FALL 2014

Engineering

CHEMICAL CIVIL ELECTRICAL GEOLOGY GEOLOGICAL MECHANICAL PETROLEUM

"We are proud to partner with the University of North Dakota to support the College of Engineering and Mines, which is on track to become a premier engineering school."

- Greg Hill, president and chief operating officer of Hess Corporation

UNIVERSITY OF NORTH DAKOTA

COLLEGE OF ENGINEERING & MINES

TABLE OF CONTENTS

ENGINEERING
Fall 2014

Dr. Robert O. Kelley, President, University of North Dakota

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

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

Contributing Writers:

Deb Austreng
David Dodds, University Relations
Marti Elshaug, University Relations
Juan Pedraza, University Relations

Photography:

Deb Austreng
Cassandra Olson
Jackie Lorentz
Jeremy Malheim
Shawna Widdel
Joseph Hartman
Jessica Mann

Design and Layout:

Amy Chandler Design
Jessica Mann, Intern
Joy Jacobson, Intern

Engineering is published by the College of Engineering and Mines at the University of North Dakota. Please send comments and address changes to Deb Austreng at deb.austreng@engr.und.edu or call 701/777-4249

MESSAGE FROM THE DEAN — MAKING A DIFFERENCE

During my frequent meetings with prospective students and their families, I often underscore the important role that our graduates must play to improve the quality of life for humanity at large. The world is still facing many challenges in critical areas—energy, environment, human health, and security, to name a few. It is now more important than ever that we better prepare our students to make long lasting contributions as we strive to address these global challenges. Preparing students to make such an impactful difference requires deep technical knowledge integrated with skills in business, entrepreneurship, and leadership. This well-rounded knowledge and skill base must be coupled with an enriched experience inside and outside the classroom.

One of the major endeavors that the College of Engineering and Mines is pursuing to help enrich students' experience at UND is the establishment of the Collaborative Energy Complex (CEC). The CEC is a combination of several strategic initiatives that will enable us to enhance the educational and research experience for our students and faculty for decades to come. The CEC will be the home of the Department of Petroleum Engineering, which has seen tremendous growth in enrollment since its establishment three years ago. Enrollment has grown to over 300 students in a very short period of time and is expected to grow further. The CEC will also house the Institute for Energy Studies, which was established in 2009 to foster interdisciplinary research and to address major challenges as well as explore innovative ideas in the energy field. In addition to providing state of the art laboratories and active learning facilities, the CEC will house the Engineering Student Success Center, which will enhance the experience of students from all disciplines through personalized mentorship, industry interactions, professional development opportunities, and outreach activities.

More than just a building to house programs, this primarily privately funded project is about people, collaboration, innovation, and building bridges with industry. It will provide students and faculty with a place to interact with one another as well as with colleagues from industry, other campus units, and beyond. The new facility will connect the Harold Hamm School of Geology and Geological Engineering to the rest of the engineering buildings, forming a major engineering education and research complex on campus. Thanks to generous gifts from alumni and industry as well as the matching contribution from ND Higher Education Challenge Fund, we have raised close to $12 million toward the target of $15.5 million needed to establish the CEC.

I excitedly invite you, our alumni, and friends, to visit with me and learn more about how we, together, can help our students make a difference in a changing world.

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

From the CEM's Executive Board

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

Two years ago, the College of Engineering and Mines' (CEM) Dean, Hesham El-Rewini, established an Executive Board of professionals. Each member has a special commitment to the success of UND's CEM based on alumni, community, government, or industry ties. The Dean's objective was to create a Board able to offer him and his faculty and staff ideas, recommendations, reactions, experiences, and abilities to augment the College with the Board members' collective diverse experiences, insights, and relationships.

Terry Severson

Steve Burian

It's certainly an exciting time to be involved with CEM. Enrollment within the entire College has more than doubled in the past decade to over 1,900 students. The new Petroleum Engineering Department has experienced explosive growth and currently has more than 300 students. Industry has emphatically recognized CEM's value and potential with Harold Hamm/Continental Resources' $10 million gift and Hess Corporation's very recent $5 million gift. The embodiment of all of this momentum is the $15.5 million Collaborative Energy Complex (CEC) that is currently under development by CEM. The CEC will house the Institute for Energy Studies and Department of Petroleum Engineering.

The Executive Board plays a variety of roles within the College. Our overriding objective is to help improve the educational experience for students, both inside and outside the classroom to better prepare them for their careers. We provide recommendations and implementation assistance to help CEM's leadership progress towards their vision. We serve as a sounding board for the Dean and provide input, feedback, and support to ensure that CEM is best serving the needs of industry, the state, and the nation. We promote interaction between the college and industry at the local, regional, and national levels, as well as between the college and the community. We also assist with broad issues related to curriculum planning, management, and evaluation, as well as charting future instructional and research areas. Board members guide and promote general excellence in engineering education and research. Finally, we help CEM secure new resources through input and support of development efforts and fundraising campaigns. Currently, our top development priority is helping to complete the fundraising effort for the CEC.

As Board members, we chose to get involved because we individually and collectively want to make a positive difference. We ask ourselves, "How can we make CEM better? What can we, a varied group of senior-level corporate and community leaders, bring to the table? How can we help the Dean implement UND and CEM goals? What corporate or personal resources can we provide or access to enhance or support the Dean's initiatives?"

The Board currently numbers 19 members, with a goal of eventually expanding to 25 members. Dean El-Rewini appoints members to three-year terms, on a staggered three-year rotation to maintain continuity. However, Board members may serve multiple terms.

CEM Executive Board members, October 12, 2013

The Board meets formally once a year and conducts business via email and conference calls throughout the year. Our current membership is made up of a widely varying group of professionals predominantly from North Dakota and Minnesota but ranging from Arizona, Texas, Washington, and Virginia.

The Executive Board's real work gets done in committees. The Board is organized into four committees, each with a specific CEM focus coincident with the Dean's and CEM's goals and priority needs. Each committee is very actively and effectively supported by a CEM senior professor or staff member—Dr. Matt Cavalli, Dr. Mike Mann, Dr. Brian Tande, Andy Bjerke, and Deb Austreng. The committees are:

Branding, Marketing, and Development

Larry Wiken, Chair

- Strives to more effectively tell the CEM story by bringing together all the differentiators, e.g., student experiences, accessibility, and professor/student relationships; getting the word out through magazine, postcards, social media, and e-blasts with the aim of creating more resources; and completing fundraising for the CEC.

Curriculum

Lisa Barnes, Bob Solberg, Co-chairs

- Provide recommendations on inside-the-classroom curriculum-related issues, e.g., adding business and entrepreneurship skills; feedback on the preparedness of students to meet market demands; and input on improving retention and graduation rates.

Research

Chuck Kummeth, Chair

- Advises and provides feedback related to the research direction to enhance or better market the research to increase funded research that addresses state, regional, and national problems; recommends ways to connect with resources who may have an interest in the work being done, e.g., partners in research, fund research, and commercialize research.

Student Programs

Jim Albrecht, Chair

- Focuses on expanding educational experiences outside the classroom for students and increasing CEM alumni's and friends' interaction with students to improve retention and graduation rates.

Dean El-Rewini stays actively involved in Board operations throughout the year with Board and Committee leaders, often reaching out to the entire Board with CEM or UND updates, and talking and visiting with individual members as circumstances allow.

The Executive Board will hold its third annual meeting this fall during Homecoming. We're looking forward to another school year filled with opportunities to enhance CEM's programs. We are so pleased to be in a position that can help move the College forward during these very dynamic times, striving toward its goals to ensure tomorrow's graduates are people we all want as future colleagues and representatives of our firms and government.

Executive Board Members

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

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

James T. (Jim) Brown, *Former President and COO, Whiting Petroleum Corporation, Denver, CO (Retired June 2014)*

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

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

Shawn Hanson, *Principal Engineering Lead, Microsoft, Fargo, ND*

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

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*

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, Tri-State Generation & Transmission Assoc., Denver, CO*

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

CEM Announces $5 Million Gift from Hess Corporation to Help Fund Collaborative Energy Complex

Additional $2.5 million in matching money provided by N.D. Higher Education Challenge Fund

On June 26, 2014, a $5 million gift from the Hess Corporation to the UND College of Engineering and Mines was received. The gift, along with a $2.5 million match from the North Dakota Higher Education Challenge Fund, will provide $7.5 million in funding towards the new Collaborative Energy Complex in the College of Engineering & Mines.

The combined $7.5 million total will fund specific portions of the Collaborative Energy Complex with the aim of stimulating innovation, problem-solving, and futuristic ideas, and creating hands-on experience, outreach, enriched lab experiences and industry partnerships between the University and the energy profession.

"This is a great day for the University of North Dakota," said UND President Robert Kelley. "We are delighted to announce this gift from the Hess Corporation and the match dollars, which combined go a long way toward making the Collaborative Energy Complex a reality. The partnership being demonstrated today—between the Hess Corporation, the State of North Dakota through Governor Dalrymple and the Higher Education Challenge Fund, the UND Alumni Association and Foundation, and the UND College of Engineering & Mines—is exactly the kind of private-public collaboration which will help us advance the University and achieve our goals related to serving North Dakota."

"We are proud to partner with the University of North Dakota to support the College of Engineering and Mines, which is on track to become a premier engineering school," said Greg Hill, president and chief operating officer of Hess Corporation.

"Providing this educational venue will not only help the state by training individuals to be ready for careers in the oil and gas industry, but will enhance the ability of Hess and the industry to hire local talent."

"We are pleased to see that the State's Higher Education Challenge Fund is encouraging the spirit of philanthropy, including this generous gift of $5 million from the Hess Corporation," Gov. Jack Dalrymple said. "This is exactly the type of support we envisioned for our colleges and universities when the Challenge Fund was proposed in our executive budget."

"We are delighted to be part of this partnership with Hess Corporation and the State of North Dakota. On behalf of all of us in the College of Engineering and Mines, I wish to express our gratitude to our partners," said Hesham El-Rewini, Dean of the UND College of Engineering & Mines.

"This is a great model of how industry support and public resources can work together to advance engineering education, research, and innovation. The Collaborative Energy Complex will provide our students and faculty with state of the art labs to address future challenges and explore big ideas. We look forward to utilizing this generous gift along

Steve McNally, General Manager of North Dakota Hess Corporation

with the match dollars to better educate engineers who will contribute to the success and prosperity of North Dakota and the nation," said El-Rewini.

"We are most appreciative of this gift from the Hess Corporation for the Collaborative Engineering Complex. It is another example of the innovative thinking and the investment that the Hess Corporation has made not only in the University of North Dakota, but also the State of North Dakota. This gift—along with the Higher Education Challenge Match Grant from the State—will propel UND to be a leader in the energy field. We can't thank the Hess Corporation and the State of North Dakota enough," said DeAnna Carlson Zink, CEO of the University of North Dakota Alumni Association and Foundation.

The Hess Corporation gift is intended to advance UND's Petroleum Engineering program, and also support Hess' core values and the University's Exceptional UND vision, which emphasizes the importance of educational opportunities and space to gather and collaborate. Pledges and commitments of $11.8 million have currently been made toward the $15.5 million goal for the project. This gift is among the largest from a corporation to the UND Alumni Association and Foundation.

The Hess Corporation's $5 million gift (and the $2.5 million from the North Dakota Higher Education Challenge Fund) will be used to establish several significant features in the new building:

- Hess Innovation Lab, to stimulate innovation, problem-solving, and futuristic ideas
- Hess 3D Visualization and Reservoir Simulation Lab, for creating hands-on experience, outreach, and enriched lab experiences and industry partnerships
- Hess Drilling Simulation Lab, creating hands-on experience, outreach, and industry partnership
- History of Oil and Gas atrium display

Collaborative Energy Complex

The 30,000-plus square-foot Collaborative Energy Complex (CEC) will be set on the southeast part of campus between Leonard Hall and Upson Hall I. The new CEC will bridge the two existing facilities, forming a major engineering education and research complex on campus that will include Upson Hall I & II, Harrington Hall, and the nearby Wilson M. Laird Core and Sample Library.

The CEC primarily will serve as the headquarters for the rapidly growing Department of Petroleum Engineering and the Institute for Energy Studies. Currently, the College of Engineering and Mines is bursting at the seams with

Left to right: DeAnna Carlson Zink, CEO, UND Alumni Association & Foundation; Jack Dalrymple, N.D. Governor; Steve McNally, General Manager of North Dakota Hess Corporation; Robert Kelley, President of the University of North Dakota, and Hesham El-Rewini, Dean, UND College of Engineering & Mines. Photo by Jackie Lorentz.

petroleum engineering students particularly, fueled by booming oil and gas exploration in western North Dakota. The Petroleum Engineering program started with four students in 2010 and currently has more than 300 students enrolled this fall. The new building will also house the Engineering Student Success Center, which will help enrich students' experience through personalized advising and mentorship, outreach activities, professional development opportunities, internships, and industry interactions.

"The proposed Collaborative Energy Complex is an excellent example of the successful private-sector partnerships that UND has fostered in recent years across our academic and research enterprises," said Kelley. "I commend Dean El-Rewini and his College of Engineering and Mines colleagues for their initiative and vision to strengthen these important bonds, which should provide immediate opportunities for students and long-term solutions for the future of North Dakota and the nation."

More than just a building to house programs, El-Rewini stressed that the new facility—as its name suggests—will provide students and faculty with a place to interact with each other as well as with colleagues from other units on campus and beyond.

"The Collaborative Energy Complex is a combination of several strategic initiatives for our College," El-Rewini said. "It will provide a common umbrella for interdisciplinary programs in the important field of energy. In addition to providing cutting-edge lab resources and multipurpose teaching centers for students, CEC will provide space for interdisciplinary collaboration among faculty and industry representatives in all fields related to energy."

Jack Dalrymple, N.D. Governor

Hess Corporation

Hess Corporation is a leading global independent energy company engaged in the exploration and production of crude oil and natural gas. More information on Hess Corporation is available at http://www.hess.com/.

Hess has been operating in North Dakota for more than 60 years. The commitment to UND is the company's latest citizenship effort in the state. In addition to providing support to flood relief in Minot and the cultural heritage center at the State Capitol, Hess is providing $25 million through Succeed 2020, a multi-stakeholder initiative to improve the transition to higher education and careers for North Dakota students.

CEM Executive Board members in attendance: Steve Burian, Vice Chair, Dean Hesham El-Rewini, Terry Severson, Chair, and Kayla Effertz Senior Policy Advisor for Governor Dalrymple

Left to right: Dan Muus, Chief Development Officer, UND Foundation; Michael Mann, Associate Dean, College of Engineering and Mines; Matthew Fossen, Facilities Engineering, Hess Corp.; Steve Benson, Chair, Petroleum Engineering; Matthew Cavalli, Chair, Mechanical Engineering; Brian Tande, Chair, Chemical Engineering.

Hess Has Strong History of Student Support

On February 21, Matthew D. Fossen, Facilities Engineering, Hess Corporation, and a UND alum (BSME '12) returned to campus to present a check for $30,000 from Hess Corporation in support of student high achievement scholarships for the departments of Petroleum, Chemical, and Mechanical Engineering.

We are very grateful to Hess Corporation for their support for our students and programs.

AE2S Donation, State Match Draw CEM Closer to Landing its "Dream House"

During the 2013 North Petroleum Annual Conference, which was held September 16-18, 2013, in Grand Forks, UND President Robert Kelley announced that AE2S had utilized a match program authorized by the North Dakota Legislature to donate more than $1 million in support of the CEC proposal.

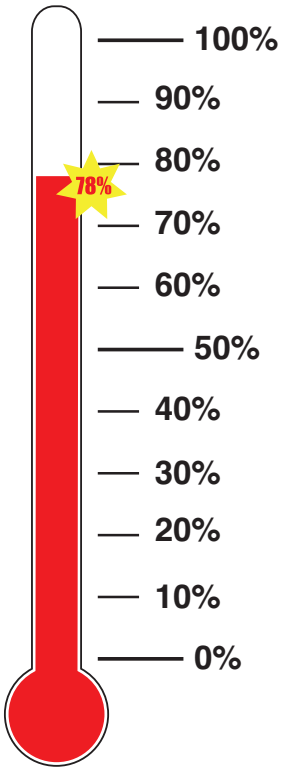
Pictured are Steve Burian and Charlie Vein

AE2S, with offices in North Dakota, Montana, Minnesota, Wisconsin, and Utah, was founded by President Charlie Vein and CEO Steve Burian, both CEM alumni and longtime supporters of UND.

"AE2S is playing a large role in addressing infrastructure needs for municipalities in the Bakken (western oilfields of North Dakota) as well as for energy companies that are growing their businesses in North Dakota and Montana," says Vein.

"We see this as an investment not only in our potential workforce and UND, but as an investment in the future economic development of our State," added Burian. "We are incredibly proud to be a part of this groundbreaking facility."

$15.5 MILLION GOAL



The Collaborative Energy Complex at the College of Engineering & Mines is nearly a reality. The momentum is strong, we can get it done with additional private support and the North Dakota State match program. Please contact Andrew Bjerke, Director of Development, College of Engineering & Mines, to see how you can be a part of this game-changing project.

Andrew Bjerke, '01
andrewB@undfoundation.org
Office: 701-777-1428
Cell: 701-610-1112

NASA Astronaut Karen Nyberg Receives Honorary Degree During UND Summer Commencement

CEM Alumna Karen Nyberg has traveled higher, faster, and farther than any other graduate of this University and on Friday, Aug. 8, in the Chester Fritz Auditorium, the University of North Dakota bestowed upon her an honorary Doctor of Letters degree.

Karen graduated summa cum laude from UND with a degree in mechanical engineering in 1994 and she achieved career success with NASA to become the 50th woman in space. Nyberg delivered last summer's commencement address from the International Space Station. This year she was present on campus to accept her degree.

Karen's proud parents were on campus to celebrate.

As early as the fourth grade, she set her sights on the heavens and the goal of becoming an astronaut and worked tirelessly toward that goal.

While at UND, Karen began her long association with NASA by securing co-op positions with the Johnson Space Center.

After receiving her doctorate from the University of Texas, she joined NASA's Crew and Thermal Systems Division and was chosen for astronaut training two years later.

In 2008, Karen became the first UND graduate, the sixth Minnesotan, and the 50th woman to be launched into space, riding the shuttle Discovery to the International Space Station for a 13-day mission.

Joyce and Rodney Medalen attended the luncheon honoring Karen.

Last year, she spent nearly six months aboard the Space Station as a flight engineer. Over the course of those two missions, Karen orbited the Earth nearly 3,000 times and traveled more than 75 million miles.

Josh Crowell (PhD student in HHSGGE) explains the operation of his seis-gun for characterizing sub-surface geological structures.

Participants in the Experience Engineering camp assemble a sound-activated electronic car.

Experience Engineering JULY 2014 UND UNIVERSITY OF NORTH DAKOTA

In mid-July CEM welcomed high school students to campus. Sixteen participated in the camp—six commuters, ten residential, all entering grades 9-12. Activities included: tour of GF water treatment plant, tour of REA, tour of two local manufacturers (Retrax, Technology Applications Group), demonstration of geological principles and the seis-gun, bridge design using Westpoint Bridge design software, bridge design contest, demonstrations of materials behavior, aluminum casting, fabrication and testing of fiberglass composites, demonstrations of chemical engineering concepts, assembly of a sound-activated car.

The winning bridge design supported over 70 pounds with a bridge mass of 40 grams.

Dr. Harvey Gullicks (CE) takes the campers on a tour of the Grand Forks water treatment plant.

Recently Granted Patents Enhance UND's Commitment to Renewable Fuels

The United State Patent and Trademark Office recently issued two patents to the University of North Dakota that increase the commercial viability of thermal cracking as a pathway to renewable fuels and chemicals. These technologies provide the capability to generate additional renewable products in biorefineries that are based on UND's noncatalytic cracking technology.

Patent No. 8,450,541 was issued to inventors in the UND College of Engineering and Mines: Wayne Seames, Chester Fritz Distinguished Professor of Chemical Engineering; Darrin Muggli, a former faculty member in the Department of Chemical Engineering; and Brian Tande, chair of Chemical Engineering and director of the Jodsaas Center for Engineering Leadership and Entrepreneurship. This patent is assigned to UND and describes a method for producing cyclic organic compounds, including aromatic compounds, from crop oils. Cyclic compounds—which look like rings when you look at them at the molecular level—are a common and important class of chemicals that show up in products such as Styrofoam and other plastics, in many synthetic dyes, pharmaceutical drugs, lubricants, and thousands of other products.

"With this invention, we crack feedstock oil from oilseed crops, algae, microbes, waste cooking oils and other sources in the presence of a zeolite catalyst," said Muggli, a catalytic reaction specialist who is now the chair of the Engineering Department at Benedictine College in Atchison, Kansas said. "The catalyst helps the cracked carbon fragments to form cyclic ring compounds, many of which then transform into aromatic compounds."

"Cracking" is a common energy industry term for a process that breaks carbon-carbon bonds in long carbon chain substances. Catalytic cracking is used in the petroleum refining industry to upgrade long chain hydrocarbons that are sold as low value fuel oil into higher value, shorter chain hydrocarbons, including cyclic and aromatic hydrocarbons, which are blended into gasoline, jet and diesel fuel.

Patent No. 8,333,949, "Method for Creating High Carbon Content Products from Crop Oils," describes a pathway from non-catalytically cracked feedstock oils, such as oil from oilseed crops, algae, microbes, waste cooking oils and other sources to high purity carbon.

When oils are cracked, a portion of the material recombines to form a longer chain, complicated carbon structures, typically known as tars. The key to this UND invention is to perform the cracking reactions without a catalyst. This allows the tars that typically stick and foul catalyst surfaces to be collected. Once collected, they can be purified and processed into various carbon products, including anode grade coke, green coke, activated carbon or, most importantly, carbon fibers. By recovering the tars, at least five percent more of the inlet carbon end up as a usable product compared to processes using a catalyst.

Co-inventors Brian Tande and Wayne Seames holding samples of chemical prodcuts generated by UND's biorefinery process.

Carbon fibers are the most attractive product since they have the highest commercial value. However, anode grade coke is also an important product used in spark plug and other electronic devices.

"The prevailing wisdom in the research community was that you needed a catalyst to efficiently crack TG oils," said lead inventor Seames. "We were able to prove

that the actual cracking reactions, which are carbon-carbon bond cleavage reactions, occurred with the same efficiency with and without a catalyst. When a catalyst is present, it facilitates secondary reactions that can transform the cracked TG fragments into other compounds, like aromatics. However, these two steps can be separated and by making this separation, many additional chemical compounds can be produced." The group has a patent pending that improves the original aromatics patent.

"In the improved process included in the pending patent, the aromatization step, which requires a catalyst, is separated from the cracking step. This allows a user to recover a wide variety of chemical products, including the tars, which would otherwise end up as fuel products. These chemical products improve the commercial viability of a biorefinery compared to a facility that only produces fuel products," according to co-inventor Tande.

Seames began studying crop oil cracking in 2004. The original process generates jet and diesel fuel as the primary products from either non-catalytic or catalytic cracking. Patents for this process were recently approved in Israel (no. 196123 issued 5/28/13) and Australia (no. 2007347872 issued 5/24/12). A U.S. patent (no. 8076504) to produce short chain carboxylic acids and esters via crop oil cracking was issued two years ago. When all of these processes are combined, a biorefinery can be created that can respond to the fuel, chemical, and plastics markets by producing a wide variety of fuel and chemical products.

"With these latest patents we have a significant bio-fuel/bio-chemical platform," said Michael Moore, associate vice-president of research and UND's principal commercialization officer. "The University is actively seeking to license this suite of technologies for rapid and widespread commercialization."

Juan Miguel Pedraza
University & Public Affairs writer

Alumni News

Monte L. Phillips

Monte L. Phillips, Ph.D., P.E., Dist. M.ASCE, was recently named a Distinguished Member of the American Society of Civil Engineers (ASCE), the society's highest accolade. To date only 649 of ASCE's worldwide members have been elected to receive this honor since the society's founding in 1852.

Phillips will be recognized for his work in the creation and passage of additional education as a prerequisite for licensure in the National Council of Examiners for Engineering and Surveying (NCEES) Model Law, and for his dedication as an educator and leader in the engineering field. He will receive the award at the ASCE Global Engineering Conference in Panama City, Panama, October 7-11, 2014.

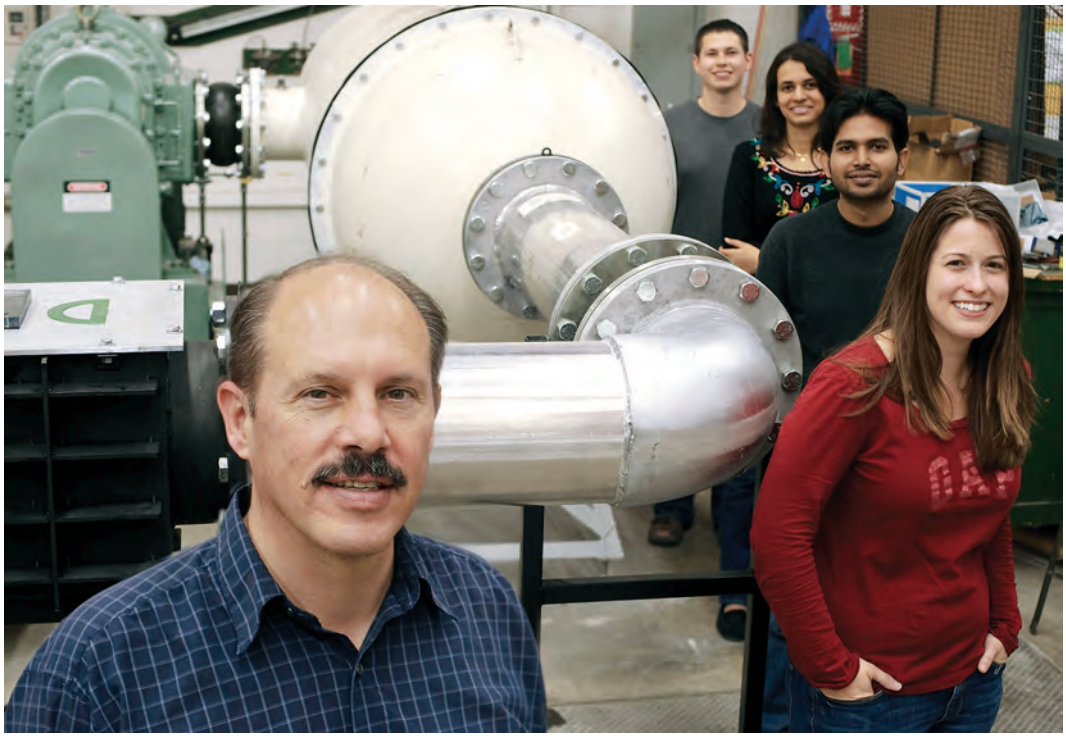
For nearly 40 years, Phillips educated the next generation of engineers as a professor at the University of North Dakota, the University of Illinois and Ohio Northern University.

As a leader in five prominent national engineering organizations, ASCE, NCEES, National Society of Professional Engineers, National Academy of Forensic Engineers and ABET, the Accreditation Board for Engineering and Technology, Phillips' efforts have been critical in initiating reform of educational requirements for licensure of professional engineers. In conjunction, he works on promoting the Raise the Bar initiative, which focuses on enhancing the educational and experiential requirements for licensure as a professional engineer in an effort to ensure engineers are prepared for today's complex challenges.

Phillips holds bachelor's and master's degrees in civil engineering from the University of North Dakota and a doctorate from the University of Illinois.

Founded in 1852, the American Society of Civil Engineers represents more than 145,000 civil engineers worldwide and is America's oldest national engineering society

Building Better, More Efficient Turbines



As members of the Turbulent Transport in Turbines Group, Forrest Ames and his students run their tests through several facilities on campus, including the Large-Scale Turbine Cascade Wind Tunnel, the Compressible Flow Facility, and the Internal Flow and Heat Transfer Rig.

Fuel starts as energy and ends up as exhaust.

Scientists in UND's College of Engineering & Mines work on both ends of that equation with research that aims to maximize fuel efficiency and minimize exhaust impacts.

Forrest Ames, professor of mechanical engineering and an expert in gas turbine heat transfer, recently received another federal grant to improve the efficiency of these engines, from the new generation of small-sized turbines in small jet planes to the monster turbines in power plants.

Ames' current grant focuses on the big stuff: he works with scaled-up models of certain components of the industrial grade, natural gas-fired turbines that run in many power plants. The new $500,000 grant from the U.S. Department of Energy (DOE), titled "Thermally Effective and Efficient Cooling Technologies for Advanced Gas Turbines," studies how to improve the internal efficiency of big gas turbines.

"Basically, it's about building new and better turbines and ultimately using less fuel," he said.

To help understand the nature of what Ames is working on, here's how the DOE defines what a turbine does:

- The compressor draws air into the engine, pressurizes it, and feeds it to the combustion chamber at speeds of hundreds of miles per hour.
- The combustion system burns fuel at temps exceeding 2,900 degrees Fahrenheit with a ring of fuel injectors that spray a steady stream of fuel into combustion chambers. This produces a hot high-pressure gas stream that enters and expands through the turbine section.
- The turbine is an intricate array of alternate stationary and rotating airfoil sections (they look like airplane wings).
- As hot combustion gas expands through the turbine, it spins the rotating blades, which (a) drive the compressor to draw more pressurized air, and (b) turn a generator to produce electricity.

With his latest DOE grant, Ames is trying to figure out how to efficiently cool turbine airfoils—the vanes—so they can survive that hot, high-pressure gas produced in the turbine's combustion chamber. Cooling the components with less actual cooling air means the turbine will run more efficiently, but with reduced stress and fatigue to the turbine vanes so they can run longer.

A key to a turbine's fuel-to-power efficiency is the temperature at which it operates: "Air temperatures (in gas turbines) rise rapidly, resulting in reduced ability to cool component surfaces adequately," Ames said.

According to Ames, higher temperatures generally mean higher efficiencies, which in turn can lead to more economical operation. Gas flowing through a typical power plant turbine can be as hot as 2,500 degrees, but some of the critical metals in the turbine can withstand temperatures only as hot as 1,600 to 1,850 degrees.

One idea is that air from the compressor would be used for cooling these key turbine components.

One of the major achievements of the DOE's advanced

turbine program was breaking through previous limitations on turbine temperatures, using a combination of innovative cooling technologies and advanced materials.

The advanced turbines that emerged from the DOE's research were able to boost turbine inlet temperatures to as high as 2,600 degrees, significantly hotter than in previous turbines, and achieve efficiencies as high as 60 percent.

"Another way to boost efficiency is to install a heat-recovery steam generator (HRSG) to harness energy from the turbine's exhaust," Ames said. "An (HRSG) captures waste heat in the turbine exhaust system and uses the thermal energy to run a steam-powered cycle."

An HRSG generates steam by capturing heat from the turbine exhaust.

A simple cycle gas turbine can achieve energy conversion efficiencies ranging between 30 and 44 percent.

That's an efficiency goal well worth aiming for.

Juan Miguel Pedraza
University & Public Affairs writer

Alumni News

Chad Schlager, BSEE'01, was honored at Rockwell Collins' annual Engineer of the Year Program which celebrates the outstanding technical creativity and innovative thinking of the company's top engineers, at an awards banquet held in February in Miami Beach, FL.

The corporate winners, who were nominated by their peers or leaders, achieved breakthrough results that significantly impact business growth and the engineering profession.

Technical Project Manager Chad Schlager, was honored as the 2013 Government Systems corporate winner. He was hand-picked to lead all technical hardware aspects of the seven major Rockwell Collins subsystems in the $242 million KC-46 tanker program award from Boeing. They span the length of the aircraft, from cockpit displays to the Remote Vision System. Many involved new hardware designs or significant redesigns, and one other challenge. "This program included a Commercial Systems and Government Systems contract with Boeing, all run out of our Government Systems organization," Schlager says. "They needed someone to manage both sides of that contract from a technical perspective, and create a seamless team with Boeing."

Schlager led his team to set goals that addressed the manufacturing and engineering sides of the program. They applied Lean tools to maximize savings through the build process. They eliminated touch labor, opting for more standardized parts. The net result: more than $7 million in cost reductions, resulting in significant improvements to profitability.

Excerpt courtesy Rockwell Collins' Horizons magazine

International Duo Forms a Unique System Dynamics Collaboration

Eduard Romanenko is on his second academic journey into the heart of the United States.

The first time around, the native of Vladivostok, Russia, was on an exchange opportunity to Lawrence University in Appleton, Wis. He did, however, have a couple of pals who ventured farther west to schools in North Dakota.

"I heard different stories from them about the temperature extremes, and back then, I thought I would never come to a place like that," said Romanenko, who received his bachelor's degree in international economics from Far Eastern Federal University in Vladivostok, a city on Russia's Pacific coast near China, Japan, and South Korea.

A lot has changed since then.

Romanenko is one of two students from the University of Bergen (UiB) in Norway who are currently working on their master's degrees at the University of North Dakota. Romanenko and Andres Julian Gil Garcia, a native of Manizales, Colombia, are pursuing European Master's Degrees in System Dynamics, through UiB and a consortium of allied institutions in Europe and at the UND College of Engineering & Mines (CEM), which is an associate member of the group.

System Dynamics is an interdisciplinary response to dynamically complex problems around the world, using high-tech computer modeling to simulate scenarios and project outcomes, relying heavily on stakeholder input to come up with solutions.

The interdisciplinary approach of System Dynamics is combined with an international dimension as Andres Julian Gil Garcia (left) and Eduard Romanenko (right), natives of Colombia and Russia, respectively, work together at UND to explore the market factors and social issues associated with carbon-capture technologies and the use of carbon dioxide for enhanced oil recovery. Photo by Jackie Lorentz

Romanenko and Garcia are working on independent theses, but the nature of their work and the idea behind System Dynamics necessitates the two collaborate on parts of their projects. The focus of their theses is the market dynamics associated with the commercialization of carbon-capture technologies and the use of carbon dioxide (CO2) for enhanced oil recovery, something of great concern to the people of the Bakken oil-producing region and Williston Basin of western North Dakota.

Romanenko, who, in addition to his economics bachelor's degree, holds a master's in economic policy and global markets from Central European University in Hungary, clearly brings a strong background in economic theory and financial markets. Garcia, who got his bachelor's degree in petroleum engineering from National University in Medellin, Colombia, possesses the technical engineering experience needed for the collaboration.

"What makes System Dynamics special is the holistic, rather than fragmented, view of a problem, and we would love to maintain this approach throughout our project work," Romanenko said. "In practice, this means that we might work on distinct pieces separately from time to time, but the important chunks of work will be happening in direct cooperation."

Last year, UND and its CEM signed a series of agreements with UiB and its Faculty (School) of Social Sciences and with the Petroleum Research School of Norway. These paved the way for faculty and student exchanges between UND and the Norwegian entities. The memoranda of understanding (MOUs) are a big reason why Romanenko and Garcia ended up at UND.

Romanenko says he's glad to be here, despite his preconceived notions of North Dakota.

"The quality of the program was so

good that I never hesitated to say yes," he said. "It's a perfect blend of economics and System Dynamics. System Dynamics supports social science research and I am a social scientist, but I also need technical experience, too."

That's where his partnership with Garcia comes in.

Garcia says it's exciting for him to study System Dynamics in North Dakota, where so much is taking place in his field of expertise out in the state's Bakken shale formation.

"For me, this is amazing to have the opportunity to come here and work on my thesis at a time and place where this is such a hot topic," he said.

A reception was held at the US Ambassador's residence in Oslo, Norway. Pictured above are: UND Provost Tom DiLorenzo, Dean El-Rewini, Karen and Ray Goldsteen (professor, SMHS), Kathy Johnson, Suzanne Austin, Lilla Alchon, Melissa Gjellstad (president, University Senate) and Scott Johnson (instructor, Institute for Energy Studies).

David Wheat, associate professor of System Dynamics at UiB's Faculty of Social Sciences, says, with respect to their areas of expertise, Romanenko and Garcia were paired together for a reason. He also added that in the System Dynamics curriculum, an important skill to master is the ability to work with and effectively communicate ideas to the public, or stakeholders, whose problems are under the microscope.

"What we have here is a program that brings people together from a variety of different backgrounds," Wheat said. "Real-world issues don't exist in silos. It requires involvement from across various disciplines if you're going to make a difference. Our work is not supposed to go back on the shelf when it's done — it's supposed to change the way people think about the problems they face.

"But it's one thing to solve problems on a computer; it's another thing to do it in real life. That's why we emphasize feasibility in our policy modeling and stress communication with stakeholders."

Romanenko and Garcia were recruited to come to UND by Scott Johnson, a principal advisor in the UND Institute for Energy Studies (IES) and an instructor in the Department of Petroleum Engineering, which has grown considerably in recent years as a result of its connections to the private sector oil and gas industry and support from the IES.

Johnson, who studied at UiB and practiced System Dynamics in industry, was instrumental in setting up UND's exchange agreements with Norway.

"Anybody can sign an MOU—once that was done, we thought, 'well, what are we going to do about it?,'" Johnson said.

So Johnson visited UiB last year and reached out to Romanenko and Garcia about the opportunity for the unique System Dynamics collaboration at UND. At the same time, Johnson was wrapping up the first semester of a new class in System Dynamics at UND. One of his students from that class, Neva Hendrickson, who already holds a bachelor's degree from UND in anthropology (cultural anthropology emphasis) and a minor in chemistry, expressed interest in being the first UND student to take part in the exchange. She will be heading to UiB in August.

Hendrickson, a native of Tioga, N.D., in the heart of the oil-boom region, currently works in the UND Office of International Programs. She said she's intrigued by System Dynamics' ability to model scientific processes and analyses of social science problems.

"Since the model presents a low-risk environment, with no actual consequences, individuals can test out ideas and make adjustments that would not be possible in the real world where similar actions could have great consequences and risk," she said.

Johnson said the System Dynamics exchange arrangement with UiB is exceeding all expectations, so far.

"We tried to create some new opportunities here at UND for students and faculty, and it's worked the first time around," he said. "We couldn't be more pleased with how it's going."

David Dodds
University & Public Affairs writer

Geomorphologist Jaakko Putkonen, Student Team go to Nepal for Himalayan Adventure (and lots of study)

A good quality sleeping bag and down jacket are essential.

This is the first line in a brochure for a summer geology field training course in Nepal, led by UND geomorphologist Jaakko Putkonen.

Actually, the trip—which ends up at one of the Annapurna chain in the Himalayas—is a wild study in total contrasts: monsoon-soaked jungle one week, icy peaks the next.

It's a rocky choice for a place to take students on a summer field course in geology.

Putkonen, a recently tenured faculty member in the Harold Hamm School of Geology and Geological Engineering has been conducting research and this field class for more than a decade.

"This course is designed to give students hands-on experience to develop the geological field skills that they will later apply in their careers," said Putkonen, well known for his research in forbidding places such as the Arctic, the Antarctic, and in some of the world's toughest mountain ranges.

"Field courses like this one are vital for geology and related majors," said Putkonen.

Students also learn the basic skills of their trade, such as geologic mapping, how to make field observations, and how to take field notes.

This year's field class includes UND graduate student Faye Ricker, Putkonen's assistant for the course, and undergraduate student Emma Lord.

"I've traveled and done research in Nepal many times," said Putkonen, who has published several papers relating to his work there. "You go to a place you've never been to and start mapping things. You find the things you need to know about the rocks in the areat and how you sample them, and then you write reports."

It's a physically demanding trip,

Cody Hoskins tries carrying a basket.

especially for first-timers, Putkonen noted.

"There are no roads up there, only animal trails, so we have to trek up and establish our highest camp at an elevation of about 16,000 feet in the Annapurna region of the Himalayas," he said. "At the end of every day up there, we're completely exhausted, so we just crawl into our tents to sleep."

Putkonen, who has stayed fit throughout his professional career so that he can accomplish this kind of rigorous field trip, says students were tried and tested. But they'll get plenty of help from the Nepalese guide and his 30 or so porters. They provide detailed knowledge of the landscape and do much of they heavy lifting of food, fuel, and technical supplies.

"Our guide, whom I've worked with for several years, takes care of everything, including arranging the food and fuel, which all has to be carried in," he said. "He even

Cody Hoskins and Connor Lindenberg log their daily observations to the amusement of local children.

Leaving the village of Sikrung. The altitude of Sikrung is 8,200 feet.

brings ingredients for western food such as French fries and pizza. The Nepalese themselves eat a staple diet of lentils, potatoes, and rice, and an occasional chicken purchased from a local farmer."

The trip costs each student about $6,000—about $1,500 more than a U.S.-based field course—including airfare and tuition for the course.

In the brochure advertising the course, organizers note that the experience is ideal for undergraduate and graduate students who can earn three semester credits. In most geology programs, a field course like this is a required part of the curriculum.

Expected weather during the camp

The Annapurna field camp coincides with the main climbing season in Nepal. This pre-monsoon time is typically calm, dry, and cool.

The air temperature in the area of this field course varies with the altitude.

At low altitutdes, temperatures are warm—60 to 80 degrees Fahrenheit—and the air is humid—90 to 100%. However, at high altitude the average daily temperature is 40 to 50 degrees Fahrenheit. Typically, the daytime temperatures feel much warmer as the days tend to be sunny.

Nights are cold, dropping close to 32 degrees Fahrenheit—a perfect counterpoint for a summer study.

Juan Miguel Pedraza
University & Public Affairs writer

Faye Riker and Megan Norr visit with local children.

Recent DEDP graduate Chris Scott '13, Jean Tinkel '78, Sandy Tinkel ED '76, prospective DEDP students William Lutkenhouse.

Seattle Social 2014

More than 100 UND alumni gathered at the Space Needle for the 4th Annual UND Seattle Social held on June 3, 2014.

1950 Geology alumnus Walter Barke and his wife Christa.

Diane Catt, recieved her master's in Geology '82 and enjoyed sharing her memories of her days in Leonard Hall. Pictured with her, Deb Austreng, CEM Director of Alumni, Corporate and Public Relations.

Kevin Madry BSME '90 accompanied by Dawn Madry.

Students from the Harold Hamm School of Geology & Geological Engineering attended.

Dexter Perkins visits with Gary Thompson'62.

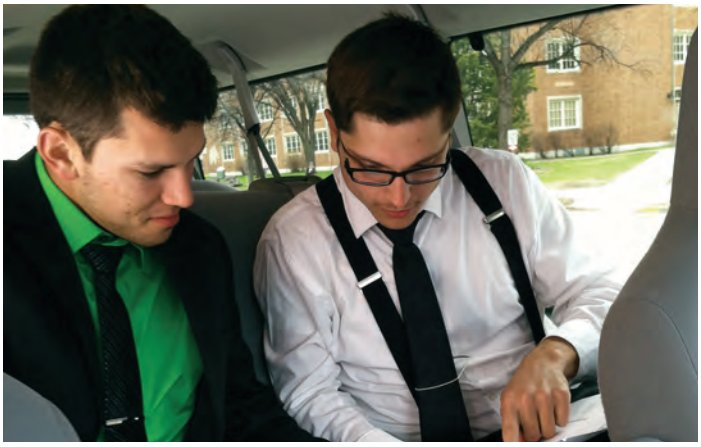
Denver Social 2013

CEM alumni gathered at the Wynkoop, downtown Denver on October 29, 2013.

Jill Parisi, Marron Bingle and Heather Lammers

Tom Heck '71, Joni Lerud-Heck '71, Mary Scott '72, J. Mark Ericson '71

Chemical Engineering Students Excel in Both Academics and Athletics



Patrick Riewer and Reid Jungling, a relief pitcher and ChE major, were road roommates and plant design partners.

Riewer Named UND's Male Scholar Athlete of the Year, Third Team Baseball Academic All-American

Patrick Riewer, a right fielder and pitcher for the UND baseball team, was named UND's male Scholar Athlete of the Year. Riewer was also named to the third team of the Capital One's 2014 Academic All-American Division I. He is only the second baseball academic all-American UND has seen.

Riewer, who has a 4.0 GPA in Chemical Engineering, was also a CoSIDA academic all-district selection, and ranked second on the team with a 0.394 on-base percentage. More importantly, he pitched a complete game victory over North Dakota State University. Riewer, a senior at UND, is a native of Wadena, MN.

Amsley-Benzie Named Third Team At-Large Academic All-American

Women's hockey goaltender Shelby Amsley-Benzie was named to the women's at-large third team of Capital One's 2013-2014 Academic All-District Division I. She is only the third women's hockey player at UND to receive this honor.

Amsley-Benzie, who has a 4.0 GPA in Chemical Engineering, was also a CoSIDA academic all-district selection and WCHA Scholar-Athlete. On top of that, she was named to the WCHA All-Academic team.

On the ice, Amsley-Benzie helped lead her team to its second consecutive SCHA Final Face-off championship game. She posted a 14-7-2 record in net last season, along with a 1.21 goals-against average and 0.958 save percentage during the postseason. Additionally, she led the nation with a 0.981 third period save percentage, conceding only three goals in the third period all year.

Amsley-Benzie, an academic junior and athletic sophomore at UND, is a native of Warroad, MN. She was a finalist for the UND female Scholar Athlete of the Year and plans to enroll in the Chemical Engineering Department's BS/MS program.

Clarke Named to CoSIDA Academic All-District Team

Lauren Clarke, a member of the UND Women's Volleyball team was named to the 2013 CoSIDA All-District Volleyball first team. The program recognizes the nation's top student athletes for their combined performances athletically and in the classroom.

Clarke, a 4.0 student in Chemical Engineering, has played in every set during her two seasons with UND and already ranks among the schools all-time leaders in digs with 931 in just her sophomore season. She was also named to the 2013-14 Big Sky All-Academic team.

Clarke, a Naperville, IL, native, completed an independent study class under the direction of Chemical Engineering's Wayne Seames. For her project, Clarke studied ways to make carbon dioxide capture and sequestration systems more energy efficient by modifying the solvent regeneration step for the process.

Britton Named UND Athletics' Male Individual Community Service Award Recipient

Dustin Britton, a men's tennis player, was named UND Athletics' 2013-14 Male Individual Community Service recipient. He logged the most community service hours from June 1, 2013 to May 1, 2014.

Britton, a freshman from Plymouth, MN, led UND's male student athletes with nearly 80 hours of community service. He was a volunteer for several organizations, including Red River Valley Community Action, Special Olympics, Red River High School's English Language Learners Program, Altru Health Systems, and more.

DiDonna Named to Big Sky All-Academic Team

Cataldo DiDonna, a freshman on the Men's Cross Country team, joined Clarke on the Big Sky All-Academic teams. Cataldo, a Bismarck, ND native, competed in six meets during the 2013-14 season.

More Successful Chemical Engineering Student Athletes

- **Aeron Carr**, Men's Football
- **Keaton Hanevold,** Men's Track and Field
- **Adedayo Idowu**, Men's Football, former Vice President of the Student Athlete Advisory Committee, currently President
- **Reid Jungling**, Men's Baseball

Pictured left to right: Taylor Albrecht, Katherine Dearth, Ruby Bimpolo-Ndzoumba, Wayne Seames, Minnkota's Mike Hennes and Wally Lang, Ernest Workman, Sima Noghanian, Robert Whittaker, Jeremiah Neubert, and Tyler Voegele.

First Place Tie at Freeman Awards

A medical mobility device and a flexible antenna shared the top prize as the most innovative engineering design in the annual Andrew L. Freeman Design Competition at the University of North Dakota College of Engineering and Mines (CEM).

The competition, held in honor of Freeman, a UND CEM alumnus and former general manager of Minnkota, requires individual or teams of engineering students to present their senior design project to a panel of distinguished engineers.

Electrical engineering student Ernest Workman took home one first-place check of $1,300 with his flexible antenna project, which integrates with clothing or suits for data transmission and communication. The antenna device is intended for astronauts' health monitoring system.

For the second straight year, there was a tie for first place. The team of mechanical engineering students Tyler Voegele, Ryan Hake and Tyler Bradley, along with physical therapy students Robert Whittaker, and Jessica Jones, created the medical mobility device. The goal of their project was to improve the autonomy and mobility of a disabled veteran.

Will Gosnold Wins Bronze Medal in the 100m Freestyle Swimming

Will Gosnold, Professor (GGE), Chester Fritz Distinguished Professor, Interim Chair of Petroleum Engineering, Director of PREEC and now, world class swimmer. Will competed in the 2014 FINA* World Masters Championships at Parc Jean-Drapeau in Montreal, QC, in August this year. Joining 5,800 swimmers representing 92 countries, the masters swimming competition consisted of 5-year age classes starting at 25 and extending to include the oldest competitor, a 97 year-old woman from New Zealand. The top level competition in each age class consists of former olympians and former national champions. There were between 50 and 60 in Will's age-class in each of the events.

** FINA (Federation Internationale de Natation = International Swimming Federation)*

CEM Students Receive Scholarships and Awards

PhD Candidate in Electrical Engineering Receives SMART Scholarship

Corey Bergsrud received a Science, Mathematics & Research for Transformation (SMART) scholarship through the Department of Defense (DoD). This award sponsors him for completion of his doctoral degree (expected May 2016) and provides him with an internship (summer 2015) at a sponsoring facility. Corey's sponsoring facility is Naval Surface Warfare Center located in Crane, IN.

Corey Bergsrud

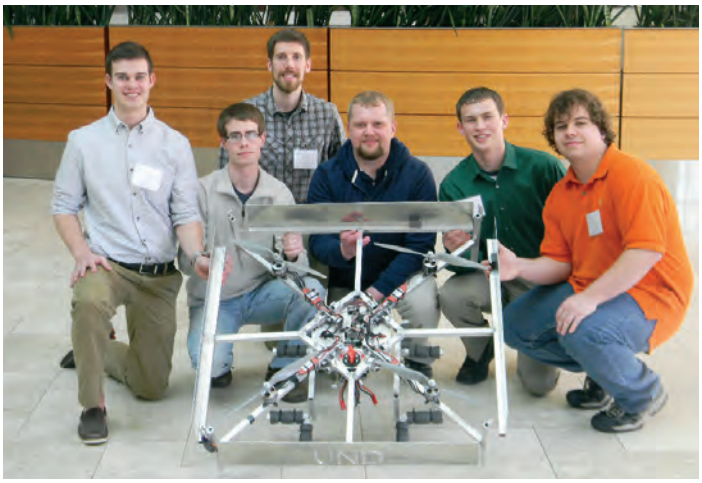
The goal of this scholarship while completing his degree is to prepare him to transition into the workforce. Upon graduation Corey's contract with the SMART scholarship is to work full time as a civil servant for the DoD at the sponsoring facility for two years. Corey was selected NASA student ambassador 2014 cohort. His duty is to promote STEM through outreach activities. Only 100 students throughout the nation get selected every year for this honor.

Mechanical Engineering Students Compete and Win

The UND student design team won first place at the ASME District C student design competition held in Madison, Wisconsin, on March 29, 2014. In an exceptional finish, the team of ME 201 students beat out 26 other teams from schools such as Wisconsin, Purdue, NDSU, South Dakota School of Mines, SDSU, and Minnesota. This is the best finish that UND's student design team has achieved since placing second in 2011.

The ASME student design competition topic changes every year. This year it was called the "Lighter than air UAV" competition. Students had to design and build a flying vehicle capable of navigating gates and carrying a heavy weight, which it would drop onto a target. The majority of points are earned by carrying more weight, so most teams created a variation of a quad copter instead of a true lighter than air vehicle, such as a blimp.

UND's design team was composed of sophomore Mechanical Engineering students. Their prototype carried 38 pounds and completed the course well within the five minute time limit, earning 850,000 points, compared to 640,000 and 440,000 points for second and third place, respectively. This earned them a price of $500, along with travel money to compete at the Internationl Design Competition in Montreal this fall.



Pictured left to right: Chris Borseth, Alex Heyd, Dustin McNally (advisor), Daniel Smith, Scott McDaniel, and Aric Glaser.

The UND team created a unique design by using folding arms that automatically extend past the size constraint when starting their run, allowing the design to lift more weight with larger rotors. The design was a crowd favorite, even forcing the contest coordinators to go on a search for a larger scale to weigh it in, exceeding their expectations.

Team places second in international competition

A team of six students and one alum competed in the SunSat Design Competition, with their proposal titled "Space-to-Space Microwave Wireless Power Transfer Experimental Mission Using Small Satellites."

First, the proposal was accepted and provided $1,000 to work towards developing their idea. After placing in the top three of the competition, an additional $1,000 was awarded for travel in order to present their work at the International Space Development Conference in Los Angeles, California, this past May. The team placed second and received $5,000 to continue to support the proposed project.

Team members:

- Corey Bergsrud, Ph.D. candidate in Engineering: team lead, satellites, and microwave wireless power transmission systems

- Robert Bernaciak, M.S. student in Electrical Engineering: RF-DC power conversion systems
- Subin Shahukhal, M.S. student in Mechanical Engineering: thermal analysis
- Ben Kading, freshman in Mechanical Engineering: mechanical design
- Jeremy Straub, Ph.D. candidate in Computer Science: satellites, economics
- Karl Williams, M.S. Space Studies: orbital design
- John McClure, Electrical Engineering Alumnus

UND faculty advisors:

- Sima Noghanian, Electrical Engineering
- Hossein Salehfar, Electrical Engineering
- Jeremiah Neubert, Mechanical Engineering
- James Casler, Space Studies
- Davide Whalen, Space Studies
- Elizabeth Becker, Department of Technology

CEM Announces Prestigious New Edson and Margaret Larson Foundation $10,000 Scholarship Recipients

Edson Larson, a successful farmer and Army Air Corp member, served overseas and as a legal clerk while stationed in the United States. Margaret Brunsdale Larson was the daughter of former North Dakota Governor Norman Brunsdale. Edson and Margaret made their home in Mayville, ND.

Prior to his passing, Edson arranged to have his estate used for a number of charitable purposes, including the establishment of a premier leadership scholarship for North Dakota students. The Edson and Margaret Larson Foundation Leadership Scholarship is available to North Dakota students who attend any North Dakota or Red River Valley post-secondary institution, and who have intentions of returning to a community in the state. Developing leaders for the future of North Dakota is the overall goal of this program.

For the 2014-2015 academic year, the Foundation awarded $10,000 scholarships to each of the following CEM students:

- Daniel Berg, senior, pursuing a Bachelor of Mechanical Engineering. Hometown: Dickinson, ND
- Ross Dunnigan, senior, pursuing a Bachelor of Mechanical Engineering. Hometown: Minto, ND
- Levi Lewis, sophomore, pursuing a Bachelor of Electrical Engineering.
- Tyler Przybylski, junior, pursuing a Bachelor of Science in Electrical Engineering with Computer Science focus and a minor in Mathematics and Computer Science. Hometown: Bismarck, ND

Pictured left to right: Harvey Gullicks, Chair CE, Charlie Vein, Gaoty Mauyabi-Maouene, and Jarda Solc

AE2S Awards Annual Scholarship

Civil Engineering student Gaoty Mauyabi-Maouene received the 2013 AE2S Scholarship of $1,000 at a reception held in her honor on September 24, 2013. On hand to present the award were Charlie Vein, President, and Jardo Solc, Assistant Operations Manager, both of AE2S.

Gaoty made her way to the United States from the Democratic Republic of the Congo. She graduated in May, 2014 with a bachelor's degree in civil engineering.

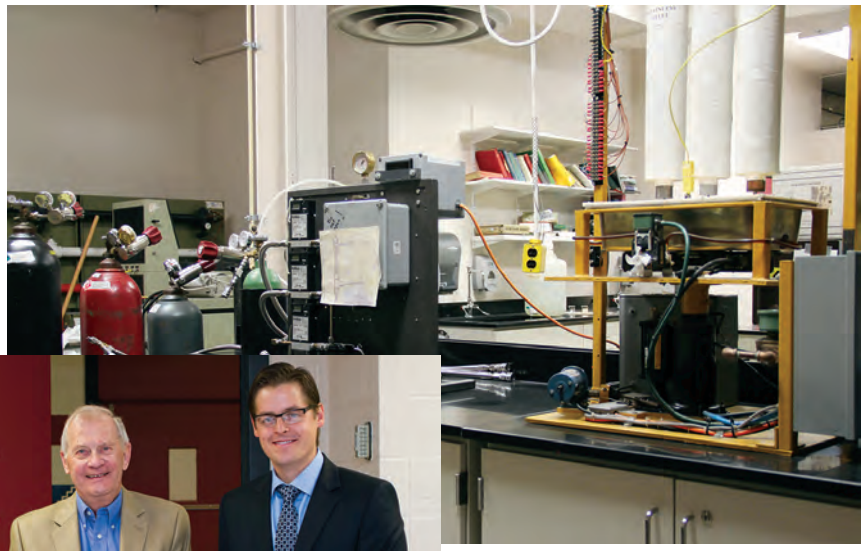
Gaoty embodies the selection criteria of a high GPA and characteristics sought by consulting firms—integrity, work ethic, intelligence, ingenuity, communication skills, and interpersonal skills.

Marathon Oil Scholarship

Geological engineering seniors Brittany Renner and Seth Knudsen each received a $500 scholarship from the Marathon Oil Health Environment, Safety and Security Scholarship Fund. Presenting the checks is Terry Kovacevich, Regional Vice President, Bakken Management Team, Marathon Oil.

New Lab Spaces Benefit Students

Alumni David, '61, and Linnea, '62, Veeder have generously provided significant funding to allow the Chemical Engineering department to transform the open area of HH360 into a new student laboratory area and turn the old stockroom into a new student study space/lounge. A celebration was held during Homecoming 2013 at which we recognized the generous support of David and Linnea Veeder. The new labs space was immediately put to use to accommodate some of ChE Lab IV experiments.



Dean El-Rewini, David Veeder and Brian Tande, Chair, Chemical Engineering

The Integrated Systems Engineering Lab was made possible with the support of **Emerson Process Management/ Rosemount.**

The lab supports project-based student learning in the context of electromechanical design projects with a focus on projects for design competitions. ISEL projects, selected by a group of mechanical and electrical engineering faculty, receive access to dedicated research, development, and conference facilities.

The Electrical Engineering Antenna and Microwave Laboratory was made possible with the support of **Rockwell Collins.** The lab is equipped with high frequency signal generators, spectrum analyzers, radar systems, microwave and antenna kits and is utilized for many junior/ senior and graduate-level electrical engineering courses.

Photo shows an EE student testing different signal modulations using a spectrum analyzer, a signal generator and a communication system trainer kit.

Continental Resources Team of Experts Met with Nearly 100 Students During Their "Takeover"

UND Harold Hamm School of Geology & Geological Engineering
University of North Dakota

As a result of the "takeover," four CEM students participated in summer internships with Continental Resources.

Billy Eerdmans
Petroleum Engineering Intern
at Oklahoma City, OK
Southern Department

Alex Cote
Engineering Intern
at Killdeer, ND
Northern Production

Lewis Keller
Engineering Intern
at Killdeer, ND
Northern Production

Mitch Sigler
Geology Intern
at Oklahoma City, OK

As of this printing, Billy, Alex, and Lewis have accepted internships for the Summer 2015 program!

Homecoming 2013

Michael A. Lodoen, BSCE '65

Mike was raised in Bottineau, ND. He was a "town kid," and as far back as he can remember he wanted to be in the construction business. All aspects of construction fascinated him as a youngster and teen. His career choice was simple—this is what he wanted to do.

Mike received his B.S. in Civil Engineering in 1965. He entered the construction field after graduation, and 14 years later worked as a construction engineer for others before founding his company. Some of his early projects included hydro-electric power generating stations, large multi-unit coal fired electric generating stations, and various military infrastructure projects in Vietnam.

CEM Class of 2013 Academy Inductees, David Veeder, Terry Severson, Michael Lodoen

In 1979 Mike became co-founder and president of L&D Construction Company, Inc., San Jose, CA, a residential general contractor building over 10,000 homes, condominiums, townhouses, and apartments in the San Francisco Bay area.

Mike and his company have been recognized numerous times for their excellence in construction and for participation in developing affordable housing.

In 2010, he and his wife established the Michael and Sitney Lodoen Engineering Scholarship Endwoment here at UND. The couple resides in Cupertino, CA.

UND

UND College of Engineering and Mines

ACADEMY

Michael A. Lodoen

Born: August 4, 1942 in Lakota, ND – Hometown: Bottineau, ND

Education: University of North Dakota, BSCE 1965

Career Experience

1965-1966	Peter Keiwitt Sons – construction engineer on hydro-electric power generating station
1966-1972	Morrison Knudsen Construction Co. – construction engineer/project engineer on various military infrastructure projects in Vietnam
1973-1978	Bechtel Power Corp. – construction engineer/ project engineer on large multi-unit coal fired electric generating stations
1979-present	L&D Construction Co. Inc. – president and co-founder – residential general contractor building over 10,000 houses, condominiums, townhouses, and apartments in the San Francisco Bay area

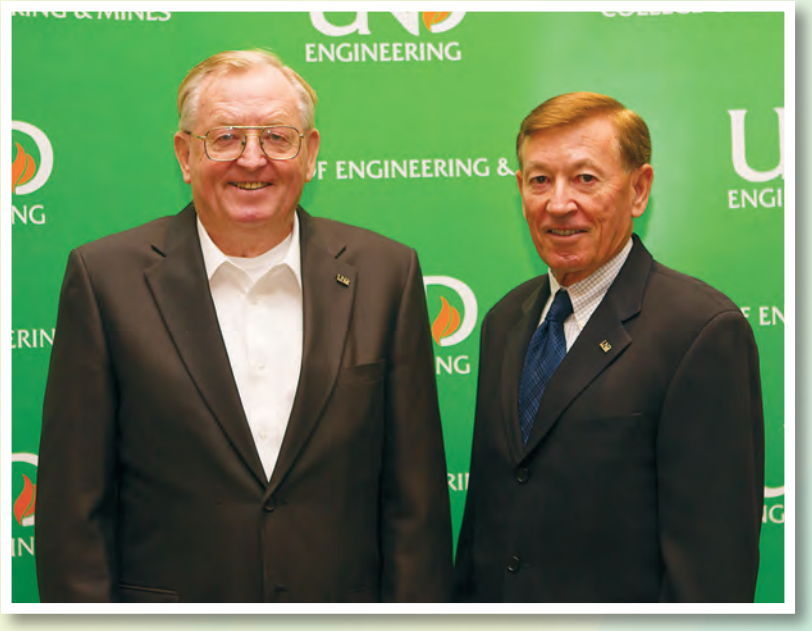
Accomplishments

Past Member of Board of Directors – Downtown College Prep – a charter high school focusing on educating Hispanic students who will be the first in their family to attend a university

Awards

Multiple corporate awards for excellence in construction and for participation in developing affordable housing

L&D CONSTRUCTION CO., INC.



Brothers Steve Loeden, BSCE '68 and Mike Loeden

Terrance E. Severson, BSEE '65

Terry's hometown is Tioga, ND. He came to UND because of its strong Air Force ROTC program. In his junior and senior years, Terry was recruited into the advanced program. It took 29 years to turn in the uniform.

He received his B.S. in Electrical Engineering in 1965 and immediately entered the U.S. Air Force, where he served from 1965-92. Before his retirement, Terry achieved the rank or Colonel. His Air Force duties included Acting Director, Joint Engineering and Interoperability Organization; Assistant Deputy Director, J61, Organization of the Joint Chiefs of Staff and Commander, 1961 Communications Group.

Diane Severson, Terry Severson, and Dean Hesham El-Rewini

Terry's civilian career lead him to Booz-Allen and Hamilton. His first position was principal, and later operations director, in Saudi Arabia. In 2006, he was one of the founders of TRACE Systems, Inc., a technical professional services firm that provides networking, telecommunications, information technology, and information assurance services to U.S. Department of Defense customers.

Terry is one of the founding members of the College of Engineering and Mines Executive Board and a strong supporter of student impact scholarships.

He and his wife Diane reside in Farifax, VA.

UND College of Engineering and Mines

ACADEMY

Terrance E. Severson

Born: July 21, 1942, Fargo, ND
Hometown: Tioga, ND

Education: University of North Dakota, BSEE 1965
University of Denver, MSEE 1970

Career Experience

1965 – 1992	United States Air Force – achieved rank of Colonel • Acting Director, Joint Engineering and Interoperability Organization • Assistant Deputy Director, J61, Organization of the Joint Chiefs of Staff • Commander, 1961st Communications Group
1992 – 1997	Booz•Allen & Hamilton, Principal
1997 – 1999	Booz•Allen & Hamilton Saudi Arabia, Operations Director
2000 – 2004	Advanced Management Technology, Inc., Vice President
2004 – 2006	TAMSCO, Director, Strategic Planning
2006 – current	Trace Systems Inc., President

Honors, Awards, Accomplishments

Military decorations:
- Defense Superior Service Medal with Oak Leaf Cluster
- Legion of Merit
- Bronze Star

McClelland Award - 1961st Communications Group - best USAF major communications organization two consecutive years

UND CEM Executive Board Founding Member

U.S. AIR FORCE

TRACE SYSTEMS

Alumni, faculty, and students enjoy the induction ceremony and luncheon.

David A. Veeder, BSCE '61

Dave grew up on his family's farm just east of Watford City, ND. While at UND, Dave was very active in his fraternity, Sigma Chi, college Who's Who, and several honorary societies.

After receiving his B.S. in Chemical Engineering in 1961, Dave began his career with Universal Oil Product Company, Des Plaines, IL, as a pilot plant engineer, pilot plant group leader, and petroleum refinery unit start-up engineer. This work took him throughout the U.S., Italy, and Puerto Rico. He continued his engineering career from 1965-69 with Conoco, Inc.

David Veeder with his wife Lynn (Kanzler '62) and grandsons Daniel and Christian.

In 1972 he received his Juris Doctorate from the University of Denver and established the Veeder Law Firm, which primarily practices corporate law, defense, civil litigation, oil and gas, taxation, and OSHA labor and environmental law. He is a member of the Patent Bar, State Bars of Montana, Colorado, and North Dakota. He is a permanent arbitrator and on the arbitration panels of Stillwater Mining Company and United Steel Workers Union.

David is on the 2013 List of Ten Best Lawyers in America in the practice of Environmental Law, an honor he has received more than 10 times.

UND College of Engineering and Mines

ACADEMY

David A. Veeder

Born: June 13, 1939, Watford City, ND

Education: University of North Dakota, BSChE with honors 1961
University of Denver, J.D. with honors 1972

Career Experience

1962-1965	Universal Oil Products Company, Des Plaines, IL: Pilot Plant Engineer, Pilot Plant Group Leader and Petroleum Refinery Unit Start Up Engineer involved in research and development in petroleum refinery industry including development of small scale refining units and start-up work on commercial petroleum refining units in the U.S., Italy, and Puerto Rico.
1965-1968	Conoco, Inc., Process Engineer, Operations Superintendent, Billing, MT
1968-1972	Conoco, Inc., Operations Superintendent and Process Superintendent, Denver Refinery
1969	Conoco, Inc., Manager of Refinery Economics & Development, Ponca City, OK
1972-present	Veeder Law Firm, P.C. and predecessor law firms—primarily corporate law, defense, civil litigation, oil and gas, taxation, OSHA, labor and environmental law

Honors and Associations

Member of Patent Bar; State Bars of Montana, Colorado and North Dakota
U.S. Tax Court
U.S. Court of Appeals, admitted to Eighth, Ninth and Tenth Circuits
Member of American Institute of Chemical Engineers 1962-72
Member of Order of St Ives, University of Denver, 1972
Permanent Arbitrator, Arbitration Panel for Stillwater Mining Company and United Steel Workers Union

Accomplishments

2013 List of Ten Best Lawyers in America in the practice area of Environmental Law
(David has received this peer-selected honor for more than 10 years prior as well)

In 2011, the Veeder's set up two scholarships—the David A. Veeder Scholarship Endowment and the Linnea J. Veeder Scholarship Endowment. David and Linn, who received her B.S. in Medical Technology in 1962, reside in Billings, MT.


David Veeder, BSChe '61, Tom Owens BSChe '63, and John MacFarlane BSEE '61

CEM Alumni Academy Members

Everett Sondreal, John MacFarlane, David Veeder, Walt Swingen, Fernanda Philbrick, Terry Severson, Dean W, Mike Loeden, Tom Owens, Howard Wrigley

2013 Sioux Award Recipients Bob and Kristine Solberg

Bob Solberg received his B.S. in Chemical Engineering in 1969, while his wife Kristine received her B.S. as a Registered Nurse.

Bob is a retired career senior executive of Texaco Inc., where he began working upon graduating UND, and served as president of Upstream Commercial Development from 1998 until 2002. Bob is currently chairman of JDR Cable Systems Ltd., manufacturer of seismic cables for offshore surveys and umbilical cables, connecting and remotely operating wells drilled in very deep water.

Kristine is a childbirth educator and community volunteer near their home in Houston, TX.

Bob and Kris were early, generous supporters of the Collaborative Energy Complex. The Solbergs have served on the UND Alumni Association & Foundation Board, the National Campaign Steering Committee for North Dakota Spirit, the Campaign for UND, and the College of Nursing & Professional Disciplines Advisory Council. Bob was inducted into the CEM alumni Academy in 2005 and is currently serving on the CEM Executive Board.

Pictured left to right: Kristine Solberg, Bob Solberg, First Lady Marcia Kelley and UND President Robert Kelley.

Congratulations, Bob and Kris, and thank you for your continuous support of the College of Engineering and Mines students, faculty, and programs.

New Appointments and New Hires

Dr. William Gosnold Appointed Interim Chair of Petroleum Engineering

Dr. William Gosnold received his B.A. in Physics from State University of West Georgia in 1971. He obtained his Ph.D. in Geophysics at Southern Methodist University in 1977. He served as chair of GGE from 2004-2010.

Dr. Michael Mann Appointed Executive Director of Institute for Energy Studies

Dr. Michael Mann received his B.A. in Mathematics and Chemistry from Mayville State College in 1979. He went on to obtain his M.S. and M.B.A. in Chemical Engineering from UND in 1981 and 1988, respectively. His Ph.D. in Energy Engineering was also received from UND in 1997.

Dr. Mann is the former Interim Dean of the College of Engineering and Mines, served as the first Associate Dean, as well as a past Chair, Chemical Engineering.

Dr. Sima Noghanian Appointed Chair of Electrical Engineering

Dr. Noghanian received her B.S. from Sharif University of Technology, Tehran, Iran, in 1992 and her M.S. and Ph.D. from the University of Manitoba, Winnipeg, Canada, in 1996 and 2001, respectively.

She was an Assistant Professor in the Department of Electrical Engineering at Sharif University from 2002-2003 and at the University of Manitoba from 2003-2008. Dr. Noghanian began her career at UND as an Assistant Professor in 2008 and was promoted to the rank of Associate Professor with tenure in 2013.

Dr. Hossein Salehfar Appointed Interim Associate Dean

Dr. Hossein Salehfar received his B.S. in Electrical Engineering from the University of Texas at Austin in 1981. He went on to Texas A&M at College Station, where he obtained his M.S. and Ph.D. in Electrical Engineering in 1984 and 1990, respectively. He served as interim chair of EE from 2011-2012.

Dr. Brian Tande Appointed Chair of Chemical Engineering

Dr. Tande received his B.S. in both Chemical Engineering and Chemistry from the University of Minnesota in 1998 and his Ph.D. in Chemical Engineering from the University of Delaware in 2002. Before coming to UND, Dr. Tande worked at Tecton Products, LLC in Fargo, ND. He has been an Associate Professor in the department since 2006. In addition, he also serves as Director of the Jodsaas Center for Leadership and Entrepreneurship.

GEOLOGICAL ENGINEERING

Dr. Stephan Norden Named Harold Hamm Distinguished Professor of Petroleum Geology

Dr. Stephan Norden received his B.S. and M.S. in Geology from Michigan Technological University in 1980 and 1988, respectively. He obtained his Ph.D. in Geology from Michigan State University in 1994.

Before coming to UND, Dr. Norden was a Subsurface Geologist for the North Dakota Geological Survey.

Dr. Dongmei Wang Hired as Assistant Professor

Dr. Dongmei Wang received her first B.S. in Computer Program Design from Daqing Petroleum University, Daqing, China, in 1987. She finished her second B.S.—in Computer Science—at the Changcun Science and Technology University, Changchun, China, in 1999. She obtained her M.S. and Ph.D. in Oil and Gas Development Engineering from the Research Institute of Petroleum Exploration and Development, Beijing, China, in 2001 and 2007, respectively.

Dr. Wang has been an Adjunct Faculty of Geology and Geological Engineering at UND since 2011.

Dr. I-Hsuan Ho Hired as Assistant Professor

Dr. I-Hsuan Ho received his B.S. in Civil Engineering from the National Chiao-Tung University, Hsinchu, Taiwan, in 1999. He went on to obtain his M.S. in Geotechnical Engineering at the National Chiao-Kung University, Tainan, Taiwan, in 2001 and at the University of Colorado, Boulder, CO, in 2004. He completed his Ph.D. in Geotechnical Engineering in 2009 at Iowa State University, Ames, IA.

Before coming to UND, Dr. Ho worked as a Clinical Assistant Professor in the Department of Civil and Environmental Engineering at Washington State University.

ELECTRICAL ENGINEERING

Dr. Arash Nejadpek Hired as Assistant Professor

Dr. Nejadpak has a M.S. in Power Electronics and Ph.D. in electromagnetics, Florida International University, Miami, FL.

Before coming to UND, he worked as a consulting engineer for several industrial companies in the Silicon Valley of California.

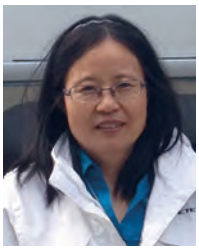
Dr. Kouhyar Tavakolian Hired as Assistant Professor

Dr. Tavakolian received his Ph.D. from Simon Fraser University, Vancouver, Canada, in 2010.

He has been involved with multiple startup companies in his area of research.

MECHANICAL ENGINEERING

Dr. Cai Xia Yang Hired as Assistant Professor



Dr. Cai Xia Yang received her B.S. and M.S. in Mechanical Engineering from Tianjin University of Technology and her Ph.D. from the University of Manitoba.

Before coming to UND, Dr. Yang worked as an Assistant Professor at the University of Minnesota, Duluth.

PETROLEUM ENGINEERING

Dr. Hadi Jabbari Hired as Assistant Professor

Dr. Hadi Jabbari graduated from Petroleum University of Technology, Iran, with a B.S. in Production Engineering and from Sharif University of Technology, Iran, with a M.S. in Reservoir Engineering. He earned his Ph.D. in Engineering at UND in 2013.

Before starting work at UND, Dr. Jabbari worked for six years in the industry as a petroleum engineer at various capacities—from working on offshore platforms to serving as reservoir engineer in the office.

Dr. Mehdi Ostadhassan Hired as Assistant Professor

Dr. Mehdi Ostadhassan received his B.S. and M.S. in Petroleum Exploration Engineering from the Petroleum University of Technology, Khwaz, Khuzestan, Iran, in 2005 and 2009, respectively. He obtained his M.S. in Petroleum Geosciences at the ENSPM/IFP School, Rueil-Malmaison, Cedex 92852, France, in 2007. He earned his Ph.D. in Engineering at UND in 2013.

Dr. Ostadhassan was a Graduate Research Assistant at the Energy and Environmental Research Center.

CHEMICAL ENGINEERING

Dr. Ali Alshami Hired as Assistant Professor

Dr. Alshami received his B.S., M.S., and Ph.D. from Washington State University in 1997, 2001, and 2007 respectively. Prior to joining UND, Dr. Alshami worked at King Fahd University in Dhahran, KSA.

Dean El-Rewini accompanied new CEM faculty on the 24th Annual UND/North Dakota bus tour. Pictured with the dean are Dr. Cai Xia Yang, Assistant Professor, Mechanical Engineering; Dr. Kouhyar Tavakolian, Assistant Professor, Electrical Engineering; Dr. I-Hsun Ho, Assistant Professor, Geological Engineering and his spouse Yi-Pen Hsieh.

Faculty and Staff Receive Achievement Awards at the Dean's Recognition Luncheon, May 5, 2014

The Dean's outstanding faculty Award was presented to:

- Daba Gedafa, Assistant Professor, Civil Engineering
- Jeremiah Neubert, Associate Professor, Mechanical Engineering

The Dean's Outstanding Staff Award was presented to:

- Jay Evenstad, Research Specialist, Mechanical Engineering
- Angeline Reinhart, Program Resource Manager, Chemical Engineering

The award is given in recognition of outstanding performance through a combination of job performance, relationship with colleagues, positive attitude and the ability to relate their work to the vision of the College of Engineering and Mines.

Pictured left are: Angeline Reinhart, Daba Gedafa, Dean Hesham El-Rewini, Jay Evenstad, Jeremiah Neubert

Drs. William Gosnold (Chester Fritz Distinguished Professor), Hossein Salehfar, Michael Mann(Chester Fritz Distinguished Professor) and Richard LeFever (not shown) received this year's **UND Founder's Day** Award for Interdisciplinary Collaboration in Research. This group combined their talents to demonstrate geothermal energy production in the oil fields of Western North Dakota.

"Lunch with Colleagues" for CEM faculty and staff is held the last Friday of each month. July 25 was a welcomed opportunity to enjoy the great ND summer.

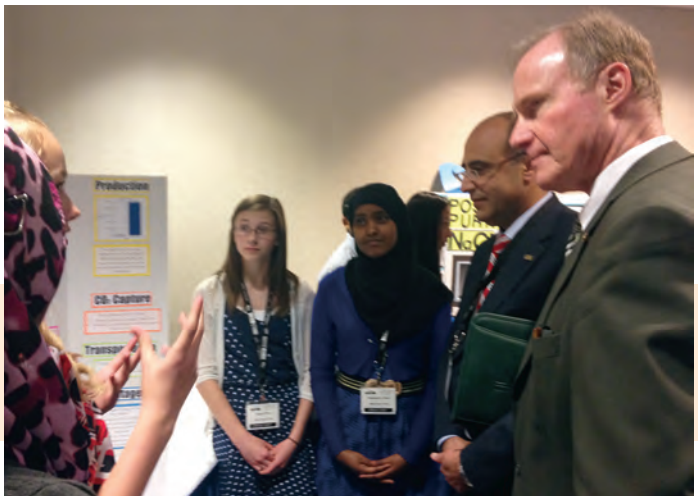
Conferences and Showcases

The Bakken-Three Forks Shale Oil Innovation Conference & Expo, February 10-12, in Grand Forks, ND, organized by BBI International and The Bakken magazine received significant collaborative support from the University of North Dakota's College of Engineering & Mines, including the Department of Petroleum Engineering, as well as the Harold Hamm School of Geology and Geological Engineering.

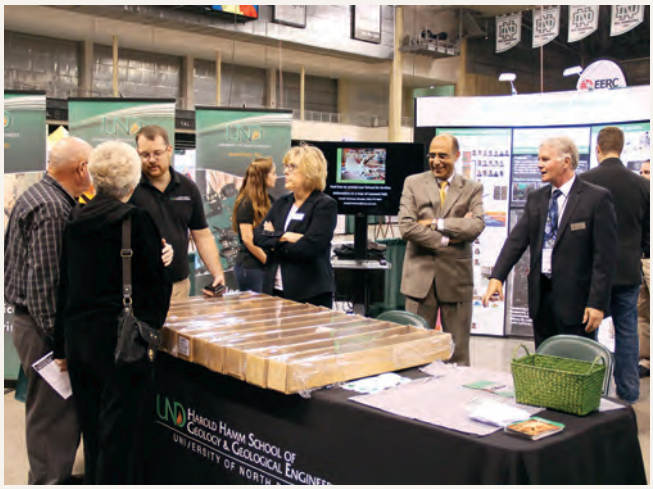
"Joining forces with UND ensures that the conference program will include perspectives from researchers and petroleum engineers from what is fast becoming one of the top oilfield-focused engineering schools in the nation. The partnership also carries with it an added degree of contextual industry knowledge that will add rich value to the agenda."

Luke Geiver, editor of The Bakken magazine.

The 2014 Williston Basin Petroleum Conference was held on May 20-22, 2014, in Bismarck, ND. Over 4,250 people attended from 48 states and Washington, D.C., six Canadian provinces, Australia, Cameroon, China, France, Nigeria, Norway, Singapore, and the Virgin Islands. CEM was among 530 exhibitors and 150 sponsors.



The 2013 ND Petroleum Council's Annual Meeting & Member Showcase was held September 17-19 in Grand Forks—for the first time—and was a great success. The annual meeting attendance reached an all-time high of 833 people, with more than 3,000 people attending the Community Day information session, visiting display booths and enjoying the BBQ. The CEM was well represented by students and faculty showcasing their areas of expertise and research to the public and membership alike. More than 40 GGE and PE students served as ambassadors for the event.



Pictured left are: UND President Robert Kelley and Dean El-Rewini visit with a very impressive group of student exhibitors from Cheney Middle School, West Fargo. The students were part of the program at the Williston Basin Petroleum Conference.

New Continental Resources High Resolution Virtual Core Library Project Provides Student-learning Opportunities

The rock is 500 million years old. The gem-quality sheen is brand new.

So is the detailed digital image of this core, which was extracted two miles underground from a site in western North Dakota as part of an oil exploration venture.

"This image is part of an innovative research library being developed right here at the University of North Dakota's Harold Hamm School of Geology and Geological Engineering," said Hesham El-Rewini, dean of the College of Engineering & Mines and the force behind the digitization project.

El-Rewini sees this new core image library revolutionizing how students and industry will develop knowledge and understanding of oil and other geologic resources in the state. UND and Houston, Texas-based PetroArc International are developing the new digital Continental Resources High Resolution Virtual Core Library project, El-Rewini says.

PetroArc representatives say that, following many years of high-tech research and development, the company produced a method of digitally scanning cores, thin sections, plugs and drill cuttings that can be viewed via computer utilizing their CORSystem software.

The four-year digitization project at UND is funded by $1.5 million from the North Dakota Industrial Commission and $500,000 from Continental Resources, now the largest operator of oil rigs in North Dakota.

"For a number of years, our students and faculty have been utilizing the Wilson Laird Core & Sample Library's core library in upper division classes and research projects," said El-Rewini. "With the rapid expansion of the oil industry in the western part of state, that library has become an even more important resource. But to access that resource, people have to physically come here and actually examine the cores and samples."

Harold Hamm, founder and CEO of Continental Resources, told El-Rewini that he regularly used the Laird Core & Sample Library when he was getting started in the petroleum exploration and extraction business.

"Mr. Hamm himself indicated to me how valuable this resource was to him when he started his career," El-Rewini said.

"The digital core library images will help our students not just with much easier access, but also with software tools that will allow them to manipulate those images," El-Rewini said. "They will be able to extract a lot more information much more easily."

The second key advantage to the digital core image library is remote access.

"You'll be able to access this image library from anywhere," El-Rewini said, noting that the details how to make that happen, such as who gets access and whether it will be free or not, still are being reviewed. "The beauty of this project is that we're also engaging students as an integral part—PetroArc has hired UND students to prepare the samples for digital imaging."

Right now only certain cores in the Core & Sample Library are being selected for processing and imaging, according to Joseph Hartman, Chester Fritz Distinguished Professor and director of the Harold Hamm School of Geology & Geological Engineering. He's also heading up the project.

There's a lot more to this project than point-and-shoot photography, as good as that's gotten over the last few years.

"It's a painstaking two-part process," says Hartman.

First, each core has to be meticulously sanded and

polished to a finish that rivals top-end marble counter tops. That takes many hours of work with sand, grinding wheels of various fine and finer grits and buffing wheels. The time it takes varies according to the composition of the cores.

Then a PetroArc digital imaging specialist, trained in academic photography and digital image processing, positions the specially prepared core precisely in a tray. After setting a sophisticated digital camera with a macro lens, the photographer scans the core and then processes and archives each image. Images for a core are merged making for a very large file.

"Every rock behaves differently," says Hartman. "So it takes varying times to process and scan each core. The result is an extremely accurate image that's much easier to access than the original core. Discussing the subsurface geology of the Williston Basin of North Dakota in class will be much easier with access to these images."

"Basically, we will be able to 'tour' the deep underground geology of North Dakota, and not just for oil, but for other resources, as well," said Hartman, an internationally known expert in prehistoric mollusks and the formations they're found in. "Now wherever possible, these digital images will be incorporated into as many geology courses and labs as possible.

"There's a lot of really cool life and features produced by life preserved in the cores, and the Virtual Core Library will help us see and understand more of the record."

Juan Miguel Pedraza, University & Public Affairs writer

50th Annual Associated General Contractors Scholarship Presentation, September 11, 2013

- John Jardine (BSCE '37) Memorial Scholarhip—a full tuition scholarship, was first awarded in 1964.
- Walter I Swingen (BSIE '53) Scholarship—a full tuition scholarship, was first awarded in 1987.
- Lindberg Construction Scholarship—a $1,000 scholarship was first awarded in 2010.

Back Row, left to right: Daba Gedafa, Walt Swingen, Russ Hanson, Harvey Gullicks, Paul Diederich. Front Row, left to right: Anna Lipetzky, John Jardine Scholarship recipient; Lucas Kowalski, National AGC of America Scholarship recipient; Bryce Johnson, UND Lindberg Scholarship recipient: and Taryn Bohan, Walter Swingen Scholarship recipient.

Harold Hamm School of Geology and Geological Engineering celebrates the 50th Anniversary of Leonard Hall

A two-day celebration marked the fiftieth anniversary of the laying of the cornerstone of Leonard Hall. The celebration included campus tours, tours of Leonard Hall, luncheons with students, evening social/banquet, the Arthur Gray Leonard Award ceremony, and the student award ceremony.

Student awards were presented to the following, from left to right: Samantha McLaughlin (Hugh and Ruth Palmer Scholarship), Stephanie Kitowski (Harold Hamm Scholar), Connor Lindenberg (Harold Hamm Scholar), Robert Schneider (Raymond and Edyth Sullivan Memorial Engineering Scholarship), Luke Belanus (Bernold M. (Bruno) Hanson Geology Scholarship), Brianna Bushee, Benjamin York (Hugh and Ruth Palmer Scholarship), Dylan Young (Estwing Hammer Award).

Ed Murphy Receives the Arthur Gray Leonard Award

Joseph Hartmann, Director of the Harold Hamm School of Geology and Geological Engineering (left) and Ed Murphy (right).

Raised in Bismarck, ND, the son of a petroleum geologist, Ed grew up surrounded by well logs, core chips, AAPG journals, and North Dakota Geological Survey publications. Ed became the State Geologist and an assistant director in the Department of Mineral Resources in 2005. His work with the Survey has focused on the impacts to groundwater from various types of mining operations and waste disposal as well as the stratigraphy, hydrogeology, and mineral content of Cretaceous and Tertiary rocks in the North Dakota Williston Basin. Ed received his B.S. from UND in 1979, followed by his M.S. in 1983.

Ed is married to Becky (Rebecca Duggan of Buxton). They have two boys—Paul will graduate from UND in May with a B.S. in English and Daniel is a freshman attending Bismarck State College.

Established in 1992 in honor of Arthur Gray Leonard, scholar, leader, and pioneering geologist of North Dakota, award of the medal recognizes outstanding achievement in the geosciences and geological engineering in research, technical studies and projects applied to societal needs, teaching, educational development, or leadership in conservation of Earth's resources and environment, as conferred by the faculty and alumni of the Harold Hamm School of Geology and Geological Engineering, University of North Dakota.

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, departmental newsletters, or through this fifth 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.

Attending or hosting an event: Events are scheduled on campus and throughout the country. We encourage you to participate. Check our online events calendar often for opportunities. Perhaps you'd consider being a host. 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 your "must see" list.

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

Volunteering: Your expertise and experience is of great value to the students. Please consider sharing that knowledge with our students by becoming a student mentor; joining students in the classroom or during informal lunches; or participating in round table discussions on specific topics of interest to engineering students. These possibilities are endless and we would appreciate your involvement.

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 as the entire UND community. Your gift may be eligible for matching state dollars.

Ongoing Opportunities

Unrestricted gifts to 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.

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

Dan Muus

We extend our congratulations to Dan Muus, who has been promoted to Chief Development Officer with the UND Alumni Association & Foundation.

Dan has served as a Development Officer for the College of Engineering and Mines since 2008. In that role, he has been the chief fundraiser for the college, working closely with Dean Hesham El-Rewini and the faculty on fundraising efforts. In addition to his new duties as Chief Development Officer, Muus will continue to work with the College of Engineering and Mines on fundraising for the Collaborative Energy Complex, a $15.5 million new home for the Petroleum Engineering department and the Institute for Energy Studies. Thank you Dan!

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

IMPACT THE FUTURE
Mentoring

The UND CEM Executive Board is promoting increased interaction with UND alumni and current engineering students and faculty, with the goal to attract and retain students to the engineering field. Several committees are seeking out alumni and friends of the university that would like to participate in initiatives to mentor students (remotely or on campus if possible), present in a classroom setting, have informal lunches with students, or participate in round table discussions on specific topics of interest to engineering students. If interested in participating, please contact Lisa Barnes at lisa.s.barnes@honeywell.com or Jim Albrecht at jim.albrecht@comdelinc.com.


Dr. Jaakko Putkonen in Nepal – page 16


Experience Engineering – page 9