FALL 2012

Engineering

CHEMICAL CIVIL ELECTRICAL GEOLOGY GEOLOGICAL MECHANICAL PETROLEUM

Announcing the Harold Hamm School of Geology & Geological Engineering

UND THE UNIVERSITY OF NORTH DAKOTA

THE UNIVERSITY OF NORTH DAKOTA

COLLEGE OF ENGINEERING & MINES

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MESSAGE FROM THE DEAN – GROWTH

Benjamin Franklin once said, *"Without continual growth and progress, such words as improvement, achievement, and success have no meaning."* I am so proud that our college has seen extraordinary growth and progress over the past four years.

As you might know, we crafted a common vision and a strategic plan for our college over the course of 2009 and 2010. This vision has been the product of an inclusive process designed to seek input from and encourage ownership by faculty, staff, students, alumni, and other constituents. As a result of the hard work of our faculty and staff, the generous support of our alumni and friends, and the teamwork spirit exhibited by everyone, we are seeing our vision come to fruition.

New Designation

In June 2012, the State Board of Higher Education approved changing the designation of the "School of Engineering and Mines" to become the "College of Engineering and Mines." This change is a reflection of the tremendous growth that our college has seen in recent years. Enrollment has reached a record high of close to 1700 students, which represents more than 50% increase since 2008. The Department of Petroleum Engineering and the Institute for Energy Studies were established in the last two years. We offer twenty-four degree programs at the undergraduate and graduate levels; three new degree programs were added in the last three years and the fourth is on its way. Our annual research expenditure has doubled over the past four years. Funding has been secured for eight new tenure track faculty positions. Two new service offices have recently been established. The Office of Student Experience and Outreach was created this year to serve and enrich the experience of our existing and prospective students. Lastly, the Office of Engineering Information Technology Services was established to provide students, faculty and staff with the best computing and information technology capability.

Westward Expansion

We are also proposing to expand our research and degree programs offering to the western part of the state via the creation of a new branch campus: *College of Engineering and Mines-West*. The proposed branch is a discipline-specific campus that is largely self-contained, providing opportunities for the complete delivery of energy-related degree programs on-site, and research facilities for high-impact work that is relevant to the region. The State Board of Higher Education has already included $10 million in its 2013-15 operating budget request for the new branch campus.

New Executive Board

In addition to our Alumni Academy, we have inaugurated the Executive Board for the College of Engineering and Mines. The new board comprises senior-level corporate and community leaders who have the experience and vision to help guide strategic directions for the college. During its first meeting in Grand Forks this past October, the board selected Sheri McDaniel, President, ATEK Products, to be the chair of the board. The members also selected Steve Burian, CEO, Advanced Engineering and Environmental Service, to be the vice chair.

Largest Gift in the History of the College

The Pinnacle of 2012 accomplishments was the announcement of $14 million funding for the College of Engineering and Mines. It includes a $10 million gift from Mr. Harold Hamm and Continental Resources, Inc. to name the Harold Hamm School of Geology and Geological Engineering. The $4 million provided by the Industrial Commission/Oil and Gas Research Program will fund a project to support geology and geological engineering education and research.

Finally, these are exciting times for our college, our university, and our state. We can all be very proud of our achievements over the past four years. By continuing to work together as a team, we can all look forward to many more great years and a much brighter future for our college.

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

The Public-Private Partnership

On September 24, 2012 the College of Engineering and Mines announced $14,000,000 in private and public partnership funding that will greatly enhance UND's efforts in petroleum geology and related fields. The announcement also included the naming of the ***Harold Hamm School of Geology and Geological Engineering*** in the UND College of Engineering and Mines.

The total project includes $10,000,000 provided as a gift from Harold Hamm and Continental Resources, Inc., which will create the ***Harold Hamm School of Geology and Geological Engineering***. This is the largest single gift given to the University from a non-alum. An additional $4,000,000 from the Industrial Commission/Oil and Gas Research Program will fund the proposal entitled "Public-Private Partnership to Support Geology and Geological Engineering Education and Research at UND's College of Engineering and Mines."

"With the discovery of the world's largest oil field in more than 40 years, Continental Resources and North Dakota are changing the world," said Harold Hamm. "The Bakken Play is one of the primary fields making North American energy independence a reality, releasing us from the grip of foreign oil and serving as a model for unconventional oil production worldwide. Establishing the School of Geology and Geological Engineering is a vital commitment to continuing North Dakota's national and global leadership in energy."

North Dakota Governor Jack Dalrymple said, "We're proud to be partnering with Harold Hamm and Continental Resources to provide funding through a private-public partnership for this major expansion of UND's geology program. This is a perfect example of what can be done at our research institutions to enhance educational and employment opportunities for our state."

UND President Robert Kelley said, "This is an

Harold accepts a gift from UND President Robert Kelley.

President Robert Kelley, Dean Hesham El-Rewini, ND Governor Jack Dalrymple, Shelly Lambertz, Director, The Harold Hamm Foundation (Harold's daughter), Harold Hamm, W.F. "Rick" Bott, President & COO, Continental Resources.

exceptional day for the University of North Dakota. We are delighted to announce the naming of our School of Geology and Geological Engineering for Mr. Harold Hamm in honor of this very generous gift from Mr. Hamm and Continental Resources, Inc. This is the largest-ever gift to UND from someone who is not an alumnus of the University, and adds a significant dimension to North Dakota Spirit | The Campaign for UND."

"I also want to thank the North Dakota Industrial Commission for their very important portion of the private-public partnership," said Kelley. "This is a perfect model of private dollars and public resources working together for maximum benefit. The combined funding will enhance the education of future petroleum geologists and engineers, which is key to the ongoing development of the Williston Basin and the nation's petroleum resources."

Hesham El-Rewini, Dean of the UND College of Engineering and Mines said, "As an essential part of the UND College of Engineering and Mines, the ***Harold Hamm School of Geology and Geological Engineering*** will highlight the importance of geology and geological engineering in the state, not only in terms of North Dakota's financial well-being, but also in terms of employment within the state. The School will help attract high quality faculty members and the best and brightest students to North Dakota."

"Our goal is to produce future generations of petroleum geologists and engineers who can contribute

Front row are President Kelley, Harold Hamm, Governor Dalyrmple, Attorney General Stenehjem, Agriculture Commissioner Goehring and Dean El-Rewini.

to building a better world through professional service and research for safe, reliable, and affordable energy production," El-Rewini added. "We also aim to increase the research efforts currently conducted by faculty members and students in petroleum related fields, which will create new opportunities for collaboration with industry in North Dakota and elsewhere."

"This generous funding will give students at the University of North Dakota access to technology and resources that will better prepare them for engineering and energy-related jobs here in North Dakota and around the world," said Attorney General Wayne Stenehjem, a member of the North Dakota Industrial Commission. "It is our hope that this is only the beginning of what we can do, partnering with industry, to educate our future workforce."

"We already have one of the best core libraries in the United States housed at the Wilson M. Laird Core and Sample Library on the UND campus. These dollars will help us leverage the information in that facility and improve the opportunities for students and others to better understand the geology of North Dakota's natural resources," said Agriculture Commissioner Doug Goehring, a member of the North Dakota Industrial Commission.

Gift from Harold Hamm and Continental Resources Inc.

The $10 million private gift from Harold Hamm and Continental Resources, Inc. will be made available over the next four years, and the endowment portion will continue to return funding on an ongoing basis. Designed to enhance education and research at the Harold Hamm School of Geology and Geological Engineering, the gift will have an impact on the entire College of Engineering and Mines for many years.

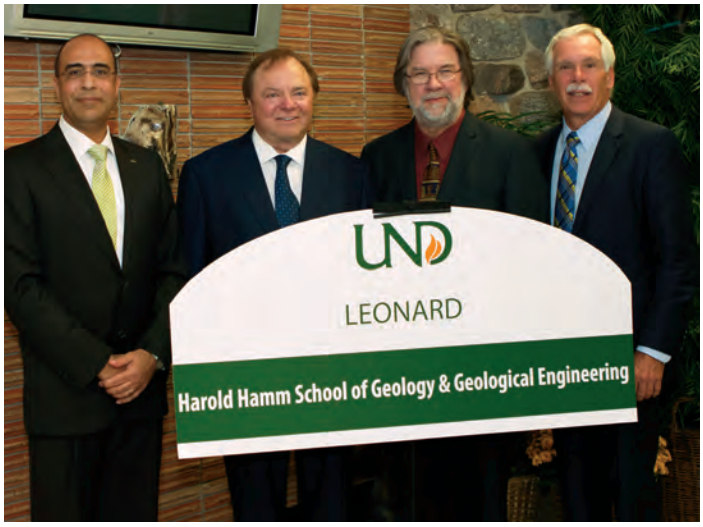
ND Industrial Commission members Agricultural Commissioner Doug Goehring and Attorney General Wayne Stenehjem.

The private gift has been designated to the following areas:

- Endowed Professor of Petroleum Geology
- Endowed Professor of Petroleum Engineering
- Endowed Leadership Scholarships
- Continental Resources High Resolution Virtual Core Library

The public funding has been designated to the following areas:

- Equipment to establish advanced laboratories
- Continental Resources High Resolution Virtual Core Library
- Student scholarships and graduate assistantships
- Students experience fund



Dean Hesham El-Rewini, Harold Hamm, Joseph Hartman, Director of the Harold Hamm School of Geology and Geological Engineering and Edward Schafer, former Governor of ND and a member of the Board of Directors of Continental Resources.

Continental RESOURCES

Governor Dalrymple and Harold Hamm announce the Public- Private Partnership on Monday September 24. The sign is a replica of the one that will stand outside Leonard Hall.

College of Engineering and Mines Executive Board Members

Steve Burian

CEO, Advanced Engineering and Environmental Service Inc (AE2S), Grand Forks, ND

Steve Burian is the 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 2-person firm into a 140-person environmental, civil, and geomatics firm with offices across North Dakota, Minnesota, and Montana. Burian has devoted his career to consulting for drinking water and wastewater systems, and is a recognized leader in the industry. Burian has received several regional and national awards recognizing his leadership and dedication to the engineering profession. He received both his bachelor's and master's degrees in chemical engineering from UND. He received the UND Young Alumni Achievement Award in 2005 and was inducted into UND Athletic Hall of Fame in 2006. Burian currently serves on the UND Alumni Association and Foundation Board of Directors.

Bob Harris

Founder and Chairman of the Board of Harris Group Inc., Seattle, WA

Founded in 1975 The Harris Group provides multi-discipline engineering through twelve domestic and International offices in the U.S. and a sister company, AO Harris Group International, in St. Petersburg, Russia. In the early 90's, Bob Harris' vision for renewable fuels became a reality, enabling Harris Group to help customers develop and commercialize next generation biofuels and conversion technologies. Although now retired, Harris remains active with the firm. He is a founding member of the UND CEM Alumni Academy. Born in Canada, Harris was educated at UND, where he played hockey and earned a degree in geological engineering.

Charles (Chuck) MacFarlane

President and CEO, Otter Tail Power Company, Fergus Falls, MN

Chuck MacFarlane joined Otter Tail Power Company in 2001 as Director of Financial Analysis and Planning. He was named Vice President of Finance and Business Planning in May 2002, Interim President in August 2002, President in 2003, and CEO in 2007. MacFarlane was born in Garrison, North Dakota. He earned his bachelor's degree in electrical engineering in 1987 from the University of North Dakota, Grand Forks, and his master's degree in business administration in 1994 from the University of St. Thomas, St. Paul, Minnesota. He also is a graduate of the Minnesota Executive Program at the University of Minnesota's Carlson School of Management. In his community, he serves on boards for Fergus Area Young Life and Productive Alternative

Sherri Bonacci McDaniel

President, ATEK Products, LLC, Minneapolis, MN

Sherri Bonacci McDaniel began her career with ATEK Products in May 2012. The company designs, manufactures and distributes industrial sensing, security, and safety systems. Prior to joining ATEK, McDaniel enjoyed a successful 20 year career with Rosemount, Inc., Emerson Process Management ultimately achieving the position of vice president and GM, Worldwide Temperature Business Unit. She is an adjunct professor at Bethel University MBA Program, and she serves on the Program Development Committee for Bethel University Global MBA Program as lead professor and developer of the MBA Global Operations Management course. She is partner and consultant at Adastra, LLC with emphasis on executive talent development and business strategy. She earned her BS in electrical engineering from UND and her MBA from UMN, Carlson School. McDaniel was inducted into the UND CEM Alumni Academy in 2008.

Robert (Mac) McLennan

President/CEO Minnkota Power Cooperative, Inc., Grand Forks, ND

Mac McLennan joined Minnkota Power Cooperative in January 2011. McLennan was previously employed by Tri-State Generation & Transmission Association based in Westminster, CO, as senior vice president of external affairs & member relations. In that position he focused on member relations, corporate planning, environmental compliance and development of business strategies. He also worked for the National Rural Electric Cooperative Association (NRECA) as director of environmental affairs and was an assistant to the chief of staff for Senator Byron Dorgan. He is a graduate of Jamestown College in Jamestown, ND.

Fernanda Philbrick

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

As Area Manager for Intel Resale Corporation Fernanda Philbrick and her team are responsible for contracts, supply chain management, and resale of goods ranging from reclaim metals to microprocessor chips. Philbrick began her career with Intel Corporation in 1997 as a process/equipment engineer in Santa Clara, CA. She has been an active participant and leader in the WIN organization (Women at Intel Network) and was awarded the 2006 Society of Women Engineers Emerging Leaders Award in procurement and logistics. In 2009 Philbrick received the Young Alumni Achievement

Award from the UND Alumni Association and was inducted into the UND CEM Alumni Academy. She earned both her bachelor's and master's degrees in chemical engineering from UND, and her MBA from Arizona State University. She currently serves on the UND Alumni Association and Foundation Board of Directors.

David Saggau

President and CEO, Great River Energy, Maple Grove, MN

David Saggau has been president and CEO of Great River Energy since 2005. He previously led its legal division as the organization's vice president and general counsel. Prior to joining Great River Energy, Saggau was an attorney for the Federal Energy Regulatory Commission in Washington, D.C., and a senior regulatory attorney for New England Electric Systems in Massachusetts. He serves on several business and charitable boards, including the Electric Power Research Institute, ACES Power Marketing, a Minnesota Business Partnership, and the Gillette Children's Hospital. He earned his BA and JD from UND. He currently serves on the UND National Campaign Steering Committee.

Terry Severson

President, TRACE Systems Inc., McLean, VA

Terry Severson is President and one of the founders of Trace Systems Inc. Trace is a technical professional services firm which provides networking, telecommunications, information technology, and information assurance services to U.S. Department of Defense customers. Severson has 47 years of experience in both military and industry communications/information technology services. Before helping found Trace in 2006, he was Director of Strategic Planning for the Communications Line of Business of DRS Technical Services, an operating element of DRS Technologies, Inc. and for Technical and Management Services Corporation (TAMSCO) for two years before it was acquired by DRS. He served in the USAF and retired in 1992 with the rank of colonel. He earned his BS in electrical engineering from UND and his MS in electrical engineering from the University of Denver. He is a resident graduate of the USAF Air War College.

Robert A. (Bob) Solberg

Chairman, JDR Cable Systems LTD, Houston, TX

Bob Solberg is chairman of JDR Cable Systems Ltd., which manufactures seismic cables for offshore surveys and umbilical cables, connecting and remotely operating wells drilled in very deep water. Solberg spent 33 years with Texaco, retiring in 2002 as president of commercial development responsible for the assessment of commercial viability and swift development of new assets worldwide. Bob's service includes; Board of Directors, Pioneer Natural Resources; Chairman, Scorpion Offshore Ltd; Advisor/Director, Katzenback LLC; non-executive chairman, the Hyperdynamics Corporation Board of Directors; UND Alumni Association and Foundation Board of Directors. Bob earned his BS in civil engineering from UND and in 2005 was inducted into the CEM Alumni Academy. He currently serves on the UND National Campaign Steering Committee.

Klaus Thiessen

President and CEO, Grand Forks Region Economic Development Corporation

Prior to joining the Grand Forks Region Economic Development Corporation, Klaus Thiessen was the President and CEO of the Winnipeg Economic Development Corporation for 10 years. With over 20 years of economic development experience, Thiessen has also held positions with Touche Ross Management Consultants, Xerox, and Canon. He holds a Master of Public Affairs degree from the University of Manitoba and B.A. from the University of Winnipeg. Thiessen's professional affiliations include: Director of International Economic Development Council in Washington D.C. and past president of the Economic Developers Association of Canada.

Lawrence F. Wiken

President and CEO, CoalitionWorks, LLC, Wiken International, Inc., IN Marketing, Inc., Wayzata, MN

After 20 years in the advertising agency business working with Fortune 500 companies, Wiken started Wiken International and two subsidiaries, IN Marketing and CoalitionWorks, to help clients meet the challenges of the rapidly changing digital world. Wiken International has worked with clients including: Pillsbury, AT&T, BellSouth, Verizon, Coca-Cola, and many others in the US and in the Czech Republic, Denmark, Sweden, Bulgaria, Belgium, Australia, Venezuela and Mexico. Recently, Wiken launched a 'smart' digital platform to provide his clients with real-time, intelligent strategies utilizing a Smart Platform, the Internet and social media. He earned his BS in business administration from UND, and attended the Executive Advanced Management Programs at both Stanford University and The Wharton School at the University of Pennsylvania. While attending UND Wiken was president of the American Marketing Assn., UND Chapter.

The museum offered free tours to our alumni the day of the social.

UND returns to SEATTLE for 2nd Annual Alumni Social held this year at the Museum of Flight

Jim Hunt, (BSChE'69) and Mike Mann, Chair of Chemical Engineering and Assoc. Dean for Research

Darren Cranston (BS'02), Colleen (Knox) Cranston (BSChE'03), Jennifer (Endicott) Klemish (BSME'02), Rae (Sculerati) Lutters (BSME'02), all have careers with Boeing

Twins guests: Barbara and Dennis Senneseth, Dean Hesham El-Rewini, Jeanie Votava (BSGE '93), Deb Austreng, Engineering and Mark Votava (BSME'83). Mark is Jeanie's big brother!

Barbara Senneseth, Dan McCarty (BSME'78), Dennis Senneseth (BSEE'66) and Jill McCarty, enjoy the game from the managers suite.

UND on TARGET with the TWINS

September 2011, Target Field

Geology and Geological Engineering

October 2011

Alumni of the Department of Geology and Geological Engineering enjoy an evening social at the Newsroom, downtown Minneapolis, MN. Many were in town to attend GSA.

Alumni Hockey Social

January 28, 2012

Ben and Dorothy Gorecki (BSBE'62/BSBA'63) with Grand Forks Mayor Michael Brown

Jarda Solc, Dan Muus, UND Foundation, and Jay Kleven (BSCE'96)

ALUMNI

Spirit Week

January 9-13, 2012

Students stop to write thank-you notes to 400 CEM alumni. Assisted here by Darin Buri, GGE library manager.

Homecoming 2011

Wallace W. Griffin, BSEE '62

Wallace W. Griffin, BSEE '62, is a native of Grand Forks, North Dakota. Wally is a seasoned telecommunications executive with significant early stage and small business senior management experience as well as serving in senior leadership positions in the telecommunications and cable television industries. His career began in 1962 with Northwestern Bell, holding progressive telecom management positions including General Manager-Operator Services, 1980-1981 and Assistant Vice President-Marketing from 1982-1983. From 1983 to 1992, he advanced his career with US West. He served as the President and Chief Executive Officer of US West Marketing Resources Group, from 1987-1992, where he managed the $1 billion publishing, media software and advertising services division. He served as a group president for a number of Jones International companies from 1994 to 1997, including Jones Lightwave, Ltd., a CLEC, and Jones Education Company, a leader in using technology to deliver education. From September 1998-June 2003 Wally assumed responsibilities as President and Chief Executive Officer of Pac-West Telecomm Inc., concurrently serving as co-owner of a consulting and business development company, Griffin Enterprises. Wally joined Red Shift as CEO in July 2009. He has served as a director on boards in both public and private companies. He has also been involved in supporting higher education including serving on the University of North Dakota Foundation Board, the University of Pacific Eberhardt School of Business Advisory Council and was a founding member of the Foundation Board at the University of California-Merced. Wally and his wife Lynette make their home in Golden, CO.

The Griffin family.

Pictured above: Hossein Salehfar, Interim Chair, Electrical Engineering, Wallace Griffin, Dean Hesham El-Rewini, Gary Hartz, Harvey Gullicks, Chair, Civil Engineering.

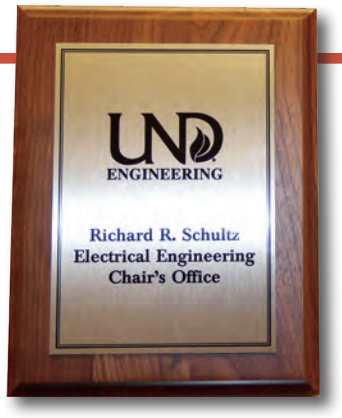
Rear Admiral Gary J. Hartz, BSCE '71

Rear Admiral (RADM) Gary J. Hartz, BSCE '71, was born in Grafton, ND and raised on a farm in Cavalier, ND. Gary is the retired Director of the Office of Environmental Health and Engineering (OEHE) with the Indian Health Service (IHS), an agency within the Department of Health and Human Services that is the principal federal health care provider and health advocate for American Indian and Alaska Native people. He oversaw health care facilities and staff quarters construction, facility maintenance and operations, and realty. He was also responsible for an environmental health program and had responsibility for the IHS facilities appropriation. He began his career with the IHS in 1971. His first assignment as a Public Health Service (PHS) Commissioned Corps Officer and Field Engineer was with the IHS Navajo Area, followed with an assignment to the IHS Alaska Area. In 1977, he transferred to the IHS Headquarters in Rockville, Maryland, where he was subsequently promoted to positions of increasing responsibility within OEHE, ultimately to his position of Director, in 1986. In 1996 he was promoted to Assistant Surgeon General (Rear Admiral) with USPHS. In August 1998, he was named Acting Director for the Office of Public Health with responsibility for a wide range of health activities related to health leadership, policy development, and advocacy for American Indian and Alaska Native public health issues. He managed a staff that assisted the Agency on budget formulation and resource allocation regarding the operation and management of IHS direct, tribal, and urban public health programs; program evaluation and assessment; research agenda; and special public health initiatives for the Agency. He retired from the U.S. Public Health Service Commission Corps in 2007 and was appointed to Senior Executive Service. Gary and his wife Janet (Brown, BSEd'70) reside in Poolsville, MD.

The Hartz Family.

Dedication of the Electrical Engineering Chair's Office in honor of Richard R. Schultz

Friends and family members join CK Schultz, Natalie, Noah and the Kelleys for the dedication ceremony hosted by Dean Hesham El-Rewini.



Noah and Natalie Schultz pictured with EE graduate students, Scott Gavett and Jonathan Musslewhite

DEDICATING THE *Norm and Ann Hoffman* ENERGETICS COLLECTION RESOURCE CENTER

The dedication of the Norm and Ann Hoffman Energetics Collection Resource Center took place on Friday, October 21, 2011.

The Hoffman Energetics Collection is designed to preserve the wealth of knowledge that has been developed in the area of energetics over many years and will support future generations working in this highly specialized area. The collection includes books, journals, conference proceedings, and databases, as well as, personal files from Norm and two of his colleagues, Bennett W. Kelley, and Theodore A. Melander.
The collection is currently being catalogued under the supervision of the Chester Fritz Library.

Dean Hesham El-Rewini, Ann and Norman Hoffman, President Robert Kelley, First Lady Marcia Kelley, President Emeritus Charles Kupchella and former first lady Adele.

Norm and Ann with their children, Jeanne, Julia and Ross and granddaughter Sophia.

In you have information to contribute to the collection, of particular interest is information that is not readily available through standard archival methods, please contact:

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Grand Forks, ND 58202-7101
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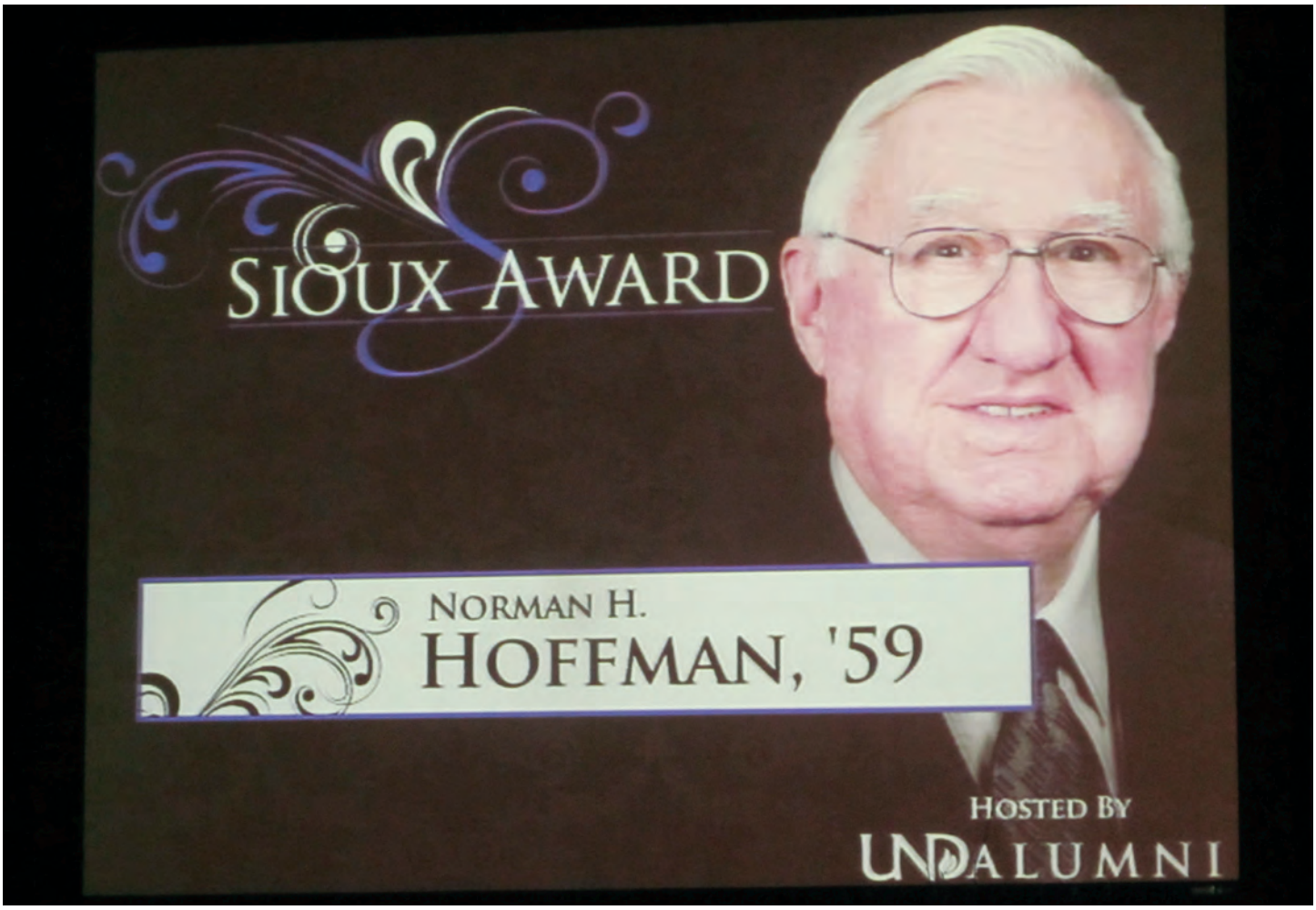
The Hoffmans with students from the first "Propellents and Explosives" class offered through Chemical Engineering and supported by the Hoffman's gift.

Norm Hoffman 2011 Sioux Award Recipient



The Hoffmans with Dr. Gautham Krishnamoorthy, the Ann and Norm Hoffman Assistant Professor in Energetics and Dr. Michael Mann, Chair, Chemical Engineering

Top Right: Ruth Dietz , Ray Kobe, (BSME'55) and Elizabeth Kobe

Bottom Right: Dorothy and Ben Gorecki, (BSEE'62, BSBA'63), Curtis Orr, (BSEE'53)

Enriching Student Learning

The CEM living-learning community is located on the fourth floor of McVey residence hall. The program was designed to provide academic and personal support to first-year students beginning with "move-in day" welcome and assistance and continuing throughout the academic year.

Junior and senior students from all engineering departments provided tutoring and mentoring, and planned study groups for the students. Monthly dinners with the College dean, department chairs and faculty were held along with activities to enhance the college experience, stimulate academic and personal growth, and increase the overall satisfaction of the student's first year college experience.

Fall 2011 saw the first class of 40 students arrive. Due to the high demand, capacity was increased to accommodate 80 students for fall 2012. Following engineering's lead and building on the success of our program; the aviation program offered a similar living-learning community for the first time in the fall of 2012.

Cassius Hartl (right) provides mentoring/tutoring.

Top right: Students participated in collaborative "hall" experiences throughout the year.

At left: Students are joined by CEM faculty for an evening meal. Pictured bottom left: Emily Javorina with Mojdeh Mardani, electrical engineering.

Getting to the Core

A UND scientist, experienced with China's most active oilfields, eyes bigger extraction payoffs for the Bakken.

Dongmei Wang, a soft-spoken scientist in UND's School of Geology and Geological Engineering, does her work far from the heart of the booming Bakken shale oil play in western North Dakota; still, she just might be the best friend the oil industry has.

The recent transplant from China, where she worked 22 years for Petrochina in that country's most active oilfields, followed her son to America when he enrolled at the University of Michigan. Wanting a new challenge and a quieter setting to call home, Wang took a job at UND as a petroleum engineering scientist, working with Will Gosnold, and the Petroleum Research, Education and Entrepreneurship Center of Excellence (PREEC), which already had been researching the relatively untapped geological formation known as the "Bakken."

An internationally recognized petroleum engineer, Wang's scientific experience in the Chinese oil industry only added to the burgeoning expertise and capabilities that have been amassing at UND's College of Engineering and Mines.

Wang now finds herself on the cusp of one of the most exciting oil exploration projects in the United States. To put it simply: UND researchers are studying the unique geological makeup of the Bakken shale and determining feasible, efficient ways to draw more "black gold" from its cavernous pores — a feat that is now akin to squeezing blood from a turnip.

Despite the unique challenges of the Bakken, oil companies have been flocking to the region to stake their claims. Favorable per-barrel prices and invasive "fracking" techniques, tailor-made for this kind of formation, have made it sufficiently lucrative for the oil industry to return to North Dakota in a huge way.

The activity has propelled North Dakota to second among oil-producing states, by some estimations.

And this is despite the fact companies are recovering only a tiny amount of the oil that's in place, using existing methods.

Imagine if that extraction success was as much as 30 times greater, or more!

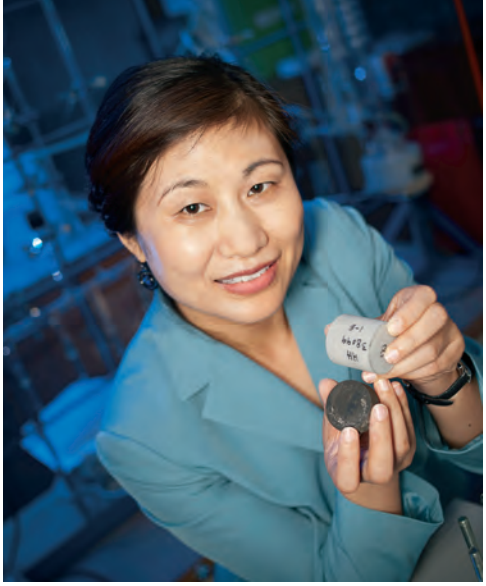
That's what Wang and her colleagues do every day.

"Right now it looks promising," she said. "It seems like the potential is huge."

Wang is the principal investigator in a three-year $625,000 research project that is starting to show positive signs. The objective is to determine whether a special blend of surfactant solutions can influence the Bakken shale formation in western North Dakota enough so that oil recovery can be improved through "imbibition" — displacement of one fluid by another.

Another important factor is that the surfactant solution should not damage the formation, Wang says.

The research could be significant because, even at current low percentage recovery rates, oil companies are making billions of dollars and boosting the state's economy along the way.



Dongmei Wang is exploring the potential of the "imbibition" process — displacement of one fluid by another — for boosting oil yields in North Dakota's Bakken formation.

Wang estimates that every 1 percent increase in recovery could lead to an increase of 2 billion to 4 billion barrels of domestic oil production.

Cores and Models

Wang's research is a multistep process that involves computer modeling at UND and analyses of core samples from private-sector oil giant Hess Corp. and the Wilson M. Laird Core and Sample Library on the UND campus.

Eventually, Wang will work with oil companies to reproduce the results with a large-scale model in the Bakken.

"If all goes well, we hope that we will have something ready along those lines by 2014," Wang said.

One of the challenges so far has been the limited availability of actual Bakken shale core samples on which to conduct the research. For this reason, the first studies have been done on "Pierre" shale samples, taken from an outcrop in northern North

Dakota.

The initial Pierre shale tests using the surfactant imbibition process were encouraging, harvesting as much as 30 percent of the available oil. That kind of success convinced UND researchers to push further with the project.

"That goes to show you the potential," she said. The goal now is to duplicate those results in the Bakken.

Another challenge is the limited amount of available laboratory data on Bakken shale characteristics compared to other kinds of oil-bearing shale and non-shale geological formations around the world.

The fact that UND scientists like Wang are pioneering research in this area makes it even more crucial that their findings are checked and double-checked.

Partnerships

Wang knows that oil companies are placing a lot of hope in her research, and she doesn't want to lead them down a wrong road when the scientific proof doesn't support it. Companies such as CorsisTech, Tiorco and Hess Corp. are participating with UND on the project.

"I have to be very careful with my research," Wang said. "I don't want to be responsible for the oil industry wasting its money."

Most of the project cost, about $500,000 worth, is being funded by the Research Partnership to Secure Energy for America; the state of North Dakota, which benefits greatly from expanded oil exploration, has chipped in an additional $125,000 through the North Dakota Industrial Commission.

Wang attributes the success of her research to the PREEC team effort at UND and collaborations with top-notch researchers in other departments, such as Julie Lefever, director of the Laird Core and Sample Library. She also lauds the assistance of people such as Ray Butler, a research associate in her department who has been instrumental in dealing with the oil industry, as well as Ronald Matheney and Nels Forsman, professors of geology and geological engineering at UND.

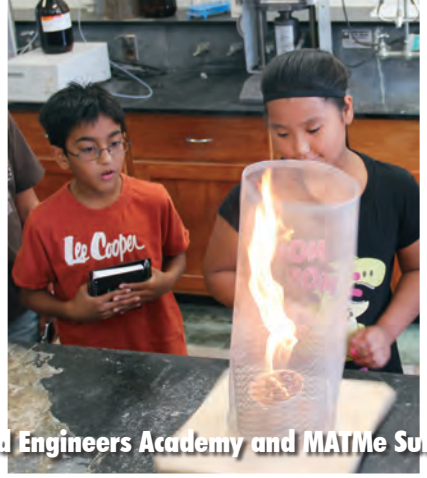
—David Dodds, Staff Writer

2012 Student Design Expo

Students share their projects with Dean El-Rewini





YSEA - Young Scientists and Engineers Academy and MATMe Summer Camps

First Lego League Competition

First Lego League Competition

UND faculty are in their second year serving as a training partner to the Dakota Science Center and Mayville State University's STEM education teacher training summer seminar

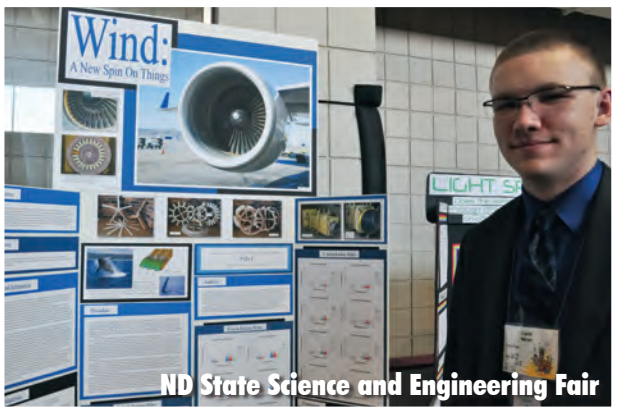
Prof. Ranganathan traveled to Sitting Bull College located in Standing Rock Reservation Fort Yates, ND and conducted an EE outreach lesson plan on "Boolean Algebra." Participants of the program include students and faculty from all five tribal colleges in North Dakota, high schools students and teachers from the four North Dakota Indian reservations, and faculty from research universities of North Dakota, North Dakota State University (NDSU) and University of North Dakota (UND).

IEEE "Binary to Letters" activity

YSEA

During the 2011-2012 academic year, UND Engineering, geology and environmental geoscience students, faculty, and industry partners performed over 1300 hours of engineering outreach to audiences totaling over 5000 students, teachers and parents.

Math Kangaroo



ND State Science and Engineering Fair

ND State Science and Engineering Fair

Dean El-Rewini and Matthew Cavalli, Asst. Dean for Outreach, led UND's planning efforts on behalf of the 2012 North Dakota State Science and Engineering Fair. Engineering students, faculty and alumni assisted as judges and hosts to 190 students for hands-on engineering activities. One of ND's top winners, a wind turbine blade design project (above left), took home an honorable mention from the Intel International Science Fair held in Pittsburgh, PA in May.

Institute for Energy Studies Receives a Major Grant

Confirmation that the University of North Dakota's Institute of Energy Studies (IES) has indeed arrived came in August 2011 when the U.S. Department of Energy (DOE) awarded the program a grant to develop a technology that reduces greenhouse gas emissions from power plants.

That's not just good news for the UND College of Engineering and Mines, which operates IES, but it's also a significant development for North Dakota's lignite coal industry as well as other energy generation technologies that emit carbon dioxide (CO2) — a factor in climate change.

"The industry wants to be prepared for the future because we don't know what the regulations might be," said Steve Benson, IES Director and Chair, Department of Petroleum Engineering. "They don't want to get caught without a viable technology that might cause a significant increase in the cost of electricity. We want to help industry maintain the low cost of electricity, and that's the challenge when looking at CO2 capture."

Hesham El-Rewini, Dean of the College of Engineering and Mines, said the DOE grant is a measure of success.

"It assures us that we are on the right track because we're pursuing what's important," he said. "We have the right vision and we have the right core of people to get it going. This project will definitely benefit North Dakota, but the benefits will go beyond to the region, to the nation and to the world. North Dakota will not only benefit by applying the technology that's developed here, but also by getting the word out that we are contributing to solving a major global problem."

Steve Benson, Director, Institute for Energy Studies and Chair, Department of Petroleum Engineering.

Benson said the project brings together a unique public/private team from UND, Envergex LLC and Solex Thermal Science. Envergex of Sturbridge, Mass., is a "green" energy company that produces carbon-based sorbents for reducing emissions from coal-fired power plants. Solex, headquartered in Calgary, Alberta, specializes in advanced heat exchange technology.

The DOE National Energy Technology Laboratory will provide nearly $3 million for the evaluation of a CO2 capture technology that uses hybrid sorbents. Project partners that include the North Dakota Lignite Energy Council, Saskatchewan Power, ALLETE, Minnesota Power and BNI Coal will contribute more than $700,000 to the project.

"We've come up with a technology that can significantly reduce the amount of energy it takes to regenerate a sorbent," said Benson. "It's 80 percent less than competing technologies. This is good for all types of combustion systems because it can be retrofitted. There are significant opportunities there for our state's lignite industry to participate in this program."

Benson noted that if the CO2 capture technology proves feasible, the next step would be to demonstrate it at UND's steam plant for a small-scale study that could lead to commercialization.

"If you think about the energy infrastructure of the University, it's like a mini-city," he said. "By using the steam plant, there's no better platform on which to train students and help people understand energy-related issues and their impacts."

IES is also addressing the problem of mercury emissions from industrial processes, an environmental issue

that's affected recreational fishing in Minnesota's lakes.

"We're testing technologies for mercury emissions control at taconite plants in Minnesota," Benson said. "We've come up with some novel ways of using activated carbon made from North Dakota lignite to capture mercury in those specific systems and coal-fired power plants."

The work is sponsored by the Minnesota Department of Natural Resources, the U.S. Environmental Protection Agency, and the taconite industry.

For El-Rewini, DOE funding for the CO2 capture project reaffirms the vision he had when he proposed creation of the IES nearly three years ago. The institute provided a mechanism to bring together the wide range of expertise at UND to collaborate and help solve energy and environmental problems.

"You can come up with the best technology, but if you don't study the social and behavior impacts, the public might reject it," he explained. "If it's not going to be accepted in regulations and laws, then it will be useless. If you don't study economics and the financial or business value of the technology, then it might not be practical. This is why we look at energy issues at UND from these perspectives."

El-Rewini and Benson believe that with such disciplines as law, medicine, nursing, business, engineering, atmospheric science and education, UND has a unique opportunity to become a leading energy university. In addition, the University has facilities such as the Energy & Environmental Research Center (EERC) and the North Dakota Geological Survey's Wilson M. Laird Core and Sample Library.

"We have the engineers; we have the scientists; we have the business people; we have the people who deal with social issues; and we have people who deal with health issues — we have it all," Benson said. "The institute brings these entities together to solve those energy-related problems. UND is developing into a premier energy university to tackle these problems. That's really where we want to go."

To put it simply, El-Rewini said, "When people think of UND, they should think energy."

If all goes as planned, El-Rewini envisions a collaborative energy complex in the middle of campus that draws on the IES, the EERC, the Department of Petroleum Engineering and the Jodsaas Center for Engineering Leadership and Entrepreneurship. It would not only make UND a world leader in energy technology, but also provide quality education opportunities.

"I'm very excited about the future and very optimistic about what's going to happen here," El-Rewini said.

—Patrick C. Miller, Staff Writer

Rendering of the proposed Collaborative Energy Complex.

Facilitating Collaboration UND/NDSU/SDSU Research Summit

Spring 2012, UND Engineering hosted the 2nd Annual Engineering Research Summit, a conference designed for engineering faculty from NDSU, SDSU and UND with the objectives to:

- Facilitate information sharing of programs, both general and research specific
- Create opportunities, both formal and informal, for faculty to discuss potential collaboration in research
- Identify possible synergies created in programs lacking critical mass to propose large competitive projects.

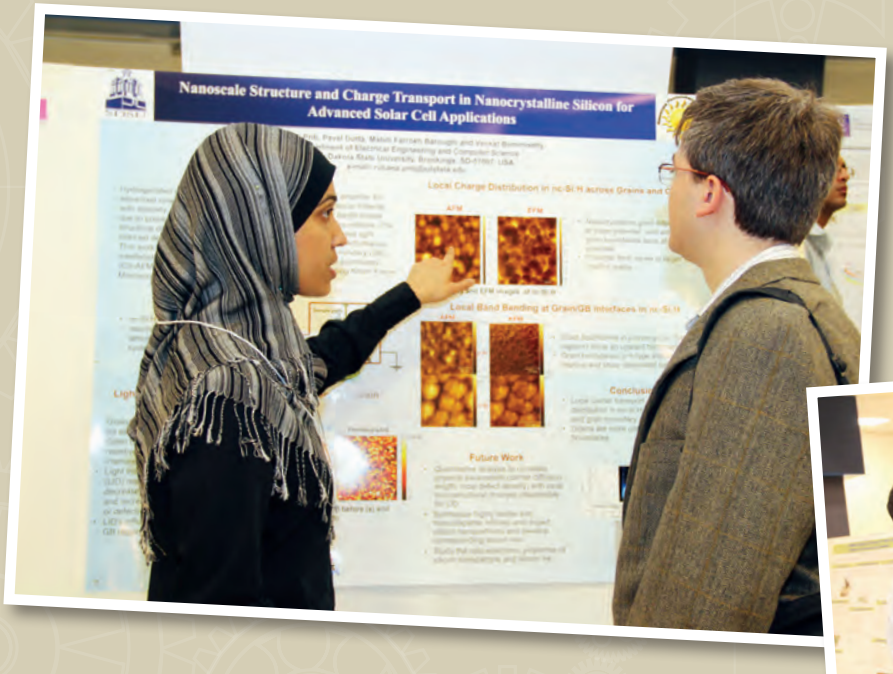
This year faculty were encouraged to bring a graduate student or post-doctoral student to present as well. More than 125 attended with 98 presenting their research. A booklet of these research projects is available online at www.engineering.und.edu.

SDSU will host the next summit Spring 2013.

Dr. Phyllis Johnson, Vice President, Research and Economic Development (UND), visits with Dean Gary Smith (NDSU) and Dean Hesham El Rewini (UND).

Local television news reporter interviewed EE student Camerin Hahn.

DEPARTMENTS



Ghodrat Karami, Associate Dean - Research, NDSU; Dennis Helder, Associate Dean - Research, SDSU; Mike Mann, Associate Dean - Research, UND

CEM Faculty Recognized at Founders' Day, 2012

The UND Award for Interdisciplinary Collaboration in Research or Creative Work

Wayne Seames, Ph.D., Chester Fritz Distinguished Professor of Chemical Engineering and Evguenii Kozliak, Ph.D., Professor of Chemistry

UND Foundation / Karleen Home Rosaaen Award for Excellence in Academic Advising

Lowell Stanlake, Assistant Professor of Mechanical Engineering. Lowell advises both on-campus and distance freshman students.

2011 ND Spirit Awards–College of Engineering and Mines

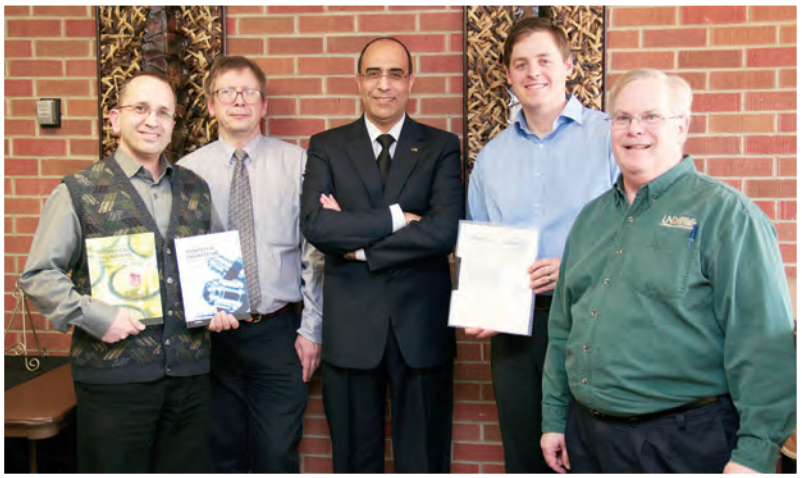
***Frank Bowman**, Associate Professor, Chemical Engineering*

***Joseph Hartman**, Chester Fritz Distinguished Professor, Chair, Geology and Geological Engineering*

***Harvey Gullicks**, Associate Professor, Chair, Civil Engineering*

***Forrest Ames**, Professor, Mechanical Engineering*

***Reza Fazel-Rezai**, Assistant Professor, Electrical Engineering*



By vote of the student body, Dr. Matthew Cavalli, Dr. Gautham Krishnamoorthy (ChE) and Dr. Reza Fazel-Rezai (EE) received the Outstanding CEM Professor Award during the E-Week Banquet.

Reza Fazel-Rezai recognized for his recently published books, and Evguenii Kozliak, (Chemistry), Brian Tande and Waynes Seames were recognized for recently issued patents at a CEM reception held in their honor.

FACULTY AWARDS

The Koroms as Kiwis

I knew that the opportunity to work outdoors is one of the "perks" of being a geological engineer, but last December as I looked across Lake Taupo toward snow-capped Mt. Ruapehu I realized I was doing field work in paradise. My family and I recently spent three months in New Zealand as part of my developmental leave for the 2011-2012 academic year.

Dr. Louis Schipper was my host at the University of Waikato in Hamilton. We met several years ago at a conference on denitrification (the conversion of nitrate, the most common groundwater contaminant, to inert nitrogen gas) that I co-convened for the American Geophysical Union. In planning for my trip to New Zealand, Louis introduced me to Dr. Greg Barkle (Aqualinc Research Limited) and Mr. John Hadfield (Environment Waikato); as a team we began to study the transport of nitrate through groundwater on the western side of Lake Taupo, the largest lake in New Zealand.

Lake Taupo fills the caldera of the Oruanui (26.5 BP) and Taupo eruptions (1.8 ka BP). Its water clarity and world-class trout fishing make it a national icon for the extraordinary natural beauty and outdoor recreational activities available in New Zealand. And the Kiwis are keen to keep Taupo clean. Although its water quality is still near-pristine, some degradation has been observed since the early 1980s. Pastoral farming, which began in the 1950s, is considered to be the major cause of the problem. Phytoplankton growth in the lake is nitrogen-limited and increasing dairy herds in the catchment was cause for concern. As a result several initiatives were undertaken to manage nitrogen loads in the Taupo catchment, including a nitrogen cap and trade system, which assumes that nitrate (NO3) is nonreactive once it moves below the root zone and into the saturated zone of the groundwater system. However, our preliminary research suggests that nitrate is reduced significantly in the groundwater in some locations. Future work is planned that will use groundwater monitoring equipment developed by my students and me that allows greater accuracy in measuring groundwater denitrification rates, while providing insights into what reactants in the subsurface contribute to denitrification.

The Koroms by Lake Rotomahana while hiking (or "twamping" if you are a Kiwi).

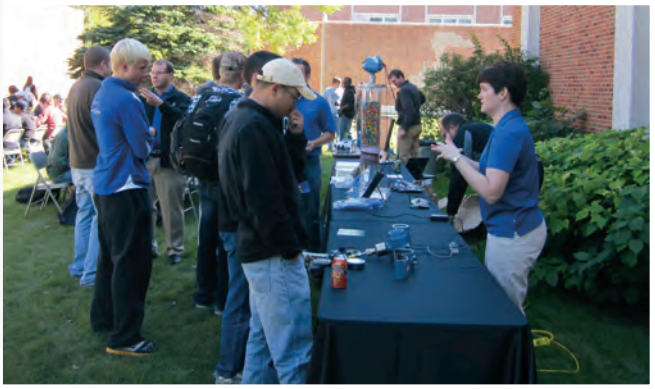
Not only was New Zealand a fantastic place to continue my research, it was a great adventure for our family. My wife Katheryne particularly enjoyed walking to markets and shops around our university rental home where she learned some real English, like "rocket" for arugula, "courgette" for zucchini, and "aubergine" for eggplant; Nicholas liked visiting places where the Lord of the Rings trilogy was filmed; Karolyne was our socialite who made friends faster than her father could learn their names; I enjoyed the natural beauty and the hospitality of the people.

I am grateful to UND and CEM for allowing me to take a developmental leave, to my Kiwi colleagues: Louis, Greg, and John, and to the New Zealanders who so warmly welcomed us to their wonderful country. Our kids didn't quite grasp that it was us who had the funny accents, but I think they will always remember our family adventure to New Zealand. It was a trip of a lifetime.

Rosemount/Emerson Day

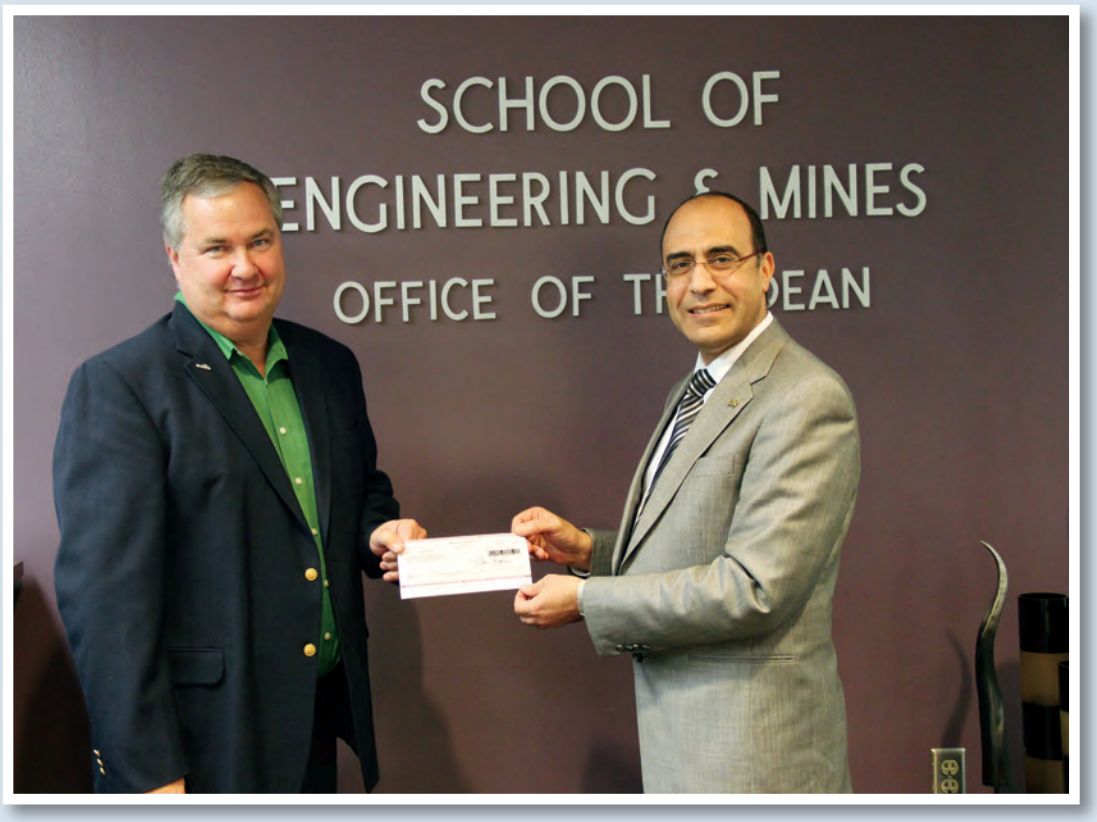
Rosemount, Inc./Emerson Process Management began a tradition of serving a local specialty, Red Pepper Grinders, on the green. It is an opportunity to network with students and later provide an information session. The company is a great supporter of CEM and has made a significant contribution and commitment to support a new Integrated Systems Engineering Lab (ISEL) to be located on the second floor of Harrington Hall.

Renae Patrick (BSME'97)



Gerard Hansen (BSME'88) and Rebecca (Gill) Koepke (BSChE'08)

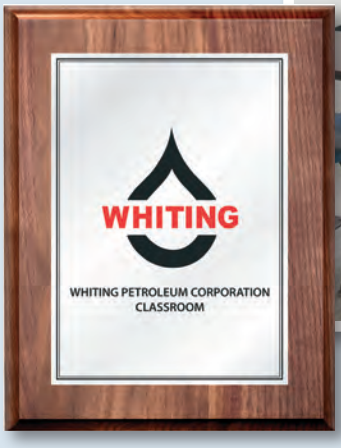
CORPORATE VISITS



Terry Kovacevich, Bakken Project Team Manager for Marathon Oil and a member of the Petroleum Engineering Advisory Board presented a $100,000 check to Dean El-Rewini; one half of a $200,000 gift Marathon has pledged in support of the petroleum engineering program.

Marathon Oil Corporation

This past February, Whiting Petroleum made a generous donation of $100,000 in support of the petroleum engineering program. Part of that gift was used to equip a classroom on the second floor of Upson II.



UND Alums Partner for Success

It was the introduction of the EPA's 1989 Surface Water Treatment Rule for which UND Civil Engineering graduates Steve Burian (BSCE'90) and Charlie Vein (BSCE'76) spotted an opportunity to help North Dakota water systems meet regulatory compliance. For that reason, in October of 1991, Burian and Vein established their specialized civil and environmental consulting engineering firm, Advanced Engineering and Environmental Services, Inc. "At the time we opened for business, it was only Steve and I working out of the basement of the old depot in downtown Grand Forks with a borrowed drafting table, a borrowed computer, and a desk." says Vein.

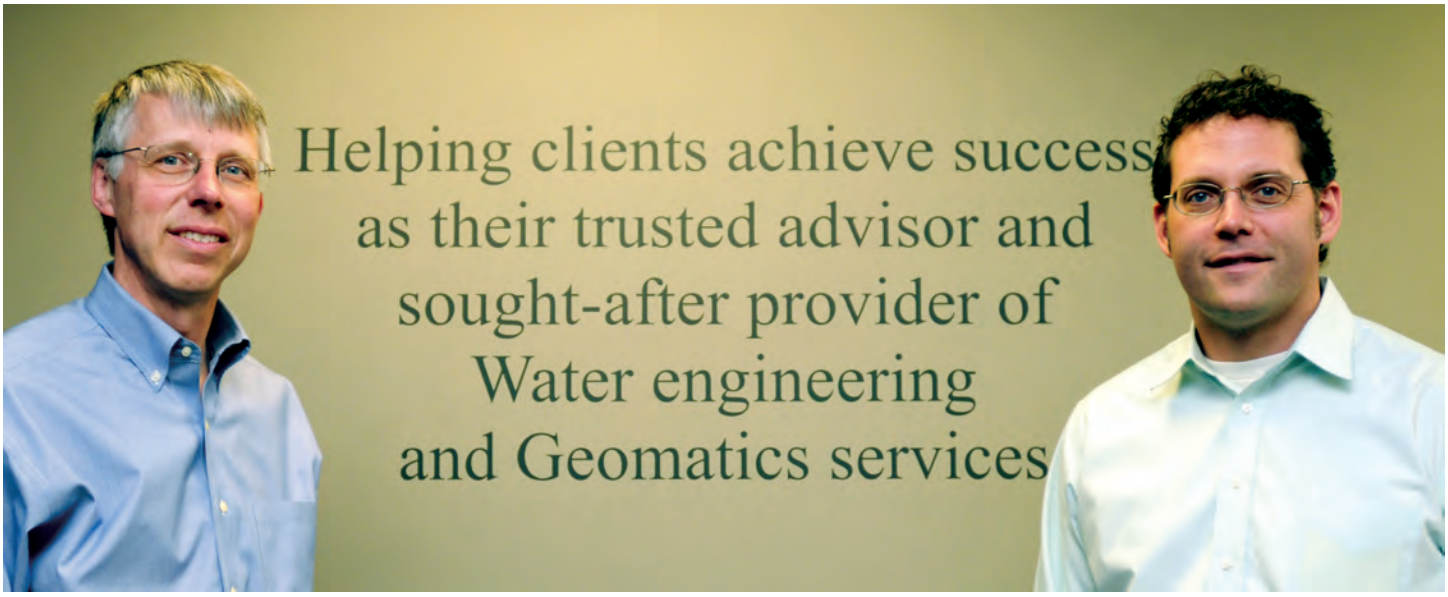
Just over 20 years later, their company, better known as AE2S, has ten additional office locations throughout North Dakota, Montana, and Minnesota and employs over 200 people – half of whom have been hired in the past two years alone. They like to be known as a "water" firm – meaning their primary services are water, wastewater, and storm water system consulting. However, over the years, AE2S began providing value-added services such as assistance with State and Federal funding programs, project financing, utility financial health, asset management, modeling, instrumentation and controls, and information technology. They consider all of their services to be an integral part of a total solution to their clients' needs.

Their corporate office remains in Grand Forks. They recently moved into a new building that boasts a geothermal heating and cooling system, movable wall systems, and surfaces made from recycled materials. Other green building features include energy-efficient glass, motion-sensing lights, and low-flow plumbing fixtures. Reclaimed wood and other recycled and locally produced materials were also used. A long storm water retention pond flanked by retaining walls outside is used for irrigation for landscaping at the site, with the rest slowly draining into the city sewer. Areas of grass grow surrounded by pavers set up to aid drainage in part of the parking lot, another green touch and a nod to much of the water, wastewater and storm water consulting work performed by AE2S.

Finding and Retaining the Best Talent Around

Through the company's phenomenal growth, AE2S has consistently maintained their unique brand of extreme client service all while maintaining a ten year average employee turnover rate of only 4.5 percent – a figure much lower than the national average of 12.2 percent for A/E firms. As Vein explains, "AE2S believes that if we provide an employee with a challenging and rewarding career that they are anxious to return to each day, we've done our job".

Many of AE2S' employees are graduates of the North Dakota University System, several of whom started as interns with the company. Of the twenty-three interns the company currently employs, six are UND students; and over the past four years alone, AE2S has hired seven full-time employees that were UND interns. "Our goal is to build relationships with these students while they are still taking courses. We want to provide them with the training



they need to be successful both in the classroom and in the field. AE2S invests a considerable amount of time with our interns and it is important for us to keep them." states Vein.

Grand Opening of the Washington Street Office, 1996.

Finding Ways to Give Back

AE2S supports several initiatives to assist its employees in cultivating their work and private lives such as flexible scheduling, supporting continuing education opportunities in-house and outside the office, as well as, but not limited to 100 percent paid family healthcare. Vein emphasizes, "Coming from my own experience, when we hire an employee, we are not only affecting them, but their family as well. That is why we want to provide a professional working environment, a salary with which they can support their family and a benefit package to allow for a good quality of life"

AE2S, Steve and Charlie have a long history of generous support to the University and to UND Engineering providing annual scholarships to Civil Engineering students, teaching courses, leading student organizations and serving on boards within the college and university. Steve is currently serving on the UND Alumni Association and UND Foundation Board of Directors.

Steve and Charlie with scholarship recipients, civil engineering students Bryan Kaemingk and Wade Thompson.

ND Petroleum Council members toured CEM and attended an info session in December while in Grand Forks for their council meeting.

North Dakota Petroleum Council

Williston Basin Petroleum Conference 2012

CEM hosted an information booth during the WBPC held May 22-24, in Bismarck, ND. With a record breaking attendance of 4,051, the booth attracted the attention of corporate representatives, booth vendors seeking information for their family members, and potential students; many who are currently working in the Bakken and interested in pursuing more education.

Mike Lodeon, BSCE'65 returned to campus during homecoming to meet the recipients of the Mike and Sitney Lodeon Scholarship. Pictured are Dean El-Rewini, Cole Johnson, EE, Mike, Kyle Bangen, ChE, Craim Campbell, CE and Ryan Buss, ME/EE

AGC Scholarship Reception for civil engineering students. Pictured are Paul Dietrich, President, Industrial Builders, Stephanie Hatten, Walt Swingen BS'52, Brian Viall, Russ Hanson, Exec. VP and Kristine Ouradnik.

Rockwell Collins has been a consistent, generous supporter of the College funding student organizations, scholarships, endowments, and research. The Rockwell team, shown here visiting with Asst. Professor Sima Noghanian in the Applied Electromagnetics Laboratory. Dr. Noghanian recently received grant funds from Rockwell Collins to support an antenna measurement lab.

Rockwell Collins

Get connected...

GET CONNECTED WITH UND ENGINEERING

The College of Engineering and Mines (CEM) has had a great year! While national discussions focused on cutbacks and low enrollment, CEM continues to thrive and excel, due in great part to the commitment of our alumni and friends. As you turn the pages of this latest edition of *Engineering*, you can see how involved our students, faculty, staff, alumni and friends are in making CEM an exceptional experience for students. As we work to build relationships and support for the University's mission of academic excellence, we would like to get to know you better. We encourage and welcome the opportunity to tell our story and to hear yours; to build on the success of students, faculty and alumni as we travel to meet with you or welcome you back to our campus. If you haven't been back to campus in a while, consider making a trip soon and reconnect with the College.

Making the Connection…

Our alumni, friends, and partnering corporations are important members of the College of Engineering and Mines community. We look forward to an opportunity to connect with you. There are so many in which you can be involved and support our students. Consider becoming a leadership mentor by sharing your career experiences with our students in the classroom as a guest lecturer. Deb Austreng can assist you with making the connections that will best meet the needs of the students, departments, and College.

You can also make an impact at the College through financial support of a program of your choice. Gifts to CEM can be directed to our passionate students, inspirational educators, innovative programs, or extraordinary facilities. Dan Muus can assist you and work with you and your financial advisor to establish a gift arrangement that best meets your personal and philanthropic goals.

We hope you have enjoyed catching up with us. We would like to connect with YOU this year!

Deb Austreng

Dan Muus

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For information regarding upcoming events please check the website often: www.engineering.und.edu

ENGINEERING
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NORTH
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THE $300 MILLION CAMPAIGN FOR UND
UAV FACTORY
North Dakota Spirit is
INNOVATIVE
Programs like the UND Unmanned Aircraft Systems Engineering Laboratory spark the fire in students to be exceptional.
Kaci Lemler and six other UND students claimed first place in last year's UAV Outback Search and Rescue competition in Australia through their involvement in one of UND's many innovative programs. When you support the North Dakota Spirit campaign, you provide critical funding for innovative programs, and make possible exceptional experiences for our students and faculty.
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