Message from Department Head, Dr. Molly Gribb:

Dear Alumni and Friends,

We’re unveiling a new e-newsletter format this fall with new features and stories, thanks to Dr. Andrea Surovek. Our newest addition to the newsletter team, BSCE student Micah Steffes, has used her considerable artistic and writing skills to make this newsletter better than ever.

Our faculty are the stars of this issue, which features an interview with Dr. Scott Kenner about his year in Mongolia on a Fulbright Fellowship. You’ll also find an update from recently retired emeritus professor Dr. M.R. Hansen, who is taking his turn in Mongolia this year, spreading the gospel of concrete, as he is wont to do! Other goodies include short updates about grants, research, travel, and other activities that our faculty members engage in, all of which serve to enrich the student experience here at Mines.

And speaking of students: this newsletter mentions just some of their recent activities. I say it all the time, but I’ll say it again: we really do have the best students at SDSM&T. From adding a steel sculpture to campus to giving a seminar in China, our students are making a difference.

Our alumni are pretty amazing, too: read about featured alumnus Jim Ness (CE ’83), principal engineer at Monroe & Newell Engineers, Inc. and president of the Structural Engineers Association of Colorado (SEAC). We’d love to hear from you, and share your stories in a future newsletter. Email Dr. Surovek the details: surovek@sdsmt.edu.

Finally, a hearty thank-you goes out to our Professional Advisory Board for coming to campus in September and sharing their insights, thoughts and suggestions.

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“A Lot to Share”: Mines Professor Reflects Upon Year on Fulbright

Dr. Scott Kenner recently returned from a year abroad as a Fulbright fellow in Mongolia, where he lectured and conducted research related to watershed management and water quality. Now that he’s back, we’ve sat down with him to ask him a few questions about his experience.

How did you end up applying for a Fulbright Fellowship, and why did you choose Mongolia?

I had applied for a Fulbright Fellowship before and was not selected. This time around I decided I wanted to do something that would be more of a service, and I wanted to look at where I could really be helpful. [Some Mines students from Mongolia] told me in 2011, “There’s this conference, and you should come over,” and it happened to be a good time for me. I had just finished up a project and I could make a great presentation, so I went.

While there, I learned about the Integrated Water Resources Management master’s degree program, which included three schools. Everything they showed me on the curriculum I said, “Gosh, I could teach almost all of these! This would be really great,” and they hadn’t even started it yet. So I asked them if they would be supportive of my involvement, told them what I would like to teach, linked that to my research, and went back to write a Fulbright proposal. It got accepted.

How was your experience influenced by your role as a professor here at the School of Mines?

Here, our professors are very involved with undergraduate and graduate students— it’s a highly interactive environment. When I first got to Mongolia, I really felt alone, especially in a country that doesn’t have strong English. But within a month or two, we started to learn how to communicate and suddenly the students began to realize, “Wow, this guy has something we can really learn!” After that got rolling, I worked really hard. I ended up teaching three courses, doing a HEC-RAS modeling workshop, doing some seminars and teaching up in Erdenet (another Mongolian city), and just really trying to share as much as I could of my knowledge and background.

The tough part there is that graduate students typically have to...
support themselves by working because they don't get funding like we would expect here, and they typically don't receive much advising. They pick out a topic and they just go out and start doing stuff. I made us meet every week to two weeks to review literature, identify tasks, and accomplish things. Establishing a team, formal advising—it worked out really well.

What kind of research were you able to dig into?
My background and what I focused on was watershed monitoring and modeling. Managing water resources with the rapid growth in mining and industry in Mongolia—it's huge and it's really happening fast. They're in a very arid region where water resources are premium, so managing and maintaining the quality is really important, and that's exactly what I do.

I had proposed to look at two watersheds on major rivers and develop models for monitoring them. Once I got there it took a while to learn what was going on. The best thing that happened was getting connected with Dr. Soninkhishig. She's the head of the botany department at the National University of Mongolia (NUM). She had a project on the Orkhon River to establish environmental low flows in response to a couple of proposed reservoirs potentially coming in on that river. I attended a workshop where she talked about all of these techniques and methods and I said to her, “I think I can help you with that.” She was working with three students, the only three who graduated with their master's degree from the first year of the water resources program. So we went out in the field and it's just beautiful. We covered thousands of kilometers. No fences. You just drove and the roads just kind of went wherever. Without a guide you'd be lost. We did two field trips during my time there, and I taught them how to do physical assessment and data collection, which was used in establishing and quantifying low flows and the ecological habitat of the stream we were working on. As a result, we were able to recommend that minimum low-flows not be a constant. We want to provide greater flows at least every two to three years so that the ecosystem is renewed and refreshed, so we're trying to keep the dynamic of the system alive.

Fulbright was established to facilitate international exchange of ideas and knowledge. What do you feel you were able to share as a guest abroad?
When [my students and colleagues] knew I was able to teach them how to create computer models, they wanted me to teach them every model I knew how to use! The fact that I was able to share these skills, the watershed techniques, and some of the statistics I had was really positive.

What's your take on the prestige of being a Fulbright Fellow?
It's nice to be selected, but boy, to share and work with [the people over there]...! They're writing their laws right now, updating their regulations on water quality and water rights, where we were doing this in the '50s and '60s. So to me, they're almost like a brand new country. They're rapidly growing, and there are certainly some [engineering] skills being gained, but we have a lot to share with them.
ASCE Student Chapter & TrueNorth Steel Welcome Steel Sculpture To Campus

On Oct. 18, members of ASCE's student chapter met with representatives from TrueNorth Steel for a ribbon-cutting ceremony to unveil a new piece of artwork on campus. Erected with steel components fabricated by TrueNorth Steel, who donated over $12,000 worth of labor and materials, and with additional donations from Fastenal and Sherwin Williams, the sculpture is the newest of over 130 similar structures erected on universities and colleges all over the country. The group of students and professionals dedicated the sculpture to the Department of Civil & Environmental Engineering as one part of a larger initiative to bridge the gap between textbook learning and real-life implementation. It's not just a work of art, but as one ASCE member described it, a “connection tree” with some deep roots.

In 1985, University of Florida professor Duane Ellifritt was troubled by the difficulty some students had translating textbook examples to real life, so he drew from his experience as both an artist and civil engineer to develop a fresh approach. “I was always frustrated by the inability of some students to visualize three-dimensional images from a two-dimensional textbook and began to look for ways to remedy that... Then I thought of what seemed to me the perfect solution: the creation of a steel sculpture that would show all kinds of connections and steel members, one that would also stand as a representative of engineering and add one more piece of art to the campus,” he explained on his personal website. Since then, with the stewardship of the American Institute of Steel Construction (AISC), who saw an opportunity to cultivate “true visual understanding” of steel connections and framing through the use of this unique teaching aide, the steel sculpture has become an icon of civil engineering programs nationwide.

In the department’s own program, thanks to the special efforts of AISC, TrueNorth Steel, and Mine’s ASCE student chapter, students struggling to make the connections won’t have to work it out with their textbooks. Instead, they can march up to the Northwest side of the Civil/Mechanical Building and get a good introduction to the nuts and bolts.

For more information on the Steel Sculpture program, visit the American Institute of Steel Construction website HERE or go to: http://www.aisc.org/content.aspx?id=704
Note from Student Chapter President Christopher Timm

We’ve been off to a great start this fall! Already, we have been very busy with all sorts of events from the kick-off picnic at Canyon Lake Park where we showcased last year’s canoe the Tippie Hippie, to the M-Day parade, a highway clean-up and even a “punkin chunkin” catapult competition. In October, we wrapped up our collaboration with TrueNorth Steel to install a steel sculpture on campus (read more on page 4). We’re especially excited this year because we’ve had great turn out with a whole lot of enthusiastic CEE freshman in attendance.

Have a look at what we’ve done so far this fall:
Graduate Student Tony Kulesa Presents Research in Beijing

Tony Kulesa (MSCE14) presented his findings on structural materials for lunar habitats this September at the 64th Annual International Astronautical Conference in Beijing, China. With more than 1,000 papers “promoting space development for the benefit of mankind,” the conference included all any and all topics related to the final frontier and was attended by more than 3,000 professionals and students from around the world. Besides describing what amounted to an exciting cultural experience, Kulesa comments on the collaborative purpose of the conference. “I think that’s the whole point of the congress–the benefit of mankind.’ So the question is, ‘How can we work together on this?’ and one way is to gather 3000 people, put them in the same building for a week and talk about what everyone is working on so that we can share ideas, technology and knowledge.”

His own research is funded by a $66,000 grant from NASA which was recently renewed for the second and final time. Of his experience, Kulesa comments, “Civil engineering can take you all over. I’m a structures guy but my research entails doing heat transfer studies, thermal conductivity, composite materials— all things that are on the far-reach of civil engineering. So it’s been a great opportunity for a Mines student to branch out.”

Undergraduate Trio Devises Approach to Save Rapid City $150,000

Working under the direction of Dr. Lew Christopher, students Kyle Doerr, Marshall Davis, and John (Tony) Osthheimer (BSCE13) designed a procedure that may save the City of Rapid City $150,000. When approached for opportunities to get “hands-on experience,” Mines alumnus and city environmental process supervisor Bob Druckey suggested the students take a look at the city’s wastewater reclamation process. The students visited the Rapid City Wastewater Reclamation Facility weekly to measure the amount of nitrogen ammonia in the facility’s activated sludge aeration basin—a relatively novel approach to the problem of controlling aeration. Druckey was quoted in June’s Legacy News explaining, “Usually when you control an aeration process you measure the dissolved oxygen concentration. The thing the students did was measure the amount of ammonia in the water as an indication of where we could reduce the oxygen feed.” In their final report, they concluded that reducing aeration beyond the nitrification stage could translate to $151,500 saved over a five-year period.
Dr. Marc Robinson and Tony Kulesa (MSCE14) enjoyed dinner with recently retired faculty member Dr. M.R. Hansen and his wife Barbara in Beijing, China. Tony presented his work with Dr. Robinson on “Analytical Study of Thermal and Mechanical Properties of Syntactic Foams for Space Applications,” at the 64th International Astronautics Congress in September. Dr. Hansen was in China to present at CONSEC 13: Concrete Under Severe Conditions.

Italy! Mongolia! China! France!
Check out what our globe-trotting faculty have been up to over the past few months:

Dr. Andrea Surovek and Dr. Dean Jensen (IEEM) enjoyed a gala dinner honoring Martin Cooper, inventor of the cell phone, at the first Marconi Institute for Creativity conference held in Bologna, Italy. Drs. Surovek and Jensen are seen here with Dr. David Cropley, an internationally known expert in engineering creativity from the University of South Australia in Adelaide. Dr. Cropley has agreed to visit the School of Mines next spring to speak on the subject. Drs. Surovek and Jensen presented their work on creativity in team design at the unique, multi-disciplinary conference that included experts in creativity from the sciences, engineering, music, art, psychology and education.

Dr. Jennifer Benning attended the 2nd International Workshop on SVOCs in the Indoor Environment in Wuhan China. Dr. Benning was invited to serve on the International Scientific Committee for the workshop.

Dr. Marc Robinson and Tony Kulesa (MSCE14) enjoyed dinner with recently retired faculty member Dr. M.R. Hansen and his wife Barbara in Beijing, China. Tony presented his work with Dr. Robinson on “Analytical Study of Thermal and Mechanical Properties of Syntactic Foams for Space Applications,” at the 64th International Astronautics Congress in September. Dr. Hansen was in China to present at CONSEC 13: Concrete Under Severe Conditions.
Dr. M.R. Hansen recently retired and is spending a year in Mongolia. He recently sent the following about his teaching challenges: “Most of the students can read English but have limited experience writing it and no experience speaking it. However, equations, graphs, and calculations are the same. It is a good challenge to teach concrete; just speak slowly and use fewer words. Barbara is teaching English and is considered a specialist, being a native speaker. The students love the yellow “sMd” shirts. I am also organizing a ballistic art painting party. Some of the students have already taken the ACI exam and the others will take it soon. We are making progress toward quality concrete in Mongolia.”

Dr. James Stone, accompanied by his family, was in Christchurch, New Zealand this past summer on an Erskine teaching fellowship from the University of Canterbury. While there, he taught two courses and was involved with research projects alongside environmental and natural resources faculty members. Dr. Stone says that while the winters in Christchurch were mild compared to those in Rapid City, he and his family found the housing to be exceptionally cold as most houses had very little insulation, and central heating was not common. Another difference from being in Rapid City was that he also experienced two earthquakes while in his 4th floor campus office.

Dr. Sangchul Bang is pictured alongside his wife Dr. Sookie Bang (CBE) at the Château des Chambord in Loir-et-Cher, France. Dr. Bang was in France to present a paper and chair a session at the 32nd International Conference on Ocean, Offshore and Arctic Engineering, which took place last June in Nantes, France. Recently, he has travelled to several other EU countries, as well as Japan, Brazil, Mexico and Hong Kong.
Jim Ness Graduated in 1983 From SDSM&T, Now President of SEAC

Jim Ness (CE83) wears a lot of hats. Among them are dad, husband, church member, basketball coach, cycler, triathloner, and Principal Engineer at Monroe & Newell Engineers, Inc. in Denver. The newest hat in his collection? President of the Structural Engineers Association of Colorado (SEAC).

Mr. Ness got involved with SEAC in 1993 when an employer recommended that he join. Impressed with its general meeting presentations, Ness's continued to deepen his participation. Since joining he has served on several committees including the Steel Liaison Committee, the Business Management Committee, and the Standards Practice Committee. After rotating on and off the SEAC Board of Directors, he became Secretary, then Treasurer, and now he has happily assumed the title of President.

His commitment to the field is evidenced by his work with SEAC and, of course, by his commitment to his career. Mr. Ness joined Monroe & Newell in 1994 and has participated in its fantastic growth over the years. “We design just about anything there is out there for architects in Colorado, and have expanded to include much of the USA,” he explains. The firm moved to a brand new office in downtown Denver last summer, where plans for hotels, renovations, warehouses, lodges, office buildings and residential work keep him busy. Still, Mr. Ness keeps acquiring new hats, adding on to a collection which includes one well-worn hat that has indeed served him well: Mines alumnus of 1983.

More About SEAC:

With chapters all over the country, the Structural Engineers Association exists to promote the profession of structural engineering and to serve as a forum for the discussion of technical, ethical, and business-related topics of concern to its members and to the public.

For more information about the Structural Engineers Association of Colorado, click HERE or visit: seacolorado.org

Odds are, you’re doing great things, too. Let us tell the CEE community all about them! Maybe you’ll be our next featured alumn!

Tell us what’s going on in your life and we might feature you in the next newsletter. Send your photos, updates, and bios to: micah.steffes@mines.sdsmt.edu surovek@sdsmt.edu

We look forward to hearing from you!
The CEE department held their fall Professional Advisory Board (PAB) meeting in late September, which included several new alumni and corporate members. SDSM&T President Heather Wilson welcomed board members to campus, including chair Lance Roberts (CE98, 99), Ron Jeitz (CE69), Ray Bettmeng (CE87), Mike Hansen (CE90), Dennis Rounds (CE91) and new members Dave Muck (CE94, 95) and Darin Brickman. Board members Mike Halde (CE98), Susie Jorgensen (CE76), and Agatha Kotsonis and new member Keith Mattecheck (CE99) were unable to attend.

The PAB will focus their efforts this year on supporting the CEE department strategic priorities that include developing additional resources to support students and providing an industry perspective to enhance the curriculum. The department is grateful for such an enthusiastic and committed PAB, and also extends its gratitude to members who have rotated off the board in the past year: Mr. Dan Ferber (CE82) and Dr. Chip Kilduff.

Meet the Chair: Lance Roberts, PhD, PE (CE ’98, MSCE ’99)

Dr. Lance Roberts (CE98,99) brings his experience in the private sector and his deep connections with SDSM&T’s CEE department to his role as the chair of the Professional Advisory Board. Prior to his current position as the vice president of RESPEC’s Mining & Energy Division in Rapid City, Dr. Roberts served as an assistant professor here in the CEE department. In his previous role, he taught geotechnical engineering courses and conducted research focused within the field of reliability-based design and risk assessment for geotechnical and geostuctural engineering applications. The CEE department is happy to welcome his special insight and leadership as chair of the PAB.

Note: Dr. Roberts will be presenting as part of the graduate seminar series on November 20th. See page 12 for more information.
Dr. Jennifer Benning Collaborates on NSF-Funded Research on Indoor Air Quality

Dr. Jennifer Benning has been awarded $161K in funding from the National Science Foundation (NSF) to study the transport of toxic semi-volatile organic compounds (SVOCs) in the indoor environment. The three-year study is a collaborative effort with researchers from Missouri S&T, Virginia Tech and the University of Sydney. The research will test the hypothesis that airborne particles increase chemical emission from sources of SVOCs and deposition of SVOCs onto sink surfaces by altering the way these chemicals are transported from surface to surface. A theoretical model of this system predicts as much as a ten-fold increase in the rate of transport from indoor surfaces and materials to occupants, thereby increasing inhalation and dermal (skin) dose. The research will carefully combine experimental quantification of relevant parameters (partition and transport phenomena) with model analysis. The results will be used to test theoretical models of particle-mediated enhanced emissions and uptake. Further, experimental results and mass-transfer models will be integrated into indoor air quality models to improve predictions of exposure, dose and risk to indoor sources of SVOCs.

Dr. Lew Christopher Leads SDSM&T as part of the Dakota Bioprocessing Consortium

With $3,000,000 in funding from the National Science Foundation, Dakota Bioprocessing Consortium (DakotaBioCon) brings together researchers from four institutions in two neighboring states. With their similar geographical, socio-economic and environmental diversity, North Dakota State University (NDSU), South Dakota State University (SDSU), University of North Dakota (UND) and South Dakota School of Mines & Technology (SDSM&T) make up the core institutions comprising DakotaBioCon. The consortium will implement cutting-edge research and development geared toward guiding the region, as well as our nation and global society toward a hoped-for transition to a bio-based economy. The establishment of a multi-state, multi-institution, multi-disciplinary, collaborative infrastructure will facilitate the development of novel bioprocessing technologies for sustainable production of high-value chemicals and materials from renewable resources, with emphasis on lignin-derived products as economically viable substitutes of imported fossil-fuel based chemicals. To ensure continuation and long-term sustainability DakotaBioCon will leverage existing partnerships within SDSM&T’s Center for Bioprocessing Research and Development (CBRD), led by Dr. Lew Christopher, UND’s Sustainable Energy Research Initiative and Supporting Education (SUNRISE), and SDSU’s SunGrant Initiative.
Graduate Seminar Series:
CEE graduate student seminars are typically held the 2nd and 4th Wednesdays of every month from 4:00-4:50 pm in CB204W. The SDSM&T and engineering community are welcome to attend. Professional development hour (PDH) certificates mailed to attendees upon request for some seminars (noted below). For more information, contact Dr. Sangchul Bang (Sangchul.Bang@sdsmt.edu), the 2013-2014 CEE seminar coordinator. For updates, visit the CEE website HERE or go to: http://www.sdsmt.edu/Academics/Departments/Civil-and-Environmental-Engineering/Activities-and-Organizations/Seminar-Series/

November 6, 2013: “Flow Field Forecasting”
Dr. Kyle Caudle, Assistant Professor, SDSM&T Department of Mathematics and Computer Science
This talk will present a new autonomous statistical learning methodology, called flow field forecasting. Flow field forecasting methodology was originally developed to predict network performance characteristics for the Dept. of Energy’s energy science network, but many other potential engineering applications exist. The talk will give the basics of flow field forecasting and several possible engineering applications will be presented. In addition, a basic overview of the process of designing an experiment will be outlined and how this was used to perform Dr. Caudle’s computer simulations within the context of flow field forecasting.

Dr. Lance Roberts (CE98, MSCE99)
The growth of wind energy in the United States has been significant over the past decade. The tremendous benefit with wind energy is that it is a renewable energy resource; however, numerous challenges are associated with wind energy as well. Among the greatest challenges is the ability to store power produced during off-peak times that can be used to meet peak demands. To address this challenge, large underground caverns mined in salt or other low-permeability rocks can be used to store air that is compressed into the caverns using excess electricity generated by the wind turbines during off-peak periods. The compressed air from the caverns is then used during peak demand periods to replace the first-stage compressors in gas-fired electric generators. These compressors normally consume about two-thirds of the power produced by gas-fired turbines. Using “pre-compressed” air from the caverns, the electricity generated for each pound of gas consumed increases by nearly a factor of three. This methodology is termed compressed air energy storage (CAES). Recently, RESPEC Consulting & Services, Rapid City, was involved in a project with the New York State Electric & Gas Corporation (NYSEG) and Parsons Brinckerhoff Energy Storage Solutions (PB ESS) to perform a geomechanical analysis of a large underground salt cavern for use as a CAES facility. The geomechanical analyses included analyzing the response of the rock salt of the cavern to daily cycling of air which created significant temperature and pressure fluctuations within the cavern. Maximum and minimum allowable pressures within the cavern were determined to ensure cavern stability during CAES operations.

Upcoming: Andy Baker (MSCE03) (Daktronics) on January 22 & Steve Palmer (CE97) (SDDOT) on February 19

Thesis Presentations
Dol Raj Chalise (MSCE13)  November 21, 2013: 11:00 am in CM 310
Karen Schaefers (MSCE13)  December 12, 2013: 11:00 am in McKeel Room (Surbeck)
Thesis Proposal: “The Effects of Clay Mineralogy on Soil Stabilization”