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BSE HALL OF FAME

Shaping the World of Irrigation and Groundwater

From Oklahoma to Africa, to South America and Eastern Europe, Darrell Watts has traveled the world as an ambassador for better irrigation management and the wise use of water. He has traveled in 37 countries, and had multi-year assignments in Ethiopia, Colombia, and Morocco. He speaks both Spanish and French. In his long and varied career he has made many friends around the world, and this year, was inducted into the department Hall of Fame. Not too bad for a farm boy from the "dust bowl area" of western Oklahoma.


Darrell Watts

Born in 1936 at home on a dryland farm, he saw the miraculous changes brought by irrigation when a project first delivered water to their farm in 1948. In 1954 Darrell entered the University of Oklahoma at the age of 17. After one year he transferred to Oklahoma A&M (now Oklahoma State University) where a service course on farm machinery hooked him on agricultural engineering. While temporarily out of school to earn badly needed cash, he met Lois, the love of his life. They were married in 1958 and then Darrell returned to OSU for his B.S. degree. An M.S. at the University of California, Davis, followed in 1962.

Oregon State University beckoned next, where Darrell spent four years as an instructor and Assistant Professor in Agricultural Engineering, teaching irrigation and land drainage courses. In 1966 he was asked by Oklahoma State to help with an institution building project in Ethiopia: developing a new College of Agriculture. This project between the U.S. and Ethiopian governments was the first of many USAID programs around the world. Back from their two-year experience Darrell embarked on a Ph.D. program at Utah State University (USU) in 1968.

The following summer USU asked Darrell to work on a research project on the Caribbean coast of Colombia for three months. While there he traveled to Bogota to visit a friend who was working on a project led by UNL to develop a graduate program in agriculture at the National University. Subsequently, UNL Department Head, Bill Splinter, hired Darrell for a two-year assignment on the UNL project.

In the summer of 1972 Darrell and his family moved to North Platte where he began work as a UNL irrigation development specialist. While at North Platte he helped lead the development of the Sandhills Ag Lab and conducted extensive experiments on nitrate leaching in sandy soils, and crop response to limited irrigation. He also worked closely with the Upper Republican NRD on water management issues. During this time he completed his Ph.D. from USU in 1975 with a dissertation on the modeling of nitrate leaching in the Nebraska Sandhills.

In 1977, the Watts family moved again, this time to Lincoln. Darrell began teaching, advising students, and conducting irrigation projects at the Rogers Memorial Farm. He had the pleasure of working with a number of M.S. candidates including, among others, current BSE faculty members Derrel Martin and Bill Kranz.

In 1982, UNL asked Darrell to go to Morocco to manage a USAID-funded project to develop a dryland research center. Darrell said he saw the project area not as dryland but rather as three million acres of irrigation research plot. He turned a failing project into a successful one in five years and received a University Distinguished Service Award in recognition of the achievement.

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From the Department Head


Ron Yoder

Undoubtedly you have heard or read of the difficult financial situations facing many public universities, and possibly wondered what that means for the Biological Systems Engineering Department. Thanks to relatively low unemployment in the state (consistently among the three lowest states), and to the conservative fiscal management of our state government and university administration, the impacts to the Department to date have not been as severe as at many other public universities. Although the future may hold significant budget cuts for our Department, and we are waiting to learn what the current round of budget cuts will mean for us, we continue to make progress in many areas. Our enrollment continues to increase at both the undergraduate and graduate levels with slightly more than 200 undergraduate engineering students and 88 undergraduate Mechanized Systems Management students enrolled in the Fall semester. As nearly as we can ascertain these are both the highest enrollments on record in those programs. Graduate enrollment is 41. Expenditures from extramural funding in the past fiscal year were slightly more than $3 million, also the highest on record.

During the past summer we welcomed Dr. Deepak Keshwani and Dr. Adam Liska to our faculty. Deepak will work in the area of bioenergy systems and will teach mechanized systems management courses. Adam has expertise in life cycle analysis of biofuel production. He also has been very active in the group that developed the university-wide Energy Sciences minor, and will now be the coordinator of that program. Their arrivals add to our growing contingent in the area of renewable energy systems, along with faculty members Milford Hanna, George Meyer, Yixiang Xu, and John Hay, and staff members Robert Weber and Loren Isom.

Consultants for the University of Nebraska-Lincoln have suggested broad themes of food, fuel, and water for the new Innovation Campus. Additionally, the University of Nebraska-Lincoln is placing a strong emphasis on the life sciences. These four areas of emphasis match very well the strengths of our extension, research, and teaching programs. As we strive to make our department the best it can be, we welcome your input.

Biological Systems Engineering Department Newsletter

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Shaping the World of Irrigation and Groundwater *Continued from page 1*

Following a six-month sabbatical after his return, Darrell joined USDA ARS researcher Jim Schepers and Agronomy and Horticulture faculty member Roy Spalding to co-direct Nebraska's ground water quality project in the Central Platte Valley near Shelton in Buffalo County. In addition to research on nitrate leaching and irrigating with high-nitrate water, Darrell helped produce a training manual and five video productions on irrigation and fertilizer management for producers. These educational materials have continued to assist Nebraska farmers in the management of irrigation and nitrogen, to reduce the negative impacts on the environment, and to consider water as a valuable resource. Darrell has received the Pioneer Award at the Nebraska Water Conference (2000) and the Maurice Kremer Achievement Award from the Groundwater Foundation (2004).

Darrell also has strong connections to the Agricultural Engineering Department of the University of Concepción in Chile, and serves as an Adjunct Professor there. Three of their faculty members have earned doctorates from our Department, and one has earned an M.S. On one of his return trips in 2002, Darrell led a group of UNL students and faculty for a firsthand view of agriculture and water resources in Chile. Darrell also helped lead a student group to Argentina in 2008, and is making plans to lead a group to Brazil in 2011.

Darrell and his wife, Lois, have been married for 50 years and have two children, Sylvia and Joel. While working nearly full time with the project in Morocco, Lois completed her dissertation requirements for a Ph.D. from UNL. Avid gardeners and bird watchers, Darrell and Lois continue to travel to many spots around the globe, and share their experiences with others through enjoyable video travelogues that Darrell creates.

His impacts on water use efficiency and water quality continue to have influence in Nebraska and the world. Darrell has continued activities with the University and consulting after his official retirement in 2001. Not too bad indeed.

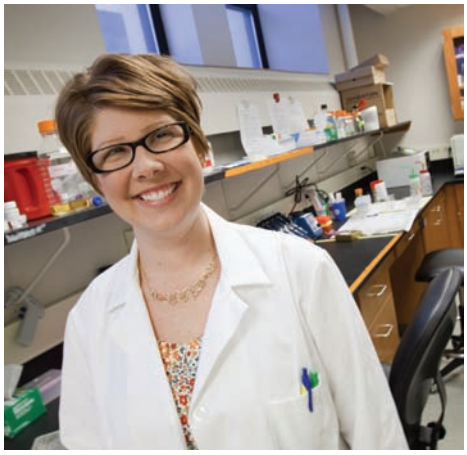
An Engineer's Art

Brent Hall, a recent BSEN graduate and current graduate student from Centerburg, OH, focusing on hydrology and water resources management, earned first place in the plant life division of the Wildlife and Nature amateur photography exhibit sponsored by the University of Nebraska State Museum, for this picture taken in the Namib Desert. http://go.unl.edu/hhn

Faculty Profile

Even as an undergraduate student, Angie Pannier had her sights set on being professionally involved in the department. Now as a BSE alumna and as a relatively new assistant professor, the first step in her career has been realized. Originally from Fremont, NE, Angie received her B.S. degree in Biological Systems Engineering (BSE) from UNL, and graduated with highest distinction and honors. For her undergraduate honors thesis, she studied a gene postulated to be involved in atherosclerosis at the University of Nebraska Medical Center. During that time she was awarded a Barry M. Goldwater Scholarship. During her senior year, Angie was also named a National Science Foundation (NSF) graduate fellow. She served as president of the UNL student chapter of the Society of Women Engineers (she is now the group's faculty adviser). Angie continued her education in BSE and received her M.S., with research focused on systems designed for transdermal delivery of nucleic acids, under the direction of Dr. Rhonda Brand. She also developed a mathematical model to predict skin permeability coefficients. Angie received her Ph.D. in Biological Sciences from Northwestern University in Evanston, IL, where she studied and subsequently patented techniques for substrate-mediated gene delivery for tissue engineering and diagnostic applications in Dr. Lonnie Shea's Cellular and Tissue Engineering Laboratory. All her research was funded by an NIH training grant.

Excited to be back in Nebraska and in the department, Angie began her position in October 2007, and has overseen construction of her new laboratory, recruited 9 group members (ranging from undergraduate to graduate students, along with a Lab Technician II), and established her courses for teaching. Angie is committed to undergraduate education both in the classroom (she teaches three undergraduate courses throughout the school year) and in the lab (6 of the 9 members are undergraduate research assistants). Angie said she feels strongly that undergraduates should gain hands-on lab experience with ". . . projects as well as washing glassware. It's important to me to help [students] grow in their engineering, critical thinking, and scientific skills," Angie said. "I love seeing them succeed."



Angie Pannier [Photo by: Craig Chandler/University Communications]

She also recognizes the "mini-business" of running a lab, which requires substantial results to continue. Pannier's philosophy has become: "do good science" and the rest will follow—at a brisk pace. Using engineering skills, such as math and science to solve problems and design solutions, research is focused on solutions for medical and biological problems. A major goal of the Pannier Lab is to understand the mechanisms that render cells responsive to DNA transfer, concentrating on the extracellular environment of the cell, the interaction between cells and biomaterials, as well as the intracellular processes and subsequent signaling involved during nonviral gene delivery.

Angie's goal is to use the knowledge of gene transfer to design more efficient delivery systems, which could be applied in gene therapy or tissue engineering. "Tissue engineering applies the principles of engineering and biology to the development of functional substitutes for damaged tissue" that restore, maintain, or improve tissue function in the medical therapy of diseases. For Angie, an immediate call-to-action is the waiting list for organ donations that topped 100,000 in 2006, according to the Organ Procurement and Transplantation Center with the U.S. Department of Health and Human Services.

The Pannier Lab group is also developing new polymeric methods of nonviral gene delivery that facilitate the application of gene transfer to oral delivery. In addition, Angie and her team are applying gene delivery methods to develop techniques to measure epigenetic profiles in small cell populations and understanding environmental effects of culture of tissue engineering constructs on epigenetic profiles that may dictate the efficacy of engineered tissue. Members of the Pannier Lab are also developing novel techniques to pattern hydrogels for tissue engineering scaffolds, using fiber-templating to create conduits within the matrix for directed cell growth, as well as applying tissue engineering approaches to study embryology. The experimental approaches developed in the Pannier lab should provide valuable insights to the gene delivery and biomaterial fields. One of their overarching goals is to translate discoveries to therapeutic, biotechnological, and tissue engineering applications.

In addition to her research, Dr. Pannier is one of three faculty members (with Dr. Greg Bashford and Dr. Shadi Othman) within the biomedical engineering (BME) emphasis of our department, and shares responsibilities for teaching and advising BME students. Some of the courses she teaches, with an accelerated approach, include Introduction to Biomedical Engineering, Biomaterials, and Tissue Engineering. In her Introduction to Biomaterials, a senior elective, Pannier teaches about designing materials for use with the human body. Since the field is rapidly changing, Pannier supplements the textbook with primary research literature; the students must immerse themselves in current research articles, participating in weekly "journal clubs." In Tissue Engineering, a major assignment involves writing an NIH grant proposal, which sometimes involves five rounds of edits.

When not in the lab or teaching, Angie loves to spend time with her husband, Tyler, a software developer, and their 2 ½ year old daughter, Lilly. "UNL did a great job preparing me," Angie said. "I'm thrilled to be back."

ASABE Annual Meeting

The American Society of Agricultural and Biological Engineers (ASABE) held its annual meeting the week of June 22, 2009, in Reno, Nevada. Several department faculty received recognition.

Ron Yoder, Department Head, was named a Fellow and began his term as the ASABE president.

Rick Stowell and **Tami Brown-Brandl**, along with Richard Gates (Agricultural and Biological Engineering, University of Illinois), received an ASABE Presidential Citation for their work in supporting the International Livestock Environment Symposium held in Brazil. **Tami Brown-Brandl** is also a member of the Board of Trustees for 2008-2010.

Educational Aids Blue Ribbon Awards:

Web Site:

The Nebraska 4-H Robotics and GPS/GIS Year 1 Curriculum
Bradley Barker, **Viacheslav Adamchuk**, **Shana Thomas** (former BSE Department Program Specialist), and Valerie Marino

Short Publication:

Weed Targeting Herbicide Management
Viacheslav Adamchuk, George Meyer, Mark Bernards, and Jerry Mulliken
GNSS Based Auto-Guidance in Agriculture
Viacheslav Adamchuk, Timothy Stombaugh, and Randy Price
Stormwater Management on Residential Lots
David Shelton and Kelly Feehan

Innovative Extension Methods or Impact Assessment:

Nebraska Agricultural Water Management Demonstration Network
Suat Irmak, Gary Zoubek, Jennifer Rees, Brandy VanDeWalle, Rodney DeBuhr, Dan Leininger, Darly Andersen, and Jim Schneider

In other awards, **Roger Hoy** was one of 5 people honored for making major contributions in the development of Standards. He was recognized for his work on the General Safety Standard for Agricultural Tractors in Scraper Applications.

The Boyd-Scott Graduate Research Award was presented to our newest faculty member, **Deepak Keshwani**, for his dissertation on *Microwave Pretreatment of Switchgrass for Bioethanol Production*. Deepak completed his B.S. and M.S. in our department, and completed his Ph.D. at North Carolina State University. Deepak will teach Mechanized Systems Management courses and do research in bioenergy.

Recognition for Alumni

The 2009 Nolan Mitchell Young Extension Worker Award was presented to **Matthew Helmers**. Matt earned his Ph.D. in 2003 in our department and is an Assistant Professor at Iowa State University.

Adel Shirmohammadi, (M.S., AGEN 1977) received a Presidential Citation for his many years of dedicated service to ASABE, most recently as the Chair of the Meetings Council. His leadership led to the development of new ideas for further growth and value of ASABE meetings and conferences for both the Society and attendees.

Yanbin Li, (M.S., AGEN 1985) a professor in Biological and Agricultural Engineering at the University of Arkansas in Fayetteville, and a department alumnus, was elected a Fellow.

Alumni News

2000s

Ramesh Singh (2009, Ph.D., Engineering) is a scientist and ARTS contractor with the USGS Earth Resources Observation and Science Center in Sioux Falls, SD.

Shah Huda (2008, Ph.D., Engineering) and his wife welcomed a new addition to their family: son Rihan, who was born on September 8, 2009.

Justin Speichinger (2006, M.S., AGEN; 2001, B.S., MSYM) works for Caterpillar in North Carolina. He and his wife, Lee, have a daughter, Sophia.

Kimberly Ryland (2003, B.S., BSEN) continues to work in project management, design, and development of arthroscopic cutters and burrs at Stryker Endoscopy in San Jose, CA.

Brian Thomas (2001, B.S., AGEN) recently accepted the engineering manager position at Hutchinson-Myrath, a company that designs and manufacturers grain conveying systems. He and his family live in Clay Center, KS, and enjoy being part of the friendly farming community.

1990s

Eric Berggren (1996, B.S., BSEN) is a program manager for HDR and recently moved to Chicago to work on building HDR's water and wastewater program there.

Let us know what's new.
Update your profile at:
bse.unl.edu

Select Alumni Update under the Department heading.
Inclusion in the newsletter is optional.

Enhancing Water Management & Tillage Practices in Turkey

Ahmet Donmez, manager of the private ag company, and Suat Irmak discuss irrigation equipment, practices, and future plans. The group is installing several T&L pivots and underground supply lines on their farm in south central Turkey.

Suat Irmak, research and extension faculty member, and **Paul Jasa**, extension engineer, visited Turkey in October for an education-related program with the Division of Research and Development of the Turkish Ministry of Agriculture (TMA) and with a large, privately owned agricultural and dairy production company. The main objective of the visit was to provide education in water management, crop production, and soil management practices to improve agricultural productivity. Suat has been working with the TMA and the private company for more than two years and has been assisting them with developing irrigation engineering infrastructure, agricultural water management, and related topics. The private company and the TMA are trying to transfer some of the research and educational technologies to modernize agricultural practices in Turkey. They are very interested in the irrigation engineering research and related programs in the Biological System Engineering Department at UNL.

Officials from the TMA and the private company leaders visited the University of Nebraska-Lincoln last summer; Suat hosted them for a week. They visited the South Central Agricultural Laboratory near Clay Center, agricultural industry partners, growers, one of the center pivot companies, and developed working relationships along the way. Paul gave the group a tour of Rogers Memorial Farm at that time, and provided information on crop production, soil management, and crop yield in relation to tillage practices. He also provided operational and practical information about the advantages of no-till practices as well as machinery options for no-till practices.

The site that Suat and Paul visited in Turkey is very dry and windy, with very limited water resources and somewhat poor soil structure. The average rainfall from May through September is 2-3 inches, or less. The climate, in general, is very similar to that of western Nebraska, but with less rainfall (western NE rainfall is >14.5 inches/year). The educational programs and agricultural production in this area of Turkey will focus on winter wheat, barley, corn, alfalfa, and soybean production. During their visit, Suat and Paul provided educational assistance about irrigation engineering and agricultural water management topics, no-till soil equipment and management, and crop production and residue management. A field day was held to inform the public about the partnership between TMA, the private company, and UNL. More than 120 field day participants attended, and included growers, officials from TMA, local deputy directors from the Ministry of Agriculture, Forest Service personnel, and people from the surrounding villages. Suat reports that the nearly 3,000 acres planted under center pivot irrigation are doing well. This interesting partnership will continue in the future.

While on a visit to the University of Nebraska, Ahmet Donmez, manager of the private ag company (in blue plaid shirt), the Turkish Deputy Minister of Ag (with red tie), and others listen as Paul Jasa explains some of the long-term soil benefits of continuous no-till at the Rogers Memorial Farm.

New Faces in the Department


Dr.Michael Van Liew

Dr. Michael Van Liew joined the department in August 2009 as a research specialist and is providing watershed modeling support to the Heartland Initiative's Bioenergy and Water Resources Team. His work involves providing awareness among watershed modelers and stakeholders in the proper use of models to address water quality issues, and implementing areas of training and assistance for model users. He also plans to promote tools and technology that improve the use of simulation models and to promote collaborative efforts among university and agency scientists to strengthen watershed modeling capabilities throughout the four-state region of Nebraska, Iowa, Kansas, and Missouri.

Mike received his B.S. degree in geological engineering from the University of Idaho, his M.S. degree in agricultural engineering from Colorado State University, and holds a Ph.D. degree in agricultural engineering from Washington State University. Throughout his career in hydrology and water resources, Mike has worked for a number of state and federal agencies, including the Agricultural Research Service and most recently, the Montana Department of Environmental Quality. While employed overseas, he has served as a visiting professor at Bunda College of Agriculture in Malawi and Taiyuan University of Technology in Shanxi Province, China. Mike's work in recent years has centered on evaluating watershed scale model performance, assessing parameter sensitivity and uncertainty in simulation models, and investigating the impacts of climate variability and changes in land management on streamflow, sediment, and nutrient response.


Dr. Adam Liska

Dr. Adam Liska is a new Assistant Professor with a joint appointment in the Department of Biological Systems Engineering (20% research, 40% teaching) and the Department of Agronomy and Horticulture (40% research). He is currently teaching Energy in Perspective (ENSC 110), which is the introductory course to the new Energy Sciences Minor. He also provides leadership and coordination for the minor. His research investigates the life cycle energy efficiency and net greenhouse gas emissions from biofuels. He has completed eight peer-reviewed research publications related to biofuels in the last three years, and is currently investigating new life cycle emissions regulations for biofuels at the State and Federal level.

Previously, he was a Research Assistant Professor and Post-doctoral Researcher in the Department of Agronomy and Horticulture at UNL, and a Post-doctoral Researcher in physics at the University of Manitoba. He completed his Ph.D. in biology, with a focus on analytical biochemistry, in 2003 at the Max Planck Institute of Molecular Cell Biology and Genetics, in Dresden, Germany, and his B.S. in biochemistry and biology at UNL.


Dr. Deepak Keshwani

Dr. Deepak Keshwani joined the department as an Assistant Professor in July 2009. He will be teaching courses in the Mechanized Systems Management (MSYM) program and will be conducting research and extension activities in the bioenergy area. Deepak received his Ph.D. in May 2009 from North Carolina State University where he conducted research on ethanol production from cellulosic materials. Originally from Chennai, India, Deepak came to the United States in 1998 and attended UNL where he received his B.S. in 2002 and M.S. in 2004.

UNL Service Awards

On September 10, more than 900 employees were honored for their years of service at the University of Nebraska-Lincoln. The Service Awards ceremony was held at the Lied Center for Performing Arts.

30 Years

Derrel Martin
Sheila Smith

20 Years

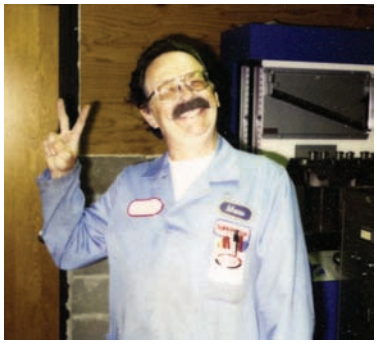
Stuart Hoff
David Jones

10 Years

Bonita Delhay

Five Years

John Hay
Bill Rathje
Jeyamkondan Subbiah
Ron Yoder



In Memoriam

Marvin N. Anderson, known as Marv around the department, died on May 8, 2009. Before retirement in 1998, he was the Instrument Maker III, shop foreman for 25 years working with faculty, staff, and students to build and fabricate project designs.

Faculty and Staff News

Greg Bashford traveled to Rome to attend the 2009 International Ultrasonics Symposium, the premier conference for scientists and clinicians solving problems applying ultrasound technology to medical problems. His laboratory had two presentations: the first, revealing a novel new way of measuring blood flow velocity, and the second, showing the latest progress in quantifying tendon degeneration (in collaboration with Madonna Rehabilitation Hospital and the University of Southern California). Graduate students **Tiantian Xu** and **Pengfei Song** were the lead authors on the two presentations. Both presentations were received very well, and Greg is still busy following up with colleagues who want more information. After the conference, Greg and his wife, Tanya, took a bus tour of southern Italy, and visited Napoli, Sorrento, Pompeii, and the island of Capri.

Suat Irmak received the "Engineer of the Year" award from the Nebraska Section of the American Society of Agricultural and Biological Engineers (ASABE) in October. The award is given to an ASABE member of the Nebraska Section to recognize outstanding achievement in the Agricultural and Biological Engineering field.

Bioenergy Engineering 2009 was held from October 11-14 in Bellevue, Washington. The conference was co-sponsored by the American Society of Agricultural and Biological Engineers (ASABE), the American Society of Civil Engineers (ASCE), the 25x'25 Alliance, and BBI International, and featured technical sessions that highlighted the latest advances in Bioenergy Engineering Research and Development, with panel discussions that addressed current challenges faced by the Bioenergy Industry, and identified priorities for future work. **David Jones, Deepak Keshwani,** and **Ron Yoder** attended from our department. Dr. Yoder gave the welcome address at the conference.

Left to right: Greg Ibach, Nebraska Director of Agriculture, Governor Dave Heineman, Jack Schinstock, David Jobman (MSYM student).

Jack Schinstock received the Award of Merit from the Nebraska Agricultural Youth Institute, the organization's highest award. Presented in July, the award recognized his role in helping to prepare hundreds of youth to serve as professional agriculturalists in a wide-range of mechanized systems management careers. One of his nominees wrote, "Dr. Schinstock is an outstanding professor and advisor for the University of Nebraska. He takes every opportunity to talk with students and gets to know them and their interests beyond the classroom."

John Hay attended the National Association of County Agricultural Agents Annual Meeting and Professional Development Conference (NACAA) in Portland, Oregon. As part of the conference John presented a poster, *Demonstration and Education; Storage of Wet Ethanol Co-Products*, and won first place for the North Central Region in the extension education division. John attended one of 21 tours and visited Oregon wheat country and a 400-MW wind farm in the hills of central Oregon. Earlier in the year, John entered his Web site in competition. It was selected as a regional finalist from the North Central Region, which comprises 12 states. The NACAA organization is the national professional organization for extension educators and agents focused in agriculture.

UNL Extension and the Nebraska Cooperative Extension Association presented awards to a number of extension faculty and staff during its annual conference, held in October in Grand Island. The Geospatial and Robotics Technologies for the 21st Century team was honored for Excellence in Team Programming. In the last four years, more than 600 youth have participated in the program from around the north central region states. Team members include: **Viacheslav Adamchuk,** Kathleen Morgan, Megan Patent-Nygren, Tracy Pracheil, Katelyn Larson, Gwen Nugent, Neal Grandgenett, and Bradley Barker.

Deepak Keshwani was part of a group of five IANR faculty who attended the USDA/NIFA Grantsmanship Workshop on November 16-17 in Arlington, VA. The trip was jointly sponsored by UNL Agricultural Research Division, UNL Extension, and UNL Office of Research and Economic Development. The November 16th portion of the workshop focused on USDA-NIFA funding opportunities. National Program leaders from NIFA shared their insights on specific research programs. The November 17th portion of the workshop focused on navigating the grant writing process.

Jan Hygnstrom, *(above left)* extension project manager for onsite wastewater treatment received the IANR Outstanding Employee Award for September/October.

The **Adamchuks** added a new member to their family. Polina was born September 17, 2009. Congratulations to Slava and Kateryna.

Student News

From Paper to Reality

Engineering design students showed their finished product at Husker Harvest Days this fall. From left are Orthman's Justin Troudt and design team members: Karoline Kastanek, Ryan Hillen, Ryan Hulme, and Andrew Schumacher. Reprinted with permission of Nebraska Farmer. Photo by Don McCabe.

Many senior design projects often don't materialize into anything beyond the day of presentation, but not for one spring 2009 team. Comprising three agricultural engineering majors: **Ryan Hillen** (Leigh), **Ryan Hulme** (Cairo), and **Andrew Schumacher** (Dalton), and Karoline Kastanek (Wilber), who is has a double major in agricultural economics and agricultural journalism, this team saw their design go from final presentation to prototype in three months.

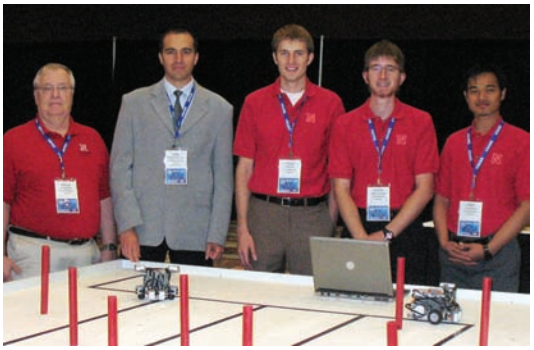
Working with their client, Orthman Manufacturing in Lexington, NE, and Orthman head engineer Curt Rickertsen, the team designed a narrow-transport stacking tool bar. It meets regulations for width, 10 feet when folded, which is the maximum width allowed on roads in many states. The tool bar can be adapted for use with different manufacturer's planting systems, and configured for eight-row units with a center-to-center spacing of 30 inches; 12-row units with a spacing of 20 inches, and 16-row units with a spacing of 15 inches. The toolbar is 20 feet wide in operating position.

In researching the problem, the team discovered that most current stacking tool bars are not capable of the 120-inch stack width because of limits in the lift linkage designs. The team found a design that overcame some of those limits and allows the wings to remain in transport position without application of hydraulic pressure. The unit has a three-point hitch mounted with a rigid center. The marketing phase of the project included an analysis of the target market and state laws regulating equipment transport.

Photo by Don McCabe.

Roger Hoy, Director of the Nebraska Tractor Test Laboratory, was their faculty advisor. An added bonus also came from the project for one team member. Ryan Hulme had been an intern with Orthman, and after graduation, he was hired by Orthman. Orthman continues to exhibit the toolbar at farm shows. Future development of the tool bar includes adapting it for European standards.

Huskertronics Places Second



From left to right: George Meyer (faculty co-advisor), Viacheslav Adamchuk (faculty co-advisor), Collin Lutz, Drew Landgraf, and Ahmad Suhaizi Mat Su

UNL's first entry into the ASABE Robotics Student Design Competition took second place at this year's annual meeting in Reno, NV. Three team members, **Collin Lutz** (EE), **Drew Landgraf** (AGEN, Kanawha, IA), and **Ahmad Suhaizi Mat Su** (AGEN graduate student, Terengganu, Malaysia), were advised by faculty advisors **Viacheslav Adamchuk** and **George Meyer**.

Each team was challenged to build and program one or more robots to travel through a "forest" and detect the presence of "trees." The competition included two teams from Taiwan University, effectively making it an international competition, increasing participation, and making the challenge more competitive.

Originally, the Huskertronics team built two NXT robots focusing on different course navigation systems, but after testing both, they decided to stick with a light reflectance guidance system for the best accuracy. Using LabVIEW 8.2, they designed the logic that would serve as a base for the decisions that the robots made through the challenge course.

After long hours of testing, writing a final report, completing the challenge in 65 seconds, and presenting their solution to the challenge, the team placed second in the overall standings. Kansas State University took first (with a time of 12 seconds) and Texas A&M University took third, while four of the eight teams were unable to complete the challenge due to technical and logistical problems.

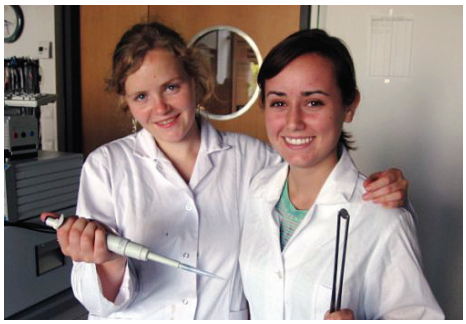
The View from a German Room *Student Study Travels*

Our students are encouraged to travel and study engineering around the world. During her sophomore year, Stephanie Berger had the opportunity to go to Germany during the summer for a biomedical internship at the Technische Universität-Dresden through the DAAD/RISE program (http://www.daad.de/rise/en/). The program matches an undergraduaate student with a doctoral student, who serves as their mentor. Stephanie successfully competed for the scholarship from the German Academic Exchange Service. She also received a scholarship from the American Chemical Society's (ACS) International Research Experience for Undergraduates (IREU) program for the internship.

Stephanie arrived in Dresden at the end of May and began her internship learning about the experiments she would be assisting with and about the different environment of the lab. The majority of her research took place at the Max Bergmann Zentrum for Biomaterials, which was not actually on the Technsiche Universitaet Dresden campus, but closer to where she lived. Stephanie was matched with Judith Reichert, a Ph.D. student working on a project with titanium implants. The surfaces are modified to attach antibiotics and growth factors so the implants have a better success rate in patients with compromised immune systems, such as smokers or diabetics.

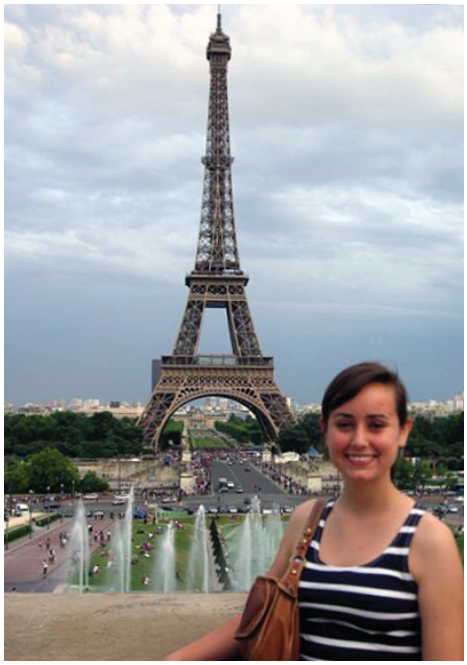
Stephanie lived in Altstadt, the oldest section of the city, known for its amazing historic buildings, many of them restored since the bombings of World War II. The 17-story building she lived in was modern in comparison (only 50 years old) and had been recently renovated. Living on the 13th floor gave her good views of the city, and she set about seeing the sights using a borrowed bicycle and the public transportation system.

The first week of her internship started with lots of reading as she learned the theory and concepts of the project as well as what had been previously accomplished. Under the supervision of Judith, she even



Stephanie Berger (right) and Judith Reichert (left)

Max Bergmann Zentrum for Biomaterials



Stephanie Berger on excursion

did some of her own experiments. Mixing education with pleasure, Judith and her boyfriend took Stephanie on an excursion to see Swiss Saxonia, a mountainous region east of Dresden. There, they hiked and took in the incredible views.

By the end of June, the pace of the work picked up. The lab supervisor wanted some extra experiments from Judith, namely growing cells on the titanium and analyzing the cell adhesion, plus taking pictures of the cells using a scanning electron microscope. Judith and Stephanie had to quickly learn how to do cell culture! By the end of the month, Stephanie gave her first presentation to the lab, an overview of the research she had done, which at this point was not a lot, so her presentation was more about future directions. It was a valuable experience, though nerve-racking, to speak in front of the doctors and Ph.D. students.

As is the nature of all short internships, the work began to pile up towards the end. Stephanie wrote a report in the format of a scientific paper on the project and prepared a poster for a presentation at the mid-August ACS Fall National Meeting in Washington, D.C., after her return. She was also busy trying to see as much of Europe as possible. Side trips were taken to Prague and Berlin with a friend from high school, and to Paris with her sister who lives in Kaiserslautern, a city in southwestern Germany.

Back in the States by August, Stephanie went right to work presenting her poster and discussing her research experiences at the ACS meeting before returning to Nebraska.

Stephanie says she really enjoyed her time abroad, and she highly recommends the DAAD/RISE program for engineering students interested in research. The internship was without a doubt an invaluable experience, and gave her the opportunity to be immersed in German culture while she learned about work in a research lab.

UNL Masters Week

From The Scarlet, University Communications

John B. Solie

UNL's Masters Week program celebrated its 45th anniversary this year with a visit by eight outstanding alumni Nov. 4-6.

Since 1964, more than 200 alumni have participated in Masters Week. Its primary goal is to link the university's outstanding alumni with students who can benefit from their experiences and knowledge. Masters are invited back to campus to meet with students in the classroom, living units, and at student organization meetings to share various ways to apply their formal education to working situations and career goals.

Candidates for Masters Week are alumni who have shown great promise, success and leadership in their fields. The selection of the Masters is competitive. Each spring, a committee of students, faculty, and administration make recommendations to the chancellor, who chooses the participants for the program. The program is sponsored by the Innocents Society, Mortar Board, the Student Alumni Association, the Chancellor's Office, and the Alumni Association.

One of our alumni, **John B. Solie**, a 1982 Ph.D. graduate, was included this year. Among his many accomplishments: he is a regents professor in biosystems and agricultural engineering at Oklahoma State University, a registered professional engineer, a member of the Nebraska Bar Association, and was inducted as an ASAE Fellow in 2004. He leads the Variable Rate Technology Team at OSU, which targets more efficient use of agricultural resources. John holds eight patents, six of which relate to the GreenSeeker TM sensor that has improved fertilization practices in many countries around the world. He was hosted by the College of Engineering and the College of Agricultural Sciences and Natural Resources.

Pulling All the Way

The UNL Quarter-Scale Tractor Team attended the annual ASABE competition in Peoria, IL, for the eleventh year in a row this past May. The team made an excellent showing with 18 members and two tractors making the trip. As the four-day competition drew to a close, it was clear that the results were going to be close. The University of Illinois ended up in the top spot for the first time, leaving last year's winner, Kansas State, in second place. Our team placed 13th overall with an excellent showing of fourth place in the pulls and a fifth place presentation.

This year got off to a great start with last year's tractor making several appearances at county fairs and festivals through the summer and fall. The final 2010 design is coming along well with building set to commence within the next few weeks. We send thanks to our alumni at Exmark, Rexnord, and TMCO for the generous help they have given us in the past and future. Visit the team Web site: bse.unl.edu/qrtrscale/

Creative Marketing

While serving as a Summer Sales and Marketing intern for Helena Chemical Company, **Justin Vonasek** (MSYM, Holdrege) won a weekly photo contest with a seed project in the Oakland, NE, market. In addition to receiving $100, the photo was circulated to over 1,500 producers in 14 states. Justin competed with 24 other Sales Interns from across the Midwest for this award. His brother, **Jeremy**, is also an MSYM student. Their father, Monte, is an alumnus of the department.

NIDA

Two students traveled to Grand Island in August for Nebraska's Institutional Development Awards at Networks of Biomedical Research Excellence (INBRE). **Cady Sargus** (BSEN, La Vista) received first place in the oral presentation and **Andie Gilkey** (BSEN, Overland Park, KS) received third place in the poster competition.

GRADUATION

AUGUST GRADUATION

MECHANIZED SYSTEMS MANAGEMENT

Ben Fitzwater, *(with Distinction)* Beatrice

BIOLOGICAL SYSTEMS ENGINEERING

Michael Classen, Omaha

M.S. IN AGRICULTURAL AND BIOLOGICAL SYSTEMS ENGINEERING

Kim Cluff, Phoenix, AZ
Thesis title: *Quantifying Optical Scattering with Hyperspectral Imaging to Predict Beef Tenderness*

Michael Johnson, Blair
Thesis title: *Optimization of Extrusion Cold Forming: A Study of Equipment Wearing Effects on Throughput*

Ai Pheeng Wee, Klang Selang, Malaysia
Thesis title: *Modeling and Analysis of Cooling of Shell Eggs in Flats*

Ph.D. IN ENGINEERING

Ajay Kumar, Patna, India
Dissertation title: *Biomass Thermochemical Gasification Experimental Studies and Modeling*

DECEMBER GRADUATION

AGRICULTURAL ENGINEERING

Andrew Schumacher, Dalton

BIOLOGICAL SYSTEMS ENGINEERING

Stephanie (Baird) Canny, Salt Lake City, UT *(with Highest Distinction)*
Kathlyn Do, Lincoln
Michaela McBride, Lincoln
Abbey McTaggart, Dubuque, IA
Nathan Stahr, York *(with Distinction)*
Brian Watt, Holdrege

MECHANIZED SYSTEMS MANAGEMENT

Alexander Austin, Wayne
Kyle Brown, Hastings
Brian Dunekacke, Auburn
Dustin Fairley, Fairbury
Sean Gillilan, Hardy
Nathan Kelly, Page
Daniel Malander, Belgrade
Christopher Morrison, Winnebago, IL
Dane Mosel, Neligh
Andrew Olson, Hastings
Michael Peterson, Lincoln
Aspen West, Camden, TN

Ph.D. IN ENGINEERING

Christopher Henry, Lincoln
Dissertation title: *Development of the Mask Scentometer: A Comparison of Ambient Odor Assessment Methods, and Their Application in Ground Truthing Atmospheric Dispersion Models*

Back row, left to right: Curtis Thoene, Robert Brauer, Nate Kelly, Andrew Vogt, David Jobman, Isaac Welborn, Kalby Wehrbein, Adam Maas, Dan Leiser, Patrick Trout, A.J. Wiese Front row, left to right: Scott Barker, Andrew Anderson, Michael McKinney, Cassandra Wehling, Stacey Joy, Thao Nguyen, Justin Vonasek

Ice Cream and Scholarships 2009-2010

Another glorious day dawned for the annual ice cream social and scholarship recognition event held in the Maxwell Arboretum. Scholarships were awarded to students in all three academic majors, totaling $47,309.

The following graduate students were recognized at the annual Distinguished Fellowship Award luncheon in September.

Widaman Trust Distinguished Graduate Assistant

Adam Flaugh
(Roger Hoy, advisor)

Denis Mutiibwa
(Suat Irmak, advisor)

John and Louise Skala Fellowship

Pratik Bhandari
(Milford Hanna, advisor)

Milton E. Mohr Fellowship

Isa Kabenge
(Suat Irmak, advisor)

Pengfei Song
(Greg Bashford, advisor)

Tiantian Xu
(Greg Bashford advisor)

AGP Biological Systems Engineering Student
Wes Cammack
Kristine Seier

Case New Holland
Brady Folck
David Jobman

Central Plains Irrigation
Andrew Volkmer

Glen D. Chambers
Scott Barker
Ross Lawrence

John Deere Mentor
Adam Maas
Grant Melotz
Kalby Wehrbein

Paul E. and Mary Beth Fischbach
Robert Brauer
Andrew Anderson

Glenn J. and Maria L. Hoffman
Nguyen Nguyen

Mr. and Mrs. W. F. Hoppe
Daniel Malander

Lloyd W. and Margaret V. Hurlbut
Tanner Case
Ryan Hillen

Fred R. Nohavec
Andrew Vogt

Warren P. Person Memorial
Andrew Volkmer

George Milo Petersen
Andrew Landgraf

Edgar Rogers Memorial
Mark Spangler
A.J. Weise

Leonard Schoenleber
Max Twedt

Dr. and Mrs. William E. Splinter
Alexandra Brown

John Sulek Memorial
Craig Brester

Elenore Gakemeier Swarts
Stephanie Canny
Stacey Joy
Daniel Menter
Allison Mettler
Cassandra Wehling

LeRoy W. and Jean E. Thom
Wes Cammack
Rebecca Dornbierer
Adam Emanuel
Daniel Leiser
Adam Maas
Curtis Thoene
Zachary Tietz
Justin Vonasek
Isaac Welborn

Tom Thompson Memorial
Jeremy Schreiber

Wayne E. and Virginia R. Thurman
Marcus Kuhl
Michael McKinney
Danielle Smith

Ken Von Bargen Student Support
Michael Rennau

Ivan D. Wood Memorial
Nathan Kelly
Patrick Moser
Patrick Trout

Left to right: Patrick Moser, Adam Emanuel, Kristine Seier, Stephanie Canny, Dan Malander

Left to right: Brady Folck, Ryan Hillen, Daniel Menter, Ross Lawrence

"It's good to know someone is investing in future youth."

"The scholarships I've received have continued to help me push for academic excellence."

"Without scholarships from the BSE department, I may not have been able to afford college."

"Because of the scholarships I have received, I was able to attend a college out of state, thus broadening my opportunities to find the best education."

In their own words, our students have said how donations to department scholarships are making an impact. (See some of the established scholarships that benefit our students on page 11.) All contributions are welcome; consider giving to one of those funds, or establishing a new fund.

Contact: Ann Bruntz, (CASNR/MSYM)
402-458-1176
abruntz@nufoundation.org
OR
Karen Moellering (COE, AGEN/BSEN)
402-458-1179
kmoellering@nufoundation.org

2010 Spring Banquet

Annual Awards
Recognition
Senior Design
Project Exhibits
BSE 2010 Hall of Fame

Plan now to attend
Friday, April 23, 2010

Alumni
Parents
Students
Faculty
Staff

Make reservations by April 16
Contact: Eileen Curtis
Biological Systems Engineering Department
200 CHA University of Nebraska-Lincoln
Lincoln, Nebraska 68583-0726
Phone: 402-472-3905
ecurtis1@unl.edu

It's Big

If you live in California, we invite you to come to the World Ag Expo in Tulare, from Feb. 9-11. We'll be in Pavilion C, representing UNL, The College of Engineering, and CASNR, the College of Agricultural Sciences and Natural Resources.

WORLD AG EXPO 2010 FEBRUARY 9-11

Meet our Department representatives at the Big Red Road Show:
February 7, Omaha, NE
March 20, Mitchell, NE

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ENGINEERING DEPARTMENT
223 L. W. Chase Hall
Lincoln, NE 68583-0726

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