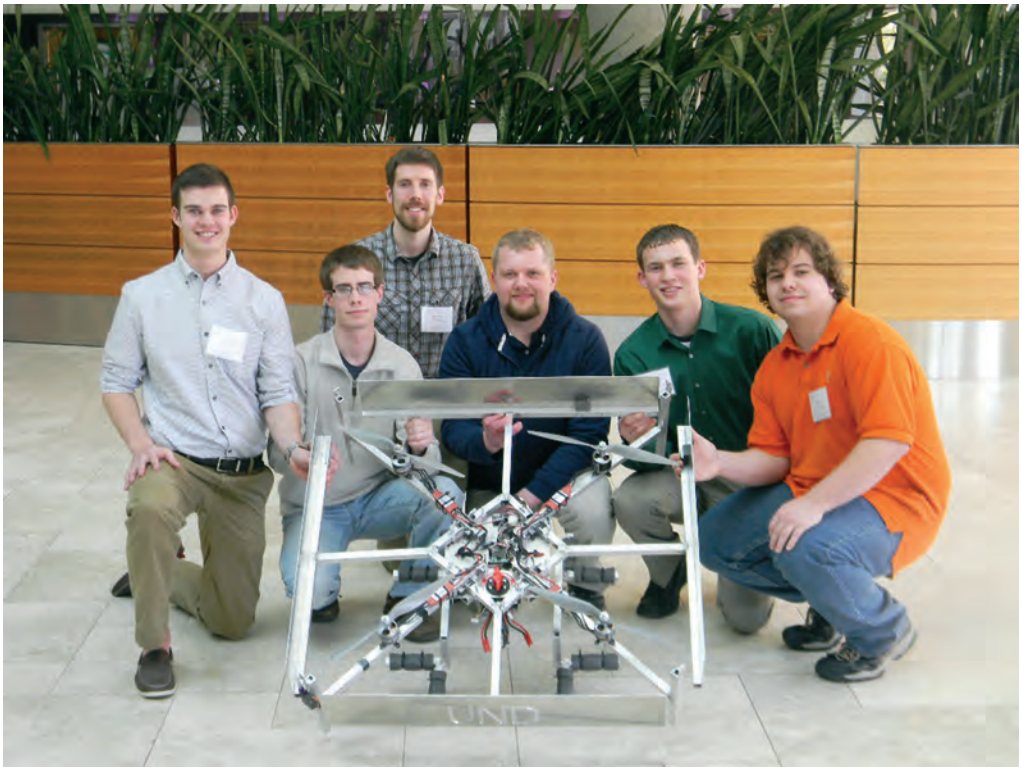
The SDC Challenge for 2014: design and build an original drone, pilot it successfully through a series of high and low obstacles, complete a targeted payload drop, and return to the start—in one piece.

Student engineer Oscar Wall Arias of the Instituto Tecnologico de Ciudad Juarez (Mexico) exemplified not only the technical excellence of the assembled teams but their humane ambition. "We're engineers," Arias said. "We're here to do good, to build, to make human lives better. What a great thing to be here with all these great teams today."

The University of North Dakota team took first place with their massive 78.4lb. gleaming steel-and-aluminum machine. Second place went to the nine-man, black-clad squad from California Polytechnic State University. Third place was taken by the "Airwolf," the drone flown by the "Wolfpack" team from North Carolina State University.

Every year, the SDC tests the mettle of young engineering students through a design-and-build challenge based on latest developments in industry and academia. A committee of ASME members led by Dr. Tim Hodges, Professor of Mechanical Engineering at the Virginia Military Institute, works throughout the year to bring the SDC to life.

"Students get to use their engineering knowledge to




*From left: Alex Heyd, Dan Smith, Dustin McNally (Advisor), Chris Borseth, Scott McDaniel and Aric Glaser.*


design and build a vehicle, and then they get to compare their work with that of their peers," Hodges said. "It gives them lots of confidence to work into the future and toward employment in the real world. And they have done such a wonderful job." Wearing protective glasses and clutching clipboards, Hodges and his colleagues also served as judges of the competition.

And a great day of competition it was: motors roared; assembled crowds hooted, laughed, and cheered; multicolored, multi-propellered flying robots swooped and zoomed high, loud and sometimes dangerously close to the competitors and judges in the arena. Judge's papers were repeatedly blown away by the windy force of the machines in flight. And though many succeeded, several entries crashed and shattered, with carbon-fiber blades and aluminum struts flying in all directions.

ASME President J. Robert Sims was deeply impressed by what he saw. "From looking at the exhibits and talking to the students, their dedication and expertise is just amazing," Sims said. "These folks are going to do well in the future in engineering. It's just a very impressive group—all of them. Whether they're winners or not in the finals, they are incredible individuals."

Scott McDaniel of North Dakota's winning team said, "We drove two full days to get here from North Dakota— I'm so glad we did!"

# Fifth Annual Seattle Alumni Event

More than 100 UND alums gathered at the Space Needle for the Fifth Annual Seattle Social held on June 3, 2015.

Deb Austreng with Curtis and Carol Orr.

Christa and Walter Barke ('50), Curtis Orr and Daughter Carol Orr.

CEM alumni and guests enjoy the evening.

We see future engineers!

# UND Founders Day Ceremony–February 26, 2015

*William Semke, Professor of Mechanical Engineering received the UND Award for Interdisciplinary Collaboration in Research or Creative Work. His team included: F. Richard Ferraro, Chester Fritz Distinguished Professor of Psychology; Glenda Lindseth, Professor of Nursing; Paul Lindseth, Professor of Aviation and Associate Dean, John D. Odegard School of Aerospace Sciences; Thomas Petros, Chester Fritz Distinguished Professor of Psychology; and Benjamin Trapnell, Associate Professor of Aviation.*

# Outstanding Employee Awards–2015

*The Dean's Outstanding Staff Award was presented to: Courtenay White, Distance Education/Student Experience Specialist and Deb Austreng, Director of Alumni, Corporate and Public Relations. The Dean's Outstanding Faculty Award was presented to: Frank Bowman, Associate Professor, Associate Chair for Education and Outreach and Mojdeh Mardani, Instructor, Electrical Engineering and Undergraduate Experience Advisor.*

# Rockwell Collins Tour

## July 30, 2015 – Cedar Rapids, IA

Dean Hesham El-Rewini, Andrew Bjerke, CEM Director of Development and Deb Austreng Director of Alumni, Corporate & Public Relations spent the day at the Rockwell Collins, Cedar Rapids headquarters. The day was filled with tours of departments, lunch with nearly 50 CEM alumni, and concluded with a meeting with a select group of Rockwell Collins management. Roger French, BSEE'78 served as host.

Rockwell Collins employs 140 UND alumni, ***80 of those are CEM Engineers!***

*Above: CEM alum Craig Olson, BSEE'88, Vice President and General Manager, Business and Regional Systems, Commercial Systems, was Rockwell's first intern from CEM. Pictured with him here are summer 2015 interns Preston Campbell and Suzanne Voce.*

*Roger French on behalf of Rockwell Collins provided funds to support EE research.*

*Joe Lovseth, MSEE'05*


*Russ Marcus, BSME'85 won the men's hockey Jersey. Pictured with Andy Bjerke.*


*Dean El-Rewini with CEM alumni.*

*Chad Raap, BSEE'97 and Roger French*

*Get connected...*

# GET CONNECTED WITH UND ENGINEERING

On behalf of the College of Engineering and Mines, it is our pleasure to welcome you back to CEM whether you physically come to campus or visit virtually via our webpage, Facebook, Twitter, departmental newsletters, or through this sixth edition of *Engineering*. We are excited to share the events, accomplishments and the future plans for the College with you at every opportunity. We are proud of our students, faculty, staff and alumni.

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. Your alma mater is working very hard to strengthen the bond between its alumni and friends. 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, here are a few:

**Attending or hosting an event:** Events are scheduled on campus and throughout the country. We encourage you to participate. Check our online event calendar often for opportunities. Perhaps you'd consider hosting. 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 investments in our campus are evident. We encourage you to let us know what's on you "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 by becoming a student mentor; joining students in the classroom or during informal lunches; or participate in round table discussions on specific topics of interest to engineering students. These possibilities are endless and we would appreciate your involvement. Would you consider participating in our **Alumni Perspectives Series**?

*Deb Austreng*

*Andrew Bjerke*


Deb Austreng
Director of Alumni, Corporate and Public Relations
College of Engineering & Mines
Harrington Hall, Room 100D
243 Centennial Drive, Stop 8155
Grand Forks, ND 58202
Office: 701-777-4249
Email: deb.austreng@engr.und.edu

Andrew Bjerke, '01
Director of Development
College of Engineering & Mines
3501 University Ave Stop 8157
Grand Forks, ND 58202
Office: 701-777-1428
Cell: 701-610-1112
Email: andrewB@undfoundation.org


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.

A gift to **support the Collaborative Energy Complex**, in its final fundraising stage, will help us make this project a reality and will enhance the learning experience across all departments as well the entire UND community. Your gift may be eligible for matching state dollars.

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

Today's students are tomorrow's leaders and innovators. Private support for **scholarships** creates opportunities for talented students to earn a degree, regardless of their ability to pay.

Faculty members are catalysts of intellectual vitality. Support for **faculty chairs and professorships** enables us to attract and retain top scholars who bring distinction to the college.

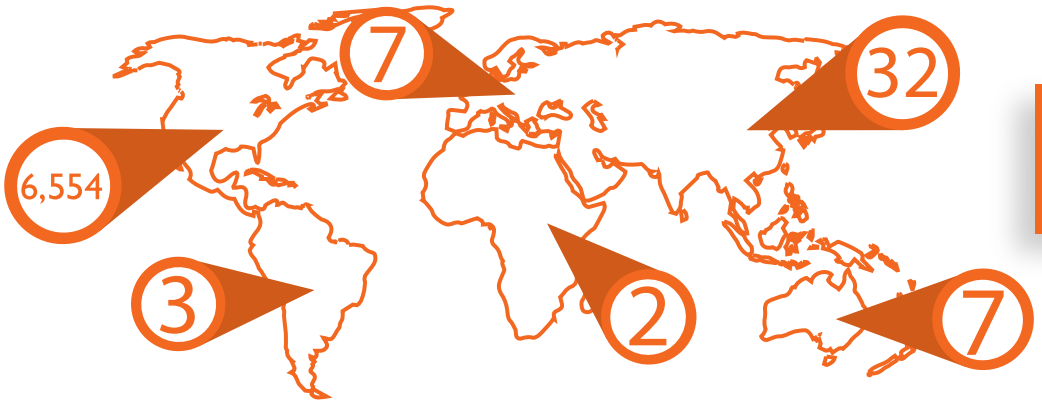
**Endowments** provide the foundation for continued innovation. Endowed funds sustain and strengthen the educational experience over the long term. Support for *endowments* provides perpetual funding for high-priority needs.

Please contact Andy Bjerke for more information about these exciting UND initiatives and to learn how you can help propel the college's future success.

## STAY CONNECTED WITH UND COLLEGE OF ENGINEERING & MINES

engineering.UND.edu  Facebook: UNDCEM  Twitter: undcem

**6,605 ALUMNI**

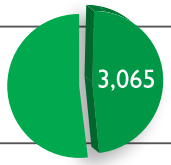


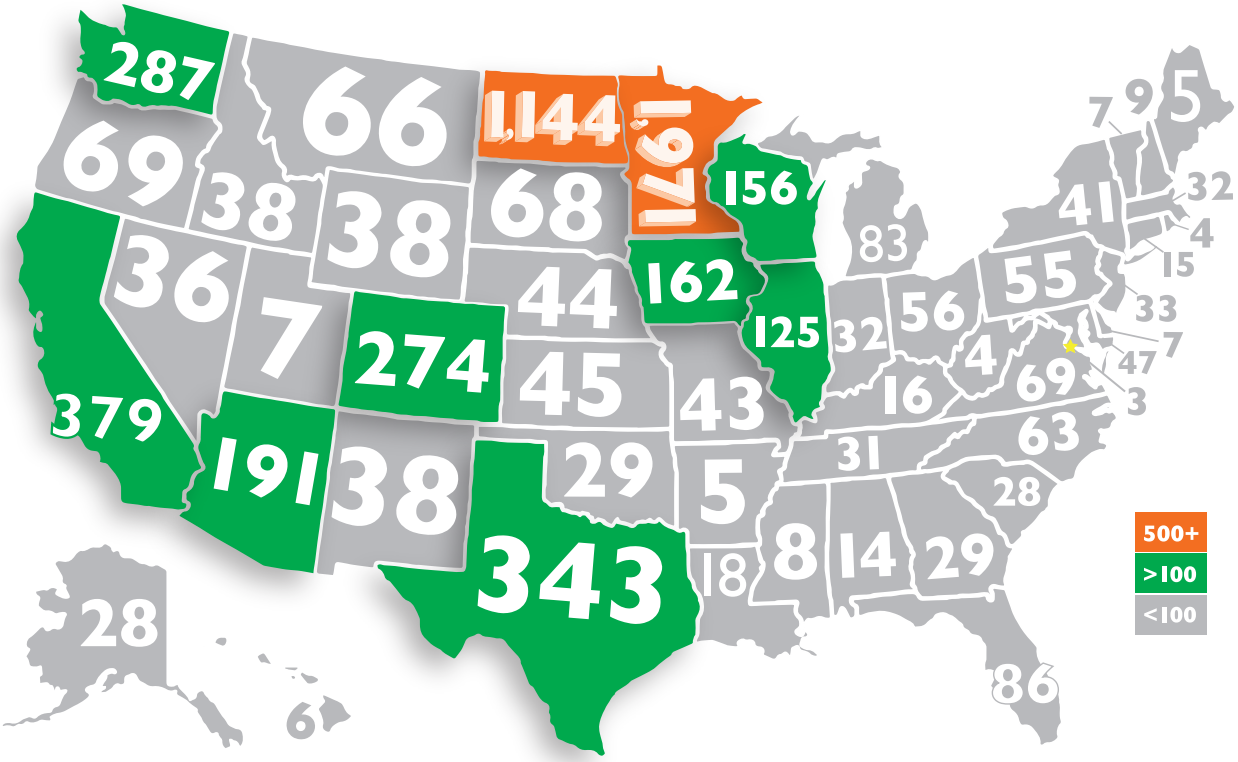

**6 CONTINENTS**

**50 STATES**

**25 COUNTRIES**

48% IN NORTH DAKOTA AND MINNESOTA



UNIVERSITY OF NORTH DAKOTA
COLLEGE OF ENGINEERING & MINES

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

Non-Profit Org.
U.S. Postage
PAID
Permit No. 10
Grand Forks, ND

**ADDRESS SERVICE REQUESTED**

**STAY CONNECTED WITH UND COLLEGE OF ENGINEERING & MINES**

**engineering.UND.edu**

**undcem**

**@undcem**