Hello from UND! We are happy to share with you the latest edition of our department newsletter. As usual, we are very proud of the accomplishments of our students, alumni and faculty. I hope you’ll take a few moments to learn about all that is going on in the world of UND Chemical Engineering.

In terms of people, we have welcomed back one faculty member but have had to say goodbye to another. Wayne Seames has returned from a nine-month sabbatical in the UK, bringing with him some new ideas and a broader perspective about ChE education. You can read more about his experience on pages 6 and 7. Robert (Dr. Bob) Wills retired over the summer after spending six years with us (see pg. 17). I spent the last year trying to talk him out of it, even going so far as to call for a vote of no confidence in his retirement, but to no avail. The department misses him, but we all wish Bob and Sally the best.

This fall, ABET evaluators will be here to review our program. It is an important event, but one which we have been preparing for since immediately after the last ABET visit, as assessment and continuous improvement are central to how the department operates. This process includes the collection and analysis of both quantitative and qualitative data about every class, as well as an annual retreat where we discuss our program in detail. Frank Bowman, our Associate Chair, (Continued on page 2)
ERICKSON SELECTED AS EERC DIRECTOR  (CONTINUED)

(Continued from page 1)

"I am thrilled to accept this role. It is my honor to continue leading the outstanding staff at the EERC and working alongside the current leadership team and UND officials to map out a positive path forward," said Erickson.

"With a new financial plan in place, we are focused on strategically expanding our technical programs under development and strengthening our existing programs. With the strong and focused group of employees at the EERC, I am very confident of a bright future ahead," said Erickson. "I am also looking forward to working along with Provost DiLorenzo on further collaborations with other key departments within the university family in order to strengthen relationships and build future research opportunities."

Erickson began his career in 1986, when he was hired as a student at the UND Energy and Mineral Research Center. He was hired full-time as a Research Specialist in 1988. Over the years, he has held many different positions, including Research Engineer, Supervisor for Analytical Research, Research Manager, and Senior Research Manager. From 1999 to 2011, he served the EERC as an Associate Director for Research, where he focused on the development of advanced power and fuel systems from fossil and renewable energy sources.

Since 2011, Erickson has served as Associate Director for Business, Operations, and Intellectual Property, where he oversees activities related to safety, facilities, business functions, and protection and commercialization of intellectual property. The duties and responsibilities of this position are focused on providing facilities, engineering and construction support, accounting services, contracting services, business policies and practices, safe operations, and intellectual property protection and development to enable and enhance the cutting-edge research of the EERC.

Erickson earned both his B.S. and M.S degrees in Chemical Engineering from UND. «
Dear Alumni and friends. It is my pleasure to share with you some of the exciting things that UND’s AIChE student chapter has experienced in the past year. We have seen students explore the Flat Irons of Colorado and walk through the Olympic Park of Atlanta while also interacting with some of the top engineers in the nation at the regional and national AIChE conferences. This past year we sent a record number of students to these conferences and have made some incredible memories. This could not have been possible without the help of our corporate sponsors ADM, Hess, and Allegro Microsystems. Perhaps your company could help us out next year? If you know a great person in HR… [to explore corporate sponsorship, please contact Deb Austreng, (see pg. 19) or the ChE Department].

During our meetings, more and more students have had the opportunity to meet other ChEs and learn from our professors and speakers about the amazing experiences and opportunities they can expect after graduation. [If you are able/interested in speaking at an AIChE meeting, please contact Frank Bowman or the Department, we’d love to have you!] The blessing and the curse of ChE is that we can do just about anything with our degree, and it has been a joy to aid students in their journey to discover what they want to do and how do they want to make an impact with chemical engineering.

It has also been fun to try out new ideas such as “Get to Know the Department” videos and a once-a-semester golf scramble tourney. A select group of guys keep winning the awesome prizes, so we would appreciate it if some of you alums could come and show us how to really play! Another new event was the “Engineering Challenge” during E-Week, where all the departments in the College of Engineering & Mines went head to head in a tournament of events that included suspending Dr. Brian Tande to a wall with duct tape, which eventually led to an all-out ChE Department victory!

With each semester riddled with Faculty/Student Cook-offs, ChE Car, Resume Workshops, and social activities, you might wonder how we get any of our course work done. Well, no worries! I can assure you that our excellent professors and staff have kept us busy. The department continues to grow and our refurbished lounge and computer labs [photo right] to accommodate the increase in students have been awesome! Thank you to everyone who contributed to that project, it has really made a difference for us. UND is an exciting place to be a chemical engineering student and AIChE is glad to help support students and alums alike.

Thanks again for checking out our section, and we look forward to meeting you alums in the future! «
Thanks to the continued generosity of ChE alumni, along with the support of the College of Engineering and Mines, we were able to complete the second phase of our lab renovation project in late 2014.

Students returned to campus from the semester break to find a renovated undergraduate lab and a larger and more modern computer lab. Harrington 321, long home to many of our undergraduate lab experiments, underwent a complete renovation and now boasts new flooring, lab benches, and a new hood. Our old computer lab in Harrington 360E was relocated to a newly renovated room 320 (see photo p. 3), providing significantly more space and allowing us to accommodate eight more computers for students. Room 360E was then renovated with new hoods and lab benches.

A primary goal of our renovation plans was to separate our lab space from the computer labs and student lounge. With the completion of Phase II, this objective has now been met, enhancing both safety and aesthetics. The additional space also allows us to better accommodate our summer labs, which support our growing Distance Engineering Degree Program. We now offer all three DEDP summer labs every summer, instead of once every two to three years!

**We’re not done yet and still need your help!**

There are two remaining phases of our laboratory upgrade project. The first is the renovation of HH 316, which is the small undergraduate lab containing our distillation column, a gas chromatograph, and several other experiments. Unfortunately, this lab could not be completed as planned due to higher-than-expected construction costs for Phase II.

Like the other labs, HH 316 is in need of new lab benches, better ventilation, and other general updates.

We will pursue all available funding options within the University and the College to complete this project, but we hope you will also consider supporting it.
PHASE 2 COMPLETED!

The last phase of the project is to replace our older, outdated lab equipment and to add new experimental systems to better align our lab experiments to the contents of the courses they support. As most of you know, we stress hands-on learning, so having well-functioning and relevant lab experiments is an important part of the program.

Our most immediate needs are the purchase of new lab systems for gas absorption (~$60k) and liquid-liquid extraction (~$90k).

We hope you will consider helping us fund these experimental systems. Please see pg. 19 or pg. 23 (the last page of Kinetics) for details on how to make a donation to this project. «

This past Spring semester, Brian Tande initiated a College of Engineering and Mines mentoring program designed to facilitate interaction between CEM alumni and current students. Sixteen students, including 10 ChEs, were matched with 16 mentors based on their background and interests. Some students specifically asked to be paired up with a mentor in their own discipline, while some matches were based on other career aspirations, such as an interest in leadership experience, or in an MBA or PhD.

While each student-mentor pair was free to develop their own approach, a mentoring guide was provided in order to give some structure to the program. For example, before their initial meeting each participant was asked to answer a list of questions which were then used to help students and mentors get to know each other. The ultimate goal for the semester was for students to create, with the help of their mentor, a professional development plan for themselves.

Based on feedback from both students and alumni, the program was a success and we hope to expand upon it this upcoming year.

If you are interested in participating in this program, please contact Brian Tande at brian.tande@engr.und.edu.

A list of participating ChE students and their mentors can be found on page 10. «
WAYNE SEAMES

W ow, what a year! On August 18th, 2014 my wife Janet and I flew from Grand Forks to Leeds, West Yorkshire, England and my developmental leave officially began. You can read all about the academic-related stuff in the article on page 7. I feel refreshed and excited to begin another academic year here at UND. Seeing how another ChE department operates and what their students learn brought home to me just how special UND’s chemical engineering program is. Despite all of the challenges we have to deal with (most of those are a result of many, many years of low funding and staffing levels), it’s still a great place to work and great place at which to obtain a ChE degree.

My wife and I tried to travel around the UK as much as possible during our time there. Our visits included a driving tour through Scotland: Glasgow, Stirling Castle, the Grampian Mountains, the Lochs (Nessie was shy while we were there), Inverness, Aberdeen, Dundee, and Edinburgh. We also made multiple visits to York (my favorite city in the UK) and London, visits to Bath, Glasgow and Belfast, as well as tours of Hadrian’s Wall and the Lake District. In December we visited two Yorkshire mansions (castles, palaces) all decorated for Christmas – Castle Howard and Burton Agnes Hall. At New Year’s we visited Warwick Castle and Leamington Spa.

The Fulbright program sponsored over 80 scholars in the UK this past year and they were an amazing group of people. In addition to university faculty, the cohort included graduate students, high school teachers, and other scholars (one was a writer while another was a photo journalist for National Geographic). I was honored to be included in such a group. I also attended two Fulbright conferences, one in September 2014 in London, England and other in January 2015 in Belfast, Northern Ireland. These conferences also gave us unique access to the US Ambassador to the UK and his staff, the US Counsel General to Northern Ireland and his staff, and UK members of parliament.

One of my projects was to complete the first draft of a new textbook with a tentative title, “Designing Controls for the Process Industries.” I’m using this book as the primary resource for CHE 408, Process Dynamics and Control, this fall. I’ve completely redesigned the class and will look forward to hearing from the students how to improve the textbook prior to its publication. I’m also teaching CHE 411, Process Design and Economics. In the Spring I’ll be teaching CHE 412, Process Project Engineering. My thanks to Bob Wills for covering the design courses for me during my leave. I know the students appreciated it. They even gave me an award (in absentia) at the senior roast thanking me for being gone during their plant design year!

Like almost everyone in the research community, my funding and therefore my level of research is reduced these days. I was able to assist two doctoral students, Michael Linnen and Swapnil Fegade, to complete their degrees this past year. In addition to my work at Leeds (see pg. 7), my research is currently focused on decomposing lignin into mixtures of building block chemicals that can be further modified/purified into valuable commercial products, the conversion of bio-derived tars into carbon fibers, and further improvements to the non-catalytic cracking technology that I helped to invent.

I am excited to initiate a new student training program this year through the National Science Foundation’s International Research Experience for Students program. You can read about this in the article below. On a personal note, I became a grandfather for the second time in January (thank you Skype for allowing us to see the little one remotely from the UK!).

SEAMES To Lead New National Science Foundation Student Training Program

The National Science Foundation has awarded UND and its partner, California State Polytechnic University at Pomona (CPP) a $248,057 three-year grant through the International Research Experience for Students (IRES) program. The theme of the program is “Technologies to mitigate global climate change.” Cohorts of five engineering students from UND and CPP will participate in a one year research experience. The Spring and Fall semester activities will occur at the student’s home university. In the intermediate summer period, the students will spend nine weeks conducting research at the Energy Research Institute (ERI) at the University of Leeds, in the UK. ERI hosted Dr. Seames during his developmental leave last year. The students will be advised by a team consisting of one US and one UK researcher. In addition to their research the students will participate in weekly seminars designed to prepare them for careers in research. They will publish the results of their work as well as make presentations to both technical and general public audiences. UND CEM is the lead partner of this IRES, which is sponsored by the SUNRISE and IRES research clusters under the direction of PI Wayne Seames.

OTHER SABBATICAL TIDBITS

- An informal survey of US Fulbright scholars in the UK found that the strangest custom they observed was eating baked beans for breakfast.
- Bonfire night, also known as Guy Fawkes Day (or night depending upon which part of England you are in), celebrates a failed attempt to assassinate the entire House of Lords, including King James I, on 5 Nov. 1605 by blowing up the Lords chamber in Westminster Palace.
- The English drink lots of coffee and eat lots of hamburgers.
WAYNE SEAMES COMPLETES DEVELOPMENT LEAVE AS THE FULBRIGHT FOUNDATION’S 2014/15 DISTINGUISHED CHAIR SCHOLAR AT THE UNIVERSITY OF LEEDS

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

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

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

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

“I am happy to say that I was able to accomplish all of these things during my nine months away from UND. And just as important, the UND ChE department functioned just fine in my absence!” stated Seames.

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

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

- **Merging fast pyrolysis experimental approaches to advance the production of fuels and chemicals.** The goal is to add a staged condensation fast pyrolysis system and design and build an improved fluidized bed reactor for the UoL fast pyrolysis reaction system based on the successful design of UND’s fast pyrolysis system. One post-doc has been assigned to oversee the design and construction of experimental equipment at Leeds. The UoL partner is waiting for a student who wants to do the project as part of their doctoral studies. He hopes to have one in this fall.

- **Renewable Fuels and Chemicals from Algae-derived Oils.** Three separate projects were initiated. 3a. Novel methods to extract lipids from algae. Status: The UoL partner is waiting for a student to work on this project. He hopes to have one in this fall. 3b. Evaluating the UND COCT process for algal oil conversion to fuels and chemicals. Status: Algal oil samples were produced in the UoL lab in April and May and shipped to UND where they will be studied using UND’s crop oil conversion technology process; the goal is to perform this work using a UoL post-graduate on a secondment assignment at UND next summer. 3c. Heterotropic algae for the production of lipids for fuel production. Status: Based on the composition of the oils, there is a good collaboration potential of this Leeds-derived algae system with the conversion technology developed at UND. We will be looking for joint funding opportunities to conduct this work in the future.

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

Seames’ education projects included:

- **Curriculum Evaluation for Two Highly Rated Chemical Engineering Programs.** Scope: A study was conducted of the differences in how undergraduate chemical engineering was taught at UoL and UND. The study report was distributed to faculty and administrators.

(Continued on page 8)
For the last couple of years, my message has been about transitions due to the changing roles I have been assigned throughout the college. This year is also a year of transitions, but on a personal rather than professional level. As you can see from this year’s photo, my son graduated from Red River High School this spring. Justin plans to attend UND in the fall and will live in the dorms, so this will make us empty nesters. I participated in a lot of activities with him and his friends over the years, so I am not sure how much of an adjustment that will be for me. He did choose ChE for his major, so I should still see him a lot over the next few years. What is not as evident, since she is not donned in cap and gown, is that my daughter also graduated this year from UND. Jessica is looking for jobs in the Minneapolis area. Having her move out of town will be a big change for my wife and I.

On the work side, this year was a bit more manageable than the last several. I finished the whole year without being reassigned to a new role or taking on extra assignments. I have been serving as the Executive Director for the Institute for Energy Studies and will remain in that role for the next year. It will be nice to have a little stability rather than serving multiple and changing roles as I had been over the past few years. I am still teaching in the department (CHE 102, Introduction to Chemical Engineering and CHE 504, Air Pollution Control). I also advised over 50 undergraduate students last year and enjoy the interactions. I had two Ph.D. and one M.S. student graduate this year.

My research activities vary, but are still focused on energy. This summer we hope to commission a 250 kW organic Rankine cycle (ORC) engine to extract electrical energy from the hot water produced in a Western ND oil rig. I have a couple of projects to look at extending the ORC technology to other low-temperature heat sources. Some of my work focuses on the development of carbon-based sorbents for CO₂ capture, and also has applications in capturing and purifying gas that is currently flared out in the Bakken oil fields. I have also been a part of a major proposal with Nissan to expand our fuel cell research.

Outside of the graduations, there was not a lot of new activities on the home front (besides remodeling the house to get ready for graduation). I continue to shoot sporting clays with my son and garden with my wife. My son and I are planning to shoot in the U.S. open again this year. He moved up a class this year, so he will see more competition. I hope to have improved enough to be competitive in my class. I wish you all well and hope to see some of you around campus.«

SEAMES DEVELOPMENTAL LEAVE (continued)

Continued from page 7)

at both universities, and presentations were given at each university for those interested in further discussion of my findings.

- **Engagement Teaching Methods Workshop (for faculty).** A three-hour workshop was developed to teach engagement instructional techniques to academic staff (faculty) in Engineering and the Physical Sciences. The materials include a participant workbook, PowerPoint slides, and instructor lecture notes. Four workshops were held at UoL for 44 total attendees. An additional 177 faculty attended these workshops conducted at Queens Belfast (Northern Ireland), Bath, Sheffield, Newcastle, Nottingham, and Strathclyde (Glasgow, Scotland). A version of this workshop will be conducted for UND CEM faculty this fall.

- **A New Paradigm for Process Control Instruction.** Two years ago Seames began designing and writing a textbook that would transform how the subject of process control is taught to chemical engineering undergraduate students. He used the time available during the sabbatical to complete the first draft of the book and will be using it as the primary teaching resource at UND this fall. «
This summer marked the completion of my first decade at UND! Like each of the past 10 years, this one has been busy and fun. I taught the ChE 321 Reactor Design, ChE 232 ChE Laboratory I, and ChE 509, and Advanced ChE Thermodynamics courses as usual. It was nice to teach ChE 232 in our freshly renovated lab space, especially with 42 students enrolled in the class. I also taught the second of our summer lab courses, ChE 335 ChE Summer Laboratory II, for the first time, which meant I spent a lot of time learning things I knew once upon a time. Somehow I’d managed to go my entire teaching career without using a McCabe-Thiele diagram!

For the department, I led our preparations for the ABET accreditation visit this fall. Collecting assessment data for each of our 13 student learning outcomes has been an ongoing effort by all of our faculty members, and I appreciate the help everyone gave me to get this information together. We held a mock visit this spring and it went very well, so we should be ready to demonstrate our high-quality program to the ABET visitors.

This year I also started two new research-related projects: the Center for Regional Climate Studies (see below) and the Interdisciplinary Renewable and Environmental Chemistry REU program (see pg. 18).

Life at home continues to be busy with the activities of 5 children ages 4-17. My oldest is starting her senior year in high school, which means I’m soon approaching the time when my students at UND are the same age as my own children. No big summer trips for us this year, because relatives from Michigan, Wisconsin, Utah, and California all came to visit us.

Global climate change impacts regional weather patterns, agricultural productivity, and environmental quality. To help understand and address these challenges, ChE’s Frank Bowman and Jianglong Zhang from the UND Atmospheric Science Department are leading a new interdisciplinary climate research center.

The Center for Regional Climate Studies (CRCS) is one of two research centers in a new five-year, $20 million grant from the National Science Foundation to the North Dakota Experimental Program to Stimulate Competitive Research (EPSCoR).

The CRCS is a collaborative research team with faculty researchers from across North Dakota in 11 different departments at UND, NDSU, United Tribes Technical College, Cankdeska Cikana Community College, Dickinson State University, and Valley City State University. Together they are investigating the influence of climate change on regional flood and drought events, agricultural crop production, land use, and how they interact to influence the agricultural economy and environment in North Dakota.

An important aim of the center is to provide research and STEM education opportunities for students across the state. Programs are targeted at undergraduate students and faculty at North Dakota’s non-research universities and tribal colleges, as well as outreach to middle and high school students. «
The Grand Forks experience continues to go well. It’s been a busy, but excellent year. I taught 7 classes last year, including a class no ChE Professor has touched in years – ENGR 460, Engineering Economy [ChE students now get this content in ChE 411]. Even though the class was full of MEs, EEs, CEs, and even PtrEs, I had a great time teaching it. The spring semester wasn’t even cold yet (well, it was cold thermally but we had barely finished) when I began teaching ChE 235, Summer Lab 1 (the day after finals ended).

My wife and I managed to squeeze in a childless trip to New York during spring break to celebrate our 10th wedding anniversary (thanks Grandma and Grandpa). I also went on my yearly canoe trip this spring – 5 days in the Boundaries Waters Canoe Area in Northern Minnesota. Even though it rained and was cold it was still a great trip. Later in the summer my family and I toured Colorado for a week.

This fall semester I am teaching ChE 201, Chemical Engineering Fundamentals (Stoich for the not-quite-so-recent grads) and ChE 331, ChE Laboratory 2. I have been teaching ChE 201 from almost the day I started here at UND and it will be a bitter-sweet (cue the music) semester for me as this will be the last time that I will be teaching this class – at least for the short term. Dr. Bowman and I have agreed to swap classes and I will begin teaching ChE 321, Reactor Design starting in the fall semester. Fundamentals has always been my favorite class to teach, and I never thought that I would be willing to part with it. However, I have now been teaching it for 12 years, and since we started offering it during the spring semester, for 11 straight semesters. It was definitely time for the change. I will also be teaching ChE 435, Materials and Corrosion during the spring semester.

On the personal side, life is also very good. My son is starting 4th grade this year while my daughter is starting kindergarten. My wife Jenn continues to work as a school counselor (her 2nd year on the job) and will also take one class a semester at UND during the upcoming year.

I continue to pursue research centered around polymer engineering. One project involves the production of various polycarbonates derived from CO₂ and renewable monomers while the other research area involves the production of polymeric membranes for the separation of racemic mixtures.

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Can you believe this is my seventh year at UND already? I will still teach ChE 301 Transport Phenomena this fall, but I’ll be giving ChE 408 Process Dynamics and Controls to Wayne Seames. He will test a new textbook he has written next semester, and I will get a nice break (thanks to his hard work and great accomplishment). In the spring semester I will teach ChE 515 Design of Engineering Experiments and ChE 206 Unit Operations in Chemical Engineering. To continuously improve my teaching skills, I will sit in on Wayne’s control class and learn some of the teaching skills and material he developed while on leave.

I am also busy writing proposals for future research funding and sharing the service load for the department. My research work is going well. My Ph.D student Srinivas Reddy Kamireddy graduated last fall semester. He works in the Minneapolis area now. We have developed several collaborations with researchers in South Dakota and at other universities. This year I am worked with Alena Kubatova (UND Chemistry), Frank Bowman, and Evgenii Kozliak (UND Chemistry) to coordinate the new Chemistry/Chemical Engineering REU program. One AURA student [an EPSCoR-sponsored undergraduate research program] from the Biology department worked in my lab for a year. She has produced great data. One REU student from Savannah State University worked with my graduate student this summer. She is a nice addition to the Dakota BioCon research team.

On a personal note, my family loves Grand Forks and both sets of grandparents visit us frequently from China. The kids are enjoying the time with their grandparents and have started to speak Chinese at home. English is still their first choice though. My oldest daughter started to ask questions that I cannot answer. When she learned I teach at school, she was very surprised and asked me “How can you teach if you do not know anything?” I told her that I know a little bit and I will learn more. So, I will read a new Transport Phenomena book and hopefully use it for next semester!

I wish all of you a great year ahead.

Yun Ji Awarded Tenure and Promoted to the Rank of Associate Professor
Reflecting her outstanding contributions to the mission of UND’s ChE department, Dr. Yun Ji was promoted to Associate Professor and awarded tenure in the Spring of 2015. This is a recognition of Yun’s high level of excellence in teaching, research, and service activities.

The practice of awarding tenure to faculty is an ancient and highly respected practice amongst the world’s leading research universities. Faculty must demonstrate, over a period of time, that they have the capability, ability, and motivation to meet acceptable levels of achievement in teaching, research, and service activities.

Tenure provides faculty with the freedom to pursue scholarship in the manner they feel is most appropriate, without fear of losing their position. It does not give faculty the right to engage in incompetent teaching or research nor to engage in criminal or other inappropriate activities. For engineering faculty, tenure is a vote of confidence from the University that they will continue to strive and achieve excellence in academic activities.

CONGRATULATIONS YUN!

Jay Skabo Named Chair of the Greater North Dakota Chamber
When the Greater North Dakota Chamber (GNDC) appointed new Board of Director members, who began their terms in October 2014, Jay Skabo (UND BSChE ’85), VP of Electric Supply at Montana-Dakota Utilities Co., was named as Chair of the GNDC Board for fiscal year 2015.

“MDU has long been a supporter of the state chamber. GNDC has played a vital role in the growth of our state’s economy,” said Skabo. “I expect GNDC to continue to be a force in keeping our state on top and providing solutions for the challenges we face. It’s an honor to serve in this capacity.”

The Board provides direction for GNDC’s policy decisions and provides oversight regarding the organization’s operations.
Greetings! My 6th year at UND has been a time for some quiet introspection. The dust and chaos associated with the first few years has begun to settle down, and I am beginning to get some feel for what works and what doesn’t in terms of creating more fulfilling experiences for my students and myself. In this regard, my focus over the past year has been on incorporating case studies within my courses and more tightly integrating my research interests with my teaching.

For instance, in CHE 531, Rocket Propulsion, which I taught last Fall, I included more content on orbital mechanics and advanced propulsion concepts to provide students with a more complete picture of a Space Mission. The outcome of this effort was reflected in the excellent manner in which the students managed to tie-in and address the various mission-related concepts and case studies in their end-of-semester technical reports and presentations. Further, I am spending a part of my summer developing a case study where computer simulations will be employed to investigate the combustion characteristics within a thrust chamber.

I adopted a similar case study-based approach in the CHE 530, Combustion Theory and Modeling course that I taught during the Spring, where we spent a lot more time on the discussion and modeling of oxy-combustion, which is a promising option being considered for reducing carbon emissions. My goal is to enable the offering of a truly unique, one-of-a-kind, sequence of courses in the area of Energetics that brings together and introduces students to the theoretical underpinnings associated with these courses from classic texts and monographs to the current research challenges in these areas. I also wish to expose them to sophisticated computational techniques that are currently employed in only space and defense laboratories.

In CHE 332, Laboratory III, I developed and introduced a “Virtual Baking Experiment” to reinforce statistical techniques and design-of-experiments concepts. Both the students and I were excited to work on this experiment, and again there are tremendous opportunities for enhancing this case study so that students are able to relate to the concepts we are trying to convey. This year, I will be introducing a simulation-based heat exchanger design in Lab III to take the place of our conventional double pipe heat exchanger experimental setup that has been running on its last leg over the past several years due to low water pressures. Yes, that’s the same piece of equipment that all of you learned on, even if you graduated in the 1950s!

As I introduce these changes, I am very sensitive to the response of the students. Thankfully, student responses, as reflected through teaching evaluations, have remained positive over the years.

Research wise, all of my graduate students are making good progress towards their graduate degrees. I continue to actively involve undergraduate students in my combustion/energetics research activities and have three undergraduate students working with me this Summer. «

**GRADUATING M.S. AND PH.D. STUDENTS**

**DECEMBER 2014**
- **Kristin Brevik**, MS ChE, “Statistical Analysis of the Effectiveness of the ‘You’re Hired!’ Program at Changing Students’ Attitudes Towards Engineering.” Advisor: **Frank Bowman**.
- **Michael Linnen**, PhD ChE, “Advanced Reactors and Novel Reactions for the Conversion of Triglyceride Based Oils into High Quality Renewable Transportation Fuels.” Advisor: **Wayne Seames**
- **Srinivas Reddy Kamireddy**, PhD ChE, “Effect of Bronsted and Lewis Acids on Biochemical Conversion of Various Lignocellulosic Feedstocks into Biofuels and Chemicals.” Advisor: **Yun Ji**

**MAY 2015**
- **Swapnil Fegade**, PhD ChE, “Catalytic Conversion of Crop Oil to Petrochemical Substitutes and Other Bio-based Chemicals.” Advisors: **Brian Tande and Wayne Seames**
- **Christina Haugen**, MS ChE, “Production Challenges in the Bakken.” Advisor: **Michael Mann**
- **Mike Steele**, MS ChE, “Identifying, Isolating, and Mitigating Paraffin Buildup in Production Oil.” Advisor: **Brian Tande**

**AUGUST 2015**
- **Stacy Bjorgaard**, PhD ChE, “Characterization and Catalytic Cracking of Tar Obtained in Coal / Biomass / Municipal Solid Waste Gasification: The Use of Basic Mineral Catalysts and Miscibility, Properties, and Corrosivity of Petroleum-Biofuel Oils and Blends for Application in O il-Fired Power Stations.” Advisor: **Michael Mann**
Faculty Research Highlights

RESEARCH PRESENTATIONS

- **Wayne Seames** delivered two papers at the 12th European Coal Combustion Research Institute Association conference in Hull, U.K. on Sept. 17, 2014. They were entitled: “Advances in Understanding Trace Element Partitioning during Pulverized Coal Combustion,” and “A Regime-Segregated Model for Trace Element Partitioning during Pulverized Coal Combustion.”

- **Gautham Krishnamoorthy** co-authored a paper entitled: “Assessing the Roles of Particle Radiation and Fragmentation during Oxy-Combustion of Coal and Biomass Blends,” at the 40th International Technical Conference on Clean Coal and Fuel Systems in Clearwater, FL.

- Kristin Brevik (NDSCS), Kristi Jean (NDSCS), Frank Bowman, and Bradley Bowen (NDSU) co-authored a paper entitled “Impact of the You’re Hired! Program on Student Attitudes and Understanding of Engineering” that was presented at the 2015 American Society of Engineering Education Conference. Both Kristin and Kristi are UND ChE alumnus.

- **Ali Alshami** presented a paper entitled “Simulation-aided Characterization of Biomimetic Separation Membranes for Water Purification” at the 2014 American Institute of Chemical Engineers (AIChE) Conference. He received a travel grant of $1971 from the UND Senate Scholarly Activities Committee to help fund his trip.

GRANTS

- **Frank Bowman**, Jiangdong Zhang (UND Atmospheric Sciences), Haochi Zheng (UND Earth System Science & Policy), Xiaodong Zhang (UND ESSP), Andrei Kirilenko (UND ESSP), Gretchen Mullethorpe (UND Atmospheric Sciences), Cindy Juntunen (UND Counseling Psychology), Anne Denton (NDSU Computer Science), David Roberts (NDSU Agribusiness and Applied Economics) and Xuefeng Chu (NDSU Civil & Environmental Engineering) were awarded $6,000,000 from the National Science Foundation for the “Center for Regional Climate Studies” as part of the ND EPSCoR Track I program entitled “Innovative and Strategic Program Initiatives for Research and Education-North Dakota.”

- **Mike Mann** was awarded $261,000 from the North Dakota Industrial Commission Renewable Energy Council for a project entitled “Demonstrating the ORC for Low-Grade Heat Recovery.”

- **Gautham Krishnamoorthy** and **Brian Tande** were awarded a $30,000 seed grant for a project entitled “Improving Ultraviolet Germicidal Irradiation – Modeling and Validation,” from ND NASA EPSCoR.

- **Wayne Seames** was awarded $248,057 from the National Science Foundation’s International Research Experience for Students Program for a three year student research education project entitled, “IRES: Technologies to Mitigate Global Climate Change.”

- Alena Kubátová (UND Chemistry) and **Frank Bowman** were awarded $270,000 from the National Science Foundation for a project entitled “REU Site: Interdisciplinary Renewable and Environmental Chemistry.”

- **Ali Alshami** was awarded $2,407 from the UND Senate Scholarly Activities Committee for the project entitled “Optimization of Fermentation Conditions for the Production of Biobutanediol using Waste Carbon Monoxide in Syngas.”

- **Gautham Krishnamoorthy** received a grant from Microbeam Technologies Inc., to numerically study slag formation during pulverized fuel combustion.

- **Mike Mann** and Kirtipal Barse (MSChE ’11) were awarded $55,000 from the Montana-Dakota Utilities for a project entitled “Demonstration of the ORC for Low-Grade Heat Recovery.”

- **Gautham Krishnamoorthy** received a Summer Research Fellowship from the ND Space Grant Consortium for his project “A Rocket Propulsion Case Study: Introducing Students to Computer Simulations for Predicting the Combustion Characteristics within a Thrust Chamber.”

PEER-REVIEWED PUBLICATIONS

(Student authors are underlined)


- Martin Halecky, Jana Rousova, Jan Paca, Evgenii Kozliak, (Continued on page 22)
Greetings to all! I hope your past year has been as productive and joyful as was mine. I’ve just finished my 1st full year at UND. It has been a wonderful year, during which I have survived the much talked about Grand Forks winters, attended my first ever hockey game in the beautiful Ralph Engelstad Arena, quenched my hunger for chocolate with the famous Widman’s chocolate covered potato chips, and learned the hard way NOT to ever go dancing in Fargo while wearing a hat!

I began my UND teaching journey with CHE 431, Laboratory IV (Fall/Summer), CHE 305, Separations (Spring), and CHE, 315 Statistical Data Analysis & Numerical Methods (Spring). Although I have spent the past four years teaching different CHE courses, it really feels as if I am teaching full-time for the first time! The reason being simply that the caliber of students here is very different from those I taught overseas. Hence, I’ve spent a lot of time in lecture preparation and course design, leaving very little time for conducting research.

Research activities, although modest, have been primarily focused on getting a laboratory set up, equipped, and sufficiently stocked up with needed supplies and materials. My first UND research project is investigating treatment methods (mainly biological) targeting wastewater from hydraulic fracturing operations by crude oil producers from the Bakken formation. A M.S. student (Ahmed Folarin) is currently working on this project as a part of his thesis project. A second project is developing a polymeric membrane for natural gas separation and upgrading. Tucker Wock is currently working on this project as part of his master’s thesis. Finally, I am also looking into technologies capable of fermenting synthesis gas (SYNGAS) constituents (mainly CO and CO$_2$) from coal gasification processes. Trevor Seidel is currently working on this topic as part of his undergraduate research experience.

I’ve also been involved with Power ON! events and took over day-to-day responsibilities from Bob Wills upon his retirement [see pg. 23]. I have had plenty of fun working with children of all ages and have learned from them as much as, if not more than, what they learned from me on science and its applications in our daily lives. I was also in the UND Alice T. Clark new faculty development mentoring program which has provided me with the support I need to get off to a good start. Finally, I was fortunate to be given the opportunity to participate in a week-long teaching workshop conducted by National Center for Case Study Teaching in Science at the University at Buffalo, New York.

On a personal level, life could not be better. My wife Amy and two sons (Ryaan and Zack) are grateful to have finally made it back to where the daily temperature is below 100°F eight months of the year [Ali and his family were living in Dhahran, Saudi Arabia prior to coming to Grand Forks]. Amy continues to be a full-time mom. Ryaan has triumphantly made it out of the 3rd grade and Zack is just starting 1st grade. Apparently it comes with the job of moving to Grand Forks that both boys are now fully committed to hockey and its enjoyment! «

**AUGUST/DECEMBER 2014 GRADUATES**

Not shown: Sahar Alghouti (DEDP), Sevil Bayram (DEDP), Benjamin Prout, and Justin Tomlinson (DEDP)

**CONGRATULATIONS TO ALL OF OUR 2014/15 B.S. GRADUATES!**

August 2014: Aaron Jeson (DEDP) and Megan Jimenez (DEDP 12/13)

December 2014: Jarad McCormick, Lily Lile (DEDP), Patrick Riewer, and Nigel Schmitz
With the retirement of Bob Wills, I pick up the mantle as ChE’s oldest faculty member. I’ve been told that wisdom comes with age, so I’m hoping it will arrive soon, but, at this point, I’ve seen no particular benefit.

This past year, I ventured out of the security of only teaching CHE 340, Professional Integrity in Engineering, into team teaching the process control portion of CHE 408, Process Dynamics and Control with Yun Ji and the controls portion of CHE 412 Process Project Engineering with Bob Wills. In the 1980’s and 1990’s I worked in laboratory and industrial process automation, but I had to “dust off” the books and reacquaint myself with control basics. This was also true for process design, as my experience since my undergraduate days has been in R&D and process operations — not process design. I felt challenged attempting to keep ahead of the students in both courses, but as became apparent at the annual student roast, my students were as challenged by my lectures — giving a hilarious rendition of one of my lectures in which I covered “life, the universe and everything else” in 55 minutes. This experience gave me a new appreciation for the quality of the faculty in the department and the difficulty of attempting to fill in for Wayne Seames during his sabbatical.

CHE 340 consistently has enrollments that have exceeded our expectations. This course has become a requirement for other CEM departments, resulting in large numbers of students — some on-campus students have even had to take the course in a distance mode to stay on schedule! In response, a fall session was added so that the course will be taught both semesters. The course is continuing to evolve as I seek to introduce more realistic case studies and increase its relevance to the practice of engineering.

Even though there are periods when I devote as much time to my faculty role as to my research role at UND’s Energy & Environmental Research Center (EERC), my major obligation is to the EERC. Fortunately, my EERC research is timely and of interest to my students. My current projects focus on high-profile issues associated with pipeline leaks and rail transportation of Bakken crude oil. North Dakota is funding a study at the EERC to identify methods of reducing leaks in petroleum and produced-water gathering lines, and the US Departments of Energy and Transportation have funded a scoping study with Sandia National Lab to which the EERC is a subcontractor to identify causes of and solutions to the tank car fires that have been experienced recently. In addition, I have roles in developing new cooling water-reduction, and carbon capture and storage technologies.

I consider myself very fortunate to have such varied and stimulating opportunities and hope I will be able to continue to pursue these well into the future. «

MAY 2015 BSCHÉ GRADUATES

Back Row (left to right): Tyler Seim, Alexander Elbinger, Ademola Owoade (DEDP), Derrick Kasunic (DEDP, August), and Dayo Idowu (Dec. 2015)

Front Row: Caitlyn Wolf, Nolan Waggener, Evan Sprecher, and Dustin Umland

Not pictured: Craig Bucholz, Michael Farnet (DEDP), Jacob Holleman, Rebecca Hovey, Reid Jungling, Zach Klabo, Zachary Rosen (DEDP), and Matt Schimke
STUDENT ACCOMPLISHMENTS

2014-15 Academic Achievement Awards were conferred at a ceremony held during the last week of the Spring semester:

FRESHMAN
Student of the Year—Cole Bachmeier
Finalists—Nicole Eisenschenk and Philomena Lloyd

AIChe Freshman Recognition Award
Jonathan Zakoski

SOPHOMORE
Student of the Year—Hunter Sannes
Finalists—Trevor Seidel and Megan Wiens

AIChe Donald F. Othmer Sophomore Academic Excellence Award
Megan Wiens

JUNIOR
Student of the Year—Lauren Clarke
Finalists—Katelyn Randazzo and Taylor Score

SENIOR
THE AM SOUBY AWARD FOR EXCELLENCE IN SENIOR PLANT DESIGN
Shelby Amslie-Benzie, Dawit Chanaka, Rachel Musielewicz, and Tyler Seim
"Oil Seed Extraction"

THE CEM-WIDE FREEMAN AWARD FOR INNOVATION AND EXCELLENCE IN DESIGN
2nd prize was won by a group of ChE students this year: Rebecca Hovey, Chris Johnson, Jacob Sulzle, and Nolan Wagner, "Scale-up of a Maple Spirits Distillery."

SPONSORED AWARDS IN SENIOR PLANT DESIGN
The Dakota Gasification Company sponsored a design project entitled “Sulfur Removal from Naphtha Streams” which was completed by Alex Elbinger, Todd Splonskowski, and Dustin Umland. Their industrial advisor was Michael Just, DGC Engineering Manager, UND BSChE ’01.

The project completed by Hovey, Johnson, Sulzle, and Wagner (see Freeman above) was sponsored by Elm Brook Farm. Their industrial advisor was David Howe, UND BSChE ’81.

CEM Annual Design Competition
The poster presentation of students Hovey, Johnson, Sulzle, and Wagner (see Freeman above) was awarded 2nd place in the Process Projects category.

We appreciate the hard work of the students on these projects and again the support and willingness to assist by both external sponsors and ChE faculty advisors. If you would like to sponsor a student design project, please contact Wayne Seames at wayne.seames@engr.und.edu or 701-777-2958 to discuss your ideas.

CONGRATULATIONS TO ALL OUR AWARD WINNERS!

CHEMICAL ENGINEERING ASSOCIATED MERIT AID & SCHOLARSHIPS

» Wendy Sellheim Spenst Memorial Endowment—$500 each Rachel Musielewicz & Megan Wiens

» The Professor Wayne Kube Memorial ChE Scholarship
Alexis Tupy — $1400

» Albert Cooley ChE Scholarship
Zachary Franzoi—$500 & Eric Mueller—$700

» E.E. Gulleson ChE Scholarship
Deniz Saka—$1800
Lauren Clarke & Andrew Eerdmans—$800 each Tanner Ring—$600

» Everett W ebба Engineering Scholarship
Justin Baker—$900 & Patrick Chapin—$600

» Daryl L. and Diane A. Anderson Scholarship
Tanner Leslie—$1200, Antonij Jurkic—$1100 & Katelyn Randazzo—$800

» The Hess ChE Leadership Scholarship
Taylor Score—$1800, Mitchell Hunt—$1700, Hunter Sannes—$1500, Maxwell McCann—$500

» Anna Peterson Walsh Memorial Engineering Scholarship
Brittany Rew—$1300

» Raymond & Edyth Sullivan Engineering Scholarship
Nicholas LaFosse & Eric Moe—$1400 each Erin Siso, Jasmine Kreft, Tobaison Monk-Simmers & Madalyn Tessler—$800 each Ryan Brock—$500

» Earl and Elinor Kitchen Memorial Fund—$500 each Cataldo DiDonna, Trevor Seidel, Austin Hautala, & Jordan Nelson

» Michael and Sitney Lodoen Engineering Scholarship—$1000 Jonathan Zakoski

» William F. and Inez L. McDonald Scholarship—$1000 each Lauren Clarke, Andrew Eerdmans, Katelyn Randazzo, Cataldo DiDonna, Trevor Seidel, Megan Wiens, Cole Bachmeier, Nicole Eisenschenk, Sydney Jacobson, Jim Lepke, Philomena Lloyd, Beau Tetreault, & Connor Willits
Dr. Bob has left the building!!

Well, when I came to UND back in 2009 I said I was only going to be here for 5 years. And, to paraphrase “The Prince Bride,” that was “mostly true.” [In the Princess Bride, the Magician states that the hero, Wesley is only “mostly dead, which is very different from completely dead.”] After 6 years I’ve retired. I started my career teaching at Oklahoma State University and I thoroughly enjoyed it. When I left I always hoped I would someday be able to return to academia and teach again. When the opportunity arose 22 years later, I couldn’t pass it up and I’m really glad that Drs. Mann and Seames had the foresight in our brief face-to-face meeting to figure out a way for me to come on board. I’ll have to admit, things had changed a bit (a lot?) since I had last taught (what in the heck is Blackboard?). Gone were my black and green chalk boards (I found my old chalk pen when cleaning out my desk) and even the white boards were really not that functional. And OMG, they VIDEOED my lectures for ALL to observe over and over again, saved for……ever, complete with the mistakes! But we survived it all and sorted out the good stuff from the fluff. I’d like to think that our students picked up a few rules-of-thumb along the way, and write and present better than the person in the next cubicle.

A lot of people have asked what I will be doing with all my “free time.” As you may have picked up in these newsletters, my wife and I have a small bookstore in the north central Minnesota town of Park Rapids, where we also now live. I already have a “to do” list that rolls out on the floor. At the Senior roast I was given a very nice fishing rod and reel which I intend to break-in with big bass. Also I have hooked up with a local community theater (strictly behind the scenes….you know there’s not a dramatic bone in my body) which is a lot of fun. Finally, I intend to spend the Fall writing up a how-to manual on Power On! with all the demo/experiments and words of advice based on our experiences.

Thanks to all the well-wishers and folks that have come by to send me off or have sent e-mails. My address at the University will work for about a year (I’m told). So if you wish to stay in touch, that will work. After that we’ll figure out another address. I’ll keep the department updated. Take care and remember: don’t fall in love with your project.

BOB WILLS RETIRES TO PARK RAPIDS, MN

In 2009, Bob Wills was looking for a transition job prior to retirement and approached Mike Mann and Wayne Seames at UND about the possibility of teaching at UND. Bob had left an academic career at Oklahoma State University to move back to his home state of Minnesota and a career in Industry. But after a 25+ year career at two Minnesota engineering companies, Wills was hoping to spend a few years passing along his experiences to undergraduates prior to his retirement. Wills proposed coming up to Grand Forks from his home in Park Rapids, MN, a couple of days a week to teach.

“If you really care as much about teaching as you appear to and as we do, you won’t be happy doing this remotely and neither will we,” Seames advised him. “We have an open door policy here and students expect to be able to come and see you whenever they need help, not just during a limited number of office hours,” he continued.

Upon reflection, Wills agreed. “It was either all or nothing; the students deserved nothing less,” recalls Wills. “So we rented a Condo and temporarily moved to Grand Forks. My wife spent about half the year in Park Rapids running our two bookstores and I joined her on weekends.”

Bob’s contributions to UND were immediate. Students appreciated the real-world experience he brought to the classroom and Dr. Bob stories became legends within the student body. He also took over the day-to-day management of the Power ON! program, which expanded substantially under his leadership. In fact, it has become one of CEM’s most important outreach activities. Bob also began helping Wayne Seames with the development and commercialization activities associated with the renewable fuels and chemicals technologies invented at UND. Bob delayed his retirement for one year so that Wayne could take a year’s sabbatical, filling in as the primary instructor of our Capstone Design courses. Some of our most important and demanding courses (for both the instructor and the students). His contributions to the department will not be soon forgotten.

THANK YOU BOB AND BEST WISHES FOR YOU IN RETIREMENT!
New REU Site Promotes Interdisciplinary Renewable and Environmental Chemistry

The National Science Foundation has awarded SUN RISE $270,000 to fund a new Interdisciplinary Renewable and Environmental Chemistry (IREC) Research Experience for Undergraduates (REU) program. When the first 3-year term for this new REU is completed, SUN RISE will have sponsored summer undergraduate student via an REU site for 15 consecutive years!

Led by Alena Kubatova, UND Chemistry, and UND ChE’s Frank Bowman, the IREC REU provides undergraduate students a 10-week summer research experience at UND using interdisciplinary research projects at the intersection of chemistry, chemical engineering, and atmospheric sciences. A distinguishing feature of the program is that all students are jointly mentored by a team of interdisciplinary faculty mentors, providing students with unique exposure to scientific approaches from different disciplines.

Research projects for the Summer 2015 session target development of renewable chemicals from lignin and lignocellulose, measurement and modeling of atmospheric processes, synthesis and toxicity testing of nanomaterials, and performance of renewable fuel combustion systems. As a part of the program, students also receive weekly training in science communication, community outreach, and research ethics. ChE mentors include Drs. Bowman, Ji, Seames, Tande, and Alshami.

The IREC experience focuses on students from primarily undergraduate institutions, with a special emphasis on students from tribal community colleges, who will conduct initial research projects at their college followed by a summer research experience at UND together with tribal college faculty. A primary goal of the program is to support and strengthen students’ commitment to pursuing careers in science and engineering.

Students funded through NSF are joined by other undergraduates working at UND for the summer. For example, Marina Hackbarth is a Brazilian student who just completed a nine month assignment at Mississippi State University. Marina is sponsored by the Institute for International Education, a program of the U.S. State Department.

BRIAN TANDE CO-LEADS NEW UND INNOVATION PROGRAM TEAM

Brian Tande is part of a team of UND faculty and administrators selected as one of 25 U.S. university teams to take part in the second cohort of the National Center for Engineering’s (Epicenter) Pathways to Innovation Program.

The program helps institutions incorporate innovation and entrepreneurship into undergraduate engineering education by leading teams of faculty and administrators through a two-year process to design and implement unique plans for each institution. The Pathways team co-leaders are Tim O’Keefe, information systems and business education professor, and Brian Tande, ChE.

“The Pathways to Innovation program will provide valuable resources to our university and help us reach our shared goals of innovation and entrepreneurship,” said UND President Robert Kelley.

Program teams receive access to models for integrating entrepreneurship into engineering curriculum, custom online resources, and guidance from a community of engineering and entrepreneurship faculty, and membership in a national network of schools with similar goals.

Some of the other universities chosen to participate in this program include the New York Institute of Technology, James Madison University, the University of Alabama in Birmingham, Washington State University, and the University of Texas at Arlington.

Ongoing innovation is required to maintain America’s global competitiveness and address pressing problems. Engineering is the foundation of much of that innovation. Faculty and administrators participating in Epicenter’s Pathways program are taking on this challenge and leading their universities into a new era of engineering education that prepares students to tackle big problems and thrive in an ever-changing economy.

“There are 500,000 students in the U.S. majoring in engineering and computer science fields,” said Tom Byers, director and co-principal investigator of Epicenter and a professor at Stanford University. “These students are expected to enter industry with technical knowledge as well as a diverse set of skills and attitudes that help them to innovate, collaborate and create value. As educators, we need to better prepare this generation of students for the workforce and position them for success in their careers.”
Both the UND Alumni Association and the College of Engineering and Mines support the ChE Department in receiving and managing donations. In addition to this newsletter you probably receive CEM’s Engineering magazine, the Alumni review, and other publications that we hope will help you stay abreast of what’s happening here at UND.

We are extremely grateful for the generosity, support, and passion that the alumni and friends of UND ChE have demonstrated. Gifts enable us to continue to attract and retain top students and faculty members. Philanthropy is more critical than ever in higher education; every gift makes a difference!

As you read through the pages of Kinetics, I’m sure you’re struck by just how often a donation is used or leveraged to maintain ChE’s position as one of UND’s signature departments. Some of this year’s more important were the laboratory renovation project (still one phase to go plus equipment) (pg. 4), matching funds for the EPSCoR new faculty startup package given to Ali Alshami (pg. 21), travel costs for our Award winning student AIChE chapter (pg. 3), partial support for two faculty positions (Bowman and Krishnamoorthy), and of course, student scholarships (pg. 16).

“If I could thank a donor, I would emphasize how important it is to stay on track with industry technology and close the gap for students between the classroom and the field. Companies not only seek students that academically excel, but also those who are able to understand the industry.”- Whitney Page, UND CEM Senior.

Please contact either Deb Austreng or Andy Bjerke to see how you can help us continue to make UND’s ChE department exceptional for students like Whitney.

WHERE ARE THEY NOW? A popular feature of Kinetics is to share where some of our ChE alumni have gotten to since they left UND. Here’s this year’s group...

- **Prasad Chavan** (MS ChE ’07) started at Seagate Technology in Bloomington, MN, after finishing his Masters in ChE in 2007. He is currently a Sr. Staff Process Development Engineer for Western Digital in Magnetic Head Division, leading reactive ion etching process development efforts for magnetic heads. He lives with his wife, Vibha (MS ’13) and 1-year old daughter, Suhani, in Dublin, CA.

- **Bruce Miller** (BS ChE 1981; MS ChE 1982) has been with Penn State’s EMS Energy Institute since 1987 after working a few years at UND’s EERC. He is a Senior Scientist and Associate Director for the Energy Institute. He researches fossil fuel and biomass utilization, emissions characterization and control, and hydrocarbon recovery from waste materials. He lives in State College, PA with his wife Sharon (MSGeo ’83). They have a 23 year old son and an 18 year old daughter.

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TOM OWENS CHEMICAL ENGINEERING FELLOWSHIP CONTINUES TO GROW

Thanks to the generosity of UND’s ChE alums, funds in the Tom Owens Endowment continue to grow, helping us to maintain our current faculty size by partially funding Frank Bowman’s position. We are currently at the Fellowship level (Endowment funds totaling $250,000 – $499,999). Our goal is to eventually reach the “Endowed Chair” level, originally established at $1.5 million.

Tom Owens was an inspirational leader and mentor for the hundreds of students who passed through the UND ChE program. We can think of no better way to honor him than with this endowment. If you haven’t already, please consider a contribution to this endowment. The goal is to provide at least 50% of the salary for the Owens Chair so that we can maintain our increased faculty size well into the future. Additional support is needed to reach this goal – outright gifts, pledges, and testamentary provisions are just a few of the many ways to support this endowment.

For further information concerning the Tom Owens Endowed Chair in Chemical Engineering, please contact Kristi Brindle (303) 888-8317, kbrindle@msn.com, Andrew Bjerke, CEM Director of Development, or the ChE department. «
Alumni Contribution Report

Thank you for your continued contributions! This year we received $9,283 for the Thomas Owens Endowment, $35,590 towards priority needs for the department, $319 towards the laboratory upgrades, and $81,575 toward student scholarships. **That’s a total of over $126,000 designated for ChE departmental needs!**

These contributions allow us to provide many enhancements to the program that directly benefit the students and the quality of the education we are able to deliver. For example, your contributions have allowed us to send Ali Alshami to a teaching workshop focused on utilizing case studies and other engagement teaching techniques to improve our teaching. We also leveraged priority needs funding with CEM and EPSCoR funding to provide Ali with a reasonable startup package [pg. 21].

We are pleased that many of you recognized the need for student financial aid. Your contributions helped many of our students partially offset the high costs of a University education [pg. 16]. The modern student has a lot of ever increasing expenses, including tuition, books, fees, housing, and other living costs. While the people of North Dakota, through the legislature, continue to be among the most generous in the nation (on a per capita basis), the fraction of the cost of education paid for by the state continues to decrease each year, leading to higher tuition and a reliance on your generosity to fund the basic operations of the department.

With this year’s funds, the Tom Owens endowment is nearing the next tier—the Professorship tier which will allow us to free up some of our other funds to support such things as a part-time laboratory assistant for our four ChE labs in the near future. Our lab class sizes, some exceeding 40 students per semester, coupled with our research systems have grown, making it impossible to maintain all the equipment and also give students the one-on-one attention that is a hallmark of our program.

We would like to personally thank those who have given to the department. «

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**ALUMNI AND CORPORATE CONTRIBUTORS**

**GIFTS FROM INDIVIDUALS**

- Charles Adeniji
- Diane Anderson
- Winton Bakke
- Dr. Doyle & Diane Boese
- Timothy & Tamela Bohan
- Timothy & Ruth Bredahl
- Dr. Robert & Elizabeth Brugman
- Dr. A. Marvin & Beverly Cooley
- John & Eileen Crystal
- Adam & Quinn Driscoll
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- Hess Corporation
- Lyondell Chemical Company
- SSOE, Inc.
- Truist
- Twin Cities Local Chapter of the AIChE

If you are supposed to be on this list but we somehow missed you, please forgive us; it is not intentional. This is an amateur production!
SHELBY AMSLEY-BENZIE GARNERS NUMEROUS AWARDS
UND WOMEN’S HOCKEY GOALIE IS AN ALL AMERICAN, UND’S FEMALE ATHLETE OF THE YEAR, AND A 4.0 CHE!

She is the most decorated student athlete in the history of the UND ChE department, but that doesn’t stop Shelby Amsley-Benzie from working hard to continue her studies. Shelby finished her 4th year of studies in UND ChE with another perfect 4.0 GPA, including our demanding plant design sequence. While she has a few classes to finish up to complete her B.S. ChE degree, that hasn’t stopped her from starting a new challenge, a M.S. ChE degree.

Shelby is taking advantage of our dual BS/MS combined degree program. In this program she is able to double count two graduate ChE classes—using them to satisfy two of her undergraduate course requirements while also getting 6 CHs of graduate credit.

So, this summer while rehabbing from hip surgery, she is busy working on her Master’s research project. Shelby worked closely with the ChE graduate committee (Profs. Krishna-moorthy, Bowman, and Seames) to plan a program that fits her special circumstances. Shelby and her graduate advisor Wayne Seames designed a master’s level research project for her that allows her to work around her sports commitments, including a possible invitation to participate in pre-selection training for the next winter Olympics! For her research, Shelby is taking all of the various previous research data for all of the options associated with UND’s technology to use non-catalytic cracking to produce renewable fuels and chemicals and developing a preliminary design for a complete, comprehensive biorefinery. She will also be conducting a full economic analysis of all the technologies various options. If she identifies any gaps in the data, she’ll be going into the laboratory or working with others to generate the data. It’s a very large, complicated project, but Shelby thrives on challenges.

Shelby’s awards this year (please see last year’s Newsletter for previous awards) include: UND 2014/15 Female Athlete of the Year, Capital One 2015 Academic All-American Division I Women’s At Large First Team, USCHO/College Hockey News 2015 First Team All American, CoSIDA 2015 Academic All-America First Team, CHA Division I Women’s Hockey Second Team All-American, AHCA 2015 All-America Second Team, WCHA 2015 Goaltending Champion, WCHA 2015 Outstanding Student-Athlete of the Year, Capital One 2015 Academic All-District 6 Women’s At-large Team, CoSIDA Academic All-District Team, UND Women’s Hockey Team 2015 Most Valuable Player, USA Hockey’s Top 10 Finalist for the 2014/15 Patty Kazmaier Memorial Award as the nation’s top women’s Division I college hockey player, WCHA 2015 First Team, WCHA 2015 Academic Team. "

CHE RECEIVES ND EPSCOR STARTUP FUNDS FOR ALSHAMI

UND ChE chair Brian Tande was awarded $100,000 from North Dakota EPSCoR to supplement the New Faculty Startup package for Ali Alshami. New faculty receive startup funds to allow them to get their research activities started while they are waiting for other, usually competitive sources of funds. Startup funds are typically used for laboratory equipment and to fund graduate research assistants during the faculty member’s first two years of service at UND. Funds are provided from ChE and CEM discretionary funds for this purpose. Thank you for your donations to ChE which make this possible!

Initiated by the Department Chair, ND EPSCoR has a competitive award program that provides additional funds to STEM faculty at UND and NDSU so that they can become more productive and competitive in their research earlier in their careers; most of our recent faculty have had similar awards. "

UND Che chair Brian Tande and students in his laboratory at UND
UND CHE SCHOLAR ATHLETES

In addition to Shelby Amsley-Benzie [p. 21], there is an unusually high number of ChE scholar athletes currently enrolled in the ChE program, many of whom won awards this year. 2014/15 student athletes majoring in ChE were:

- **Adedayo Idowu**, Mens Football; 2015 team co-Captain, President of the UND Student-Athlete Advisory Committee and member of the Nickname Committee; also a combined BS/MSChE degree student. Dayo is studying the conversion of lignin-derived tars into carbon fibers with research advisor *Wayne Seames*.

- **Lauren Clarke**, Women’s Volleyball; she just completed her junior year in ChE. Awards: Big Sky Conference Fall All-Academic Team; CoSIDA Academic All-District Team. Lauren used an Undergraduate Research award from the ND Space Grant Consortium to conduct a summer research project entitled, “Developing Radiative Transfer Models in Hypersonic Flow during Atmospheric Re-Entry” with research advisor *Gautham Krishnamoorthy* this summer.

- **Dustin Britton**, Men’s Tennis; just completed his sophomore year. Award: Big Sky Spring All-Academic Team.

- **Cataldo DiDonna**, Men’s Track and Field (Distance); just completed his sophomore year. Award: Big Sky Winter All-Academic Team.

- **Keaton Hanevold**, Men’s Track and Field (Javelin); is in his senior year. Award: Big Sky Spring All-Academic Team.

- **Reid Jungling**, Men’s Baseball; completed his senior year.

- **Syd Swanson**, Women’s Swimming; just completed her Freshman year. «

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**EXTERNAL ADVISORY COMMITTEE**

As part of our quality assurance program, the Department uses a diverse group of Alumni and other stakeholders as an Advisory Committee which meets every two years to review the Department’s activities, with an emphasis on the educational component of our work.

Current members of the Advisory Committee are:

- **Jim Albrecht**, BS 1984 – ComDel Innovations
- **Kristi Brindle**, BS 1978 – Noble Energy
- **Adam Driscoll**, BS 2006 – Barr Engineering
- **Mark Jesh**, BS 1986 – Medtronics
- **Ben Oster**, BS 2005, MS 2009 – POET Research
- **Brandon Pavlish**, BS 2006 – Cirrus Aircraft
- **Steve Rosenaue**, BS 1995 – Am. Crystal Sugar

External Advisory Committee members serve six-year terms. We are always looking for volunteer members. If you have an interest, please let us know. «

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**Faculty Research Highlights**

(Continued from page 13)


Please stay in touch! Remember, UND ChE alumni never really leave the department after graduation — they just do less homework!

NAME

DEGREE & YEAR

EMPLOYER

EMAIL ADDRESS

HOME ADDRESS

WORK ADDRESS

HOME PHONE

WORK PHONE

Check here if you are enclosing a donation to the UND Chemical Engineering Department with your information form.

Check here if you would like someone to contact you with more information about contributions supporting the Chemical Engineering Department or the Tom Owens Endowment.

Please send to:
Department of Chemical Engineering
Harrington Hall Room 323
The University of North Dakota
241 Centennial Drive, Stop 7101
Grand Forks, ND 58202-7101
Fax: 701.777.3773

POWER ON! HAS ANOTHER SUCCESSFUL YEAR

This past year was another busy one for the Power ON! outreach program. Power ON! provides demonstrations and educational services for events throughout the region in order to increase the interest of 4th-8th graders in science and engineering. Last Fall we had two off-campus events. Both were 3 to 4 hours and included several demonstrations where people just walked up to participate. The first had 325 students attending along with about 200 adults. The second event, at the Grand Forks Air Force Base, had 140 students and 100 adults attending.

Spring was a very busy time for Power ON! at UND with nine events from January to the end of April. There were five events on-campus that were short programs running approximately 1 to 2 hours that varied in content from lectures to demonstrations to contests. These involved 154 students (mostly middle school age) and 6 adults (teachers). There were two off-campus, nearby (<10 miles) events that were demonstrations of 2 to 3 hours. These were attended by a total of 145 young people ranging in age from 5 to 17 and 50 adults. Finally, there were two half-day events that were off campus more than 10 miles away (one in Minnesota) that entailed STEM demonstrations. These drew a total of 345 young people and 45 adults.

Power ON! also provided the You’re Hired content again this year for a week-long summer camp in Grafton, N.D. This included using our mobile travel trailer to transport all of the experiments and demonstrations to the host school. Power ON! also continues to participate in and through Dakota Science Center events.

With Bob Wills’ retirement this past summer, Ali Alshami has graciously volunteered to take over the day-to-day supervision of the Power ON! program. Wayne Seames will continue to serve as the program’s administrator. But it is our amazing students who are the real stars of Power ON! They generously spend their time to design the demonstrations and to put on all of our programs. «

Ian Foerster (left), BS/MSChE is one of the student leaders of Power ON!