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**DEPARTMENT OF BIOLOGICAL SYSTEMS ENGINEERING
NEWSLETTER, Issue 2, November 2006**

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DEPARTMENT OF BIOLOGICAL SYSTEMS ENGINEERING

ISSUE 2

NEWSLETTER OF ACHIEVEMENT

NOVEMBER 2006

Visiting Scholar



Dr. Abbas Hemmat is visiting from Isfahan University of Technology for nine months. In his home department of Agricultural Machinery Engineering, his research focuses on tillage and planting systems for irrigated and dryland crop production, and on site-

specific tillage. He is working with Dr. Slava Adamchuk developing a tillage implement to break through the hard pan formed from repeated plowing. A plow pan can impede crop root development and the depth of the plow pan might not be uniform throughout the field, making it difficult and labor intensive to identify and break. A tool that can adjust to the varying depths of a pan would reduce energy, ensure that the pan is broken throughout the field, and allow a farmer to make adjustments on the go. In his research, Dr. Hemmat is working to accurately locate the depth of the pan using a mechanical soil strength sensor.

He received his B.S. degree in Agricultural Engineering from Tabriz University in Tabriz, Iran, his M.S. degree at the University of California-Davis, and his Ph.D. from Cranfield University in England. We welcome Dr. Hemmat and his family to Nebraska.

Big changes in the BSE Computer Lab



Dr. Adamchuk demonstrates precision agriculture software in the new computer lab configuration.

Next time you are in Lincoln for a visit, stop by and take a peek at the new lab/classroom in room 114. You will find that we have upgraded the computers and monitors, and rearranged the desks to create a new state-of-the-art teaching facility. The new setup is composed of 23 Dual Core Pentium D 3.0-GHz machines, each with one gigabyte of memory and a 17" LCD monitor. Students now have an improved hands-on-experience with great software titles like LabVIEW 8, Mathcad 13, Solidworks/Cosmos 2006, Matlab 2006, Autocad 2007, Office 2003, ArcGIS 9.1, Manifold 7, and high-speed access to the internet. We have also added a new ceiling-mounted projector, a screen, and an instructor's podium so that faculty can lead classes in software instruction. This effort is part of the Department's continuing plan to bring the latest computing technology to our students.

For your calendar:

Plan Now
Annual
Spring Banquet
Awards Recognition
Friday,
April 20, 2007

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UNIVERSITY OF
Nebraska
Lincoln

From the Department Head



Ron Yoder

In this issue of the Newsletter we bring you up to date on happenings in the Biological Systems Engineering Department, and inform you about some of our research and extension activities related to water. In future issues we will highlight other emphasis areas. We also say good-bye to graduating students and Dr. Leonard Bashford, and hello to incoming students and Dr. Roger Hoy, the new Director of the Nebraska Tractor Test Lab. On August 31, 2006, Dr. Leonard Bashford retired after more than 30 years as a faculty member at the University of Nebraska – he will be missed in the Department.

Over the past year we saw the graduation of eight Agricultural Engineering students, 16 Biological Systems Engineering students, and 18 Mechanized Systems Management students who received their bachelor's degrees; five students received their master's degrees, and two students received their doctoral degrees. Our current undergraduate enrollment is 34 students in Agricultural Engineering (down 8%), 110 in Biological Systems Engineering (up 18%), and 73 in Mechanized Systems Management (up 7%). Maintaining strong enrollment in each program is very important to us, and we would like to solicit your continuing help in recruiting students to our programs.

Ron Yoder
Department Head

National Science Foundation Initiative Moving to Transform Water and Environment Research

By Wayne Woldt

As population increases, water resources become stressed and environmental problems become tougher to solve. Multiple stressors often threaten a geographic region across many levels. Agricultural production and community activities all affect the environment and water resources of Nebraska, and each of these stressors operates on different temporal and spatial scales. Mitigating one problem requires understanding how it relates to others, and engineers must consider social and economic impacts, not just environmental issues, when determining best solutions to water and environmental problems. Other environmental and water resources issues such as drought can span massive geographic regions, with potentially devastating effects on the economy, the environment, and numerous ecosystems. To understand and tackle the problems—and to mitigate damage from future events—scientists and engineers need integrated, real-time data and sophisticated simulation models for catchments, streams, watersheds, aquifers, communities, and cities throughout a given region.

I am involved in a National Science Foundation (NSF) initiative termed the Collaborative Large-scale Engineering Analysis Network for Environmental Research (CLEANER) program with a focus on expanding the toolbox of environmental engineering beyond the laboratory or single, small-field sites in order to solve complex modern water and environment problems. Solutions require collecting and integrating massive amounts of data and the input of sociologists, educators, industry, policy makers, and the general public, in addition to engineers. Modern problems require modern approaches and technology to solve them.

I have been working with the CLEANER Cyberinfrastructure Committee for the past year, and am currently Chair of the newly formed Modeling Committee.

These two committees, along with others, have been tasked by the CLEANER Project Office to form the vision for the CLEANER network initiative. The network is envisioned to include distributed sensor networks, high bandwidth communication systems using the internet as a backbone, high performance computing systems, and extreme simulation and visualization environments. Ultimately, this network will enable scientists to better understand natural and human-stressed water environment systems across multiple space and time scales, and to improve management strategies over time as new data are received—fundamentally transforming the field of environmental and water resources engineering.

By July 2007, the CLEANER Project Office, in coordination with the Consortium of Universities for Advancement of Hydrologic Science, Inc. (CUAHSI), will produce a water environment engineering and science plan that defines the key scientific questions that CLEANER will focus on: an overall network design that includes research and education plans, timelines, milestones, and the scope of facilities, resources, and required research. To accomplish this feat, the Project Office has formed committees on cyberinfrastructure, education, environmental engineering and science, organization, sensors, social science and economics, and simulation modeling. Ultimately, the plan will lay the foundation for a new, “big science and engineering infrastructure,” that will transform the way water and environmental research and education are conducted, and will prove joint CLEANER-Hydrologic Observatories worthy of Major Research Equipment and Facilities Construction (MREFC) funding in 2011.

The Department of Biological Systems Engineering is pleased to be involved in this exciting NSF initiative, and helping to shape the future for a transformation of water and environmental research and education at the national scale. For more information on the project, please visit: cleaner.ncsa.uiuc.edu.

Biological Systems Engineering Newsletter

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Gail Ogden Editorial Coordinator
Sheila Smith Graphics and Design
Contributors Wayne Woldt, Dean Eisenhauer,
..... Eileen Curtis, Bruce Dvorak, Suat
..... Irmak, Garret Coffman, Bart Coffman

ASABE Awards

The annual meeting of the American Society of Agricultural and Biological Engineers (ASABE), held in Portland, Oregon, in July of this year, was an opportunity for Society members to share news and ideas. Several of our faculty received recognition for their research and service this year.

John Nienaber, adjunct professor and agricultural engineer and Research Leader, USDA/Agricultural Research Service at the U.S. Meat Animal Research Center, was elected as an ASABE Fellow.

Rick Koelsch was recognized for developing standards in Manure Production and Characteristics. Rick also received an ASABE Presidential Citation for his work on the standard.

Roger Hoy and Dale Heermann also received Presidential Citations. Dale, a department alumnus, was recently inducted into the department Hall of Fame (See story on page 7). Roger Hoy is the new Director of the Nebraska Tractor Test Laboratory.

Superior Paper

Alejandro Amézquita, Lijun Wang, and Curtis Weller
Finite Element Modeling and Experimental Validation of Cooling Rates of Large Ready-to-Eat Meat Products in Small Meat-Processing Facilities

Publications: Factsheet

Blue Ribbon Winner **Suat Irmak, Jose Payero, and Derrel Martin**

Using Modified Atmometers (ET gage) for Irrigation Management (NebGuide)

Publications: Bulletins

Blue Ribbon Winner **Jill Heemstra, Rick Koelsch, John Lawrence, Mark Risse, Tommy Bass, Jamie Benning**
Agricultural Environment Management Systems

Publications: Manuals or Workbooks

LaVerne Stetson (BSE emeritus), Bill Koenig, Kathy Walker, Jack Moore, Letitia Wetterauer, Susan Lucke, Kris Wilson—MidWest Plan Service (MWPS)
Wiring Handbook for Rural Facilities

Honorable Mention Paper Awards

Ayse Irmak, J.W. Jones, and S.S. Jagtap
Evaluation of the CROPGRO-Soybean Model for Assessing Climate Impacts on Regional Soybean Yields

D.L. Reinemann, **LaVerne Stetson**, N.E. Laughlin, S.D. LeMire
Water, Feed, and Milk Production Response to Dairy Cattle Exposed to Transient Currents

Nebraska Tractor Test Lab Welcomes New Director

Daniel Moser, IANR News Service



Roger Hoy

The University of Nebraska–Lincoln's internationally known Nebraska Tractor Test Lab has a new director. Roger M. Hoy, a former staff engineer with the John Deere Product Engineering Center in Waterloo, Iowa, assumed leadership of the lab on September 1. Hoy replaced Leonard Bashford, who retired.

“We are pleased that UNL successfully attracted an individual with Dr. Hoy’s experience to fill the director position. In recent years, Dr. Bashford has broadened the areas of testing by the lab—for example, testing construction equipment and alternative fuels—and we know that Roger will continue to strengthen the testing and research that is done at the lab,” said department head Dr. Ron Yoder. He noted that Hoy is involved in organizations such as the American Society of Agricultural and Biological Engineers and the International Organization for Standardization. He’s also recognized internationally as an expert in roll-over protection structures and has broad experience as a project manager.

“He has an excellent background to take on the challenges of directing the Nebraska Tractor Test Lab,” Yoder said. “The lab works closely with students with an interest in machine design and testing and Roger’s expertise and experience will be an asset for classroom instruction and for advising student research or design projects. We are certain this hire will continue to foster the strong relationship that has developed between the Nebraska Tractor Test Lab and our industry partners,” Yoder added.

Hoy had been with John Deere since 1999. He also spent four years as manager of product development at Hennessy Industries Inc. and four years as development manager at Jacobs Vehicle Equipment Co. Hoy earned a bachelor’s degree in agricultural engineering from the University of Georgia and his master’s and doctorate degrees in agricultural engineering from North Carolina State University.

Hoy began working part-time at the lab this summer, and joined the university full-time this fall. In addition to serving as the lab’s director, Hoy also will conduct research, work on standards development, and teach and mentor students.

The Nebraska Tractor Test Lab was founded in 1920, spurred by state legislation that required any tractor sold in Nebraska to be tested to make sure it met its maker’s claims. The lab’s importance grew as tractors made in other countries also began to be tested here. In the 1980s, the lab became an official testing station for the Paris-based international Organization for Economic Cooperation and Development (OECD), increasing the lab’s prominence. This spring, the lab distributed performance reports for 84 tractor models — 23 of them tested at UNL during 2005, with the others tested at other OECD stations. Visit the Nebraska Tractor Test Lab website: tractortestlab.unl.edu/

Alumni News

1970s

Cezar de Mello Mesquita (1978, M.S., AGEN; 1989, Ph.D., AGEN) received the Frederico de Menezes Veiga Award in 2006, the most prestigious award for agricultural research from Embrapa in Brazil. The award recognized his scientific and technological work in designing a small- to medium-sized innovative row harvest machine that can be attached to a tractor. The modular characteristic of the equipment also allows it to be configured as a multi-row, self-propelled harvester to attend bigger areas.



Cezar and his wife Sonia were joined by their three sons and daughter-in-law at the ceremony.

This equipment harvests soybeans, dry edible beans, rice, wheat, and other grains with less breakage and invisible mechanical damage, and with significant reduction in material other than grain. It's socio-economic potential will benefit smaller agricultural operations worldwide, and it should be ready for market sometime in 2007. Cezar has also been a visiting scholar in the department and is recently retired from Embrapa.

1980s

Paul Hottovy (1984, B.S., MSYM) lives in Lincoln and is a District Business Manager for New Holland Construction Equipment, a division of Case New Holland. He provides business management and product sales direction to 28 New Holland Construction dealerships in Nebraska, Kansas, Iowa, and Colorado. Paul also recently participated in a panel to share ideas about the scope and future of the MSYM program.

Randy Carlson (1985, B.S., AGEN) is a Senior Manufacturing Quality Engineer with Borg Warner Turbo in the Emissions division. He has also worked in mass production automation development and processing for other automotive companies, such as Ford. Some of his department memories are of working on the beginnings of the Lester Larsen Tractor Test Museum and of welding equipment in the machine shop. A bit too far away to make football games or play for the band on Alumni day, Randy lives in Dixon, Illinois.

Kevin Power (1987, B.S., AGEN) owns KPE Consulting Engineers, Inc., in Bellevue, Nebraska. In 2005 the company received the MidAmerican Energy's Energy Design Project Team Award, and the 2006 Bellevue Chamber of Commerce Business of the Year Award.

1990s

Garret Perrin (1998, B.S., BSEN) is a Special Agent for the FBI on the east coast.

2000s

Priya Nataraj (2001, B.S., BSEN) works for Stratatech Corporation, a small, but growing, biotech company in Madison, Wisconsin. The company is working with engineering skin tissue for skin grafting purposes. She is involved in R & D for the process and in production to validate the engineering. The company is currently beginning phase I in clinical trials.

Easton Eggers (2003, B.S., MSYM) is employed with Golden Harvest as a District Sales Manager. He is based in Wayne, Nebraska. He was honored to be chosen for the Circle of Excellence in his first year, one of only six selected in the Western corn belt. Members of the Circle of Excellence help management make decisions for the upcoming year. Easton also participated in a panel to share ideas about the scope and future of the MSYM program.

Melissa Halverson (2004, B.S., BSEN; 2006, M.S., BSEN) received her master's in environmental engineering this summer, and is now working for Burns & McDonnell in Denver, Colorado.

Send your alumni updates via the web:
bse.unl.edu/contact/Alumni%20contact.htm



August Graduation

We bid farewell to the following students and wish them all the best now that they have graduated and are either continuing their education, or beginning a new career.

Agricultural Engineering

Brandon Wyant (Kearney, NE)

Biological Systems Engineering

Oluwatosin Adekoya (Lagos, Nigeria)

Christopher Artz (Hastings, NE)

Graduate Students

Ashish Maheshwari, M.S. Agricultural and Biological Systems Engineering, Industrial and Management Systems Engineering

Corey Searle, M.S. Mechanized Systems Management. Thesis: Field Slope Effects on Uniformity of Corn Seed Spacing for Three Precision Planter Metering Systems

Christopher Hay, Ph.D. Engineering. Dissertation: Fish and Invertebrate Abundance in Relation to Abiotic Factors in the Missouri River

College of Agricultural Sciences and Natural Resources Alumni Association (CASNRAA)

Joining CASNRAA for \$20 per year entitles you to receive the fall and spring issues of Class Acts and The Sower—publications providing current information about the College and our Alums. You will be invited to our annual Football Reunion and receive the quarterly Online Sower. To obtain a free brochure about CASNRAA, contact Paul Horton, 103 Ag Hall, Lincoln, NE 68583-0702; or, email phorton2@unl.edu.

Hydrologic Studies in Prairie and Agricultural Watersheds

Gleanings from a Faculty Development Leave

by Dean E. Eisenhauer

I participated in a Faculty Development Leave at the Biological and Agricultural Engineering Department at Kansas State University from January through June 2006. My faculty hosts included Drs. James Koelliker and Phil Barnes. While at K-State I worked on two research projects dealing with the hydrology of prairie and agricultural watersheds. One theme of my work was that by observing the hydrology of prairie ecosystems we can learn more about how to achieve water resources sustainability. K-State afforded a great opportunity for this because only 10 miles south of Manhattan is the Konza Prairie Biological Station, an 8,600-acre tallgrass prairie located in the Kansas Flint Hills. Konza Prairie Biological Station is owned by The Nature Conservancy and Kansas State University and operated as a field research station by the K-State Division of Biology. The station is dedicated to a three-fold mission of long-term ecological research, education, and prairie conservation. It is a unique outdoor laboratory that provides opportunities for the study of tallgrass prairie ecosystems. Dr. Koelliker has been conducting hydrologic research at this site for more than 20 years. My goal was to learn more about the hydrology of this prairie system and contrast the hydrology to that of the Nebraska Sand Hills.



Konza Prairie



Brian Twombly (undergraduate BSEN) and Shannon Rose Bates (undergraduate AGEN) assisted Dr. Eisenhauer with research in the Republican River Basin in Kansas. They used this Cornell infiltrometer to simulate rainfall and measure water infiltration.

The ground and surface water resources in many parts of Kansas and Nebraska have been highly developed, especially for agricultural irrigation. Ground water and stream flow depletion in localized areas of these states suggests that the current level of development is not sustainable in these areas given the prevailing agricultural water management practices. Essentially all ground water and stream flow depletion occurs in agricultural crop producing areas. Interestingly, there are also localized areas in Nebraska where water resources depletion is not evident, even where irrigation development is very intense. Why is that? Why do some regions show depletions and others do not? Undoubtedly the answer lies in the relationship between evapotranspiration (water use) of vegetated surfaces and local precipitation, and how this relationship compares to a sustainable system. The hypothesis of my research was that natural ecosystems, which are inherently in balance with the available water resources and thus are sustainable (assuming of course that the climate does not change), could serve as models for water resources management in managed ecosystems. Table 1 shows a summary of the hydrology of the two prairie systems that I studied.

By learning more about how water is partitioned at the earth's surface in natural ecosystems of an area, we can better understand how to create a sustainable agroecosystem in the same region.

The second research project that I worked on during my leave dealt with the agricultural hydrology in the Republican River Basin of Colorado, Kansas, and Nebraska. I am currently cooperating with Drs. Derrel Martin and Ayse Irmak at UNL and Drs. James Koelliker and Phil Barnes at K-State on a project that pertains to the impact of agricultural water conservation practices on stream flow in the Republican River in Nebraska and Kansas. The U.S. Bureau of Reclamation is funding the five-year project. During my leave I coordinated the establishment of five field research sites, two in northwest Kansas and three in southwest Nebraska. Four of the sites are on farmer-owned land and one site is at the Kansas State Research and Development Center at Colby, Kansas. At these sites we installed instrumentation needed to monitor precipitation, runoff, evapotranspiration, soil water content, and percolation. In addition, we measured the infiltration characteristics at each site and obtained soil cores to a depth of 25 feet at each site to quantify water

movement below crop root zones. All sites are terraced and are in dryland eco-fallow crop production. The data from these sites will help us determine how local precipitation is partitioned into evapotranspiration and streamflow in these dryland agroecosystems.

The projects that I worked on during this leave will lead to future collaborative research on how to manage water for sustainability while using this valuable resource for food production. K-State was the right place for this Faculty Development Leave because of the Konza Prairie site and because of our joint project in the Republican River Basin.

Table 1. Hydrology of Two Prairie Ecosystems

	Kansas Flint Hills Konza Prairie, Manhattan, Kansas	Nebraska Sand Hills Dismal River, Thedford, Nebraska
Annual Precipitation (in.)	32.9	20.9
Annual Water Yield (Stream Flow) (in.)	7.7	2.9
Percent of Stream Flow from Ground Water (Baseflow)	54	98
Actual Annual Evapotranspiration (in.)	25.2	18.0

Irrigation and Energy Conservation Field Day

By Suat Irmak

The Field Day was held on September 6, 2006, at the UNL ARDC-Mead. The main theme of the Field Day was to transfer information to participants on irrigation water and energy conservation strategies. The program was organized by Keith Glewen, Extension Educator in Saunders County, in coordination with the BSE Irrigation Specialists and The Nebraska Corn Board.

There were four break-out sessions, 80 minutes each, that participants were able to attend:

1. Demonstration of soil water measurement technologies – Suat Irmak
2. Evapotranspiration measurements – Derrel Martin
3. Furrow irrigation management – Dean Yonts
4. Sprinkler package selection: Above and In-Canopy Demonstration – Bill Kranz

Participants were exposed to learning newer technologies and/or strategies that could help them in their farm management practices to save water and reduce energy costs to maximize their net return.

A total of 80 people participated in the program. This table shows the background of the participants who filled out questionnaires.

	#	%
Farmer	28	48%
Independent Crop Consultant	10	17%
Agribusiness Representative	16	28%
Public Agency Representative	2	3%
Other	2	3%

All participants provided very good feedback about the program. More than 50% of the participants stated that they plan to improve their management based on knowledge and/or skills learned in the sessions. More than 25% of the participants expressed that they will definitely plan to improve their management practices and adopt some of the new technologies they learned from the program.

This program was one of the many series of programs that have been conducted in the state. Winter programs will be conducted to transfer information to users about how to make crop production more profitable, and similar topics will be covered.

P3–Ten Years

Many businesses do not have the time or resources to learn about the most current technologies available to help them minimize waste. This is a niche that the UNL Partners in Pollution Prevention (P3) internship program has filled for the past ten years. Student interns offer technical assistance to small- to medium-sized businesses by conducting assessments of waste streams and then developing suggestions to minimize waste generation and to make operations more sustainable. The P3 program is sponsored by UNL Extension, the UNL College of Engineering, the Nebraska Department of Environmental Quality, and the U.S. Environmental Protection Agency.

From 1997–2006, 134 P3 interns have helped 377 businesses save over \$14.8 million through waste reduction and conservation of energy and resources. To celebrate this success, a 10th anniversary luncheon was held on August 8 in the Nebraska East Campus Union. Chet McLaughlin of the U.S. EPA Region 7 office gave the keynote address on “Sustainability: Power for the Future.”



Summer interns and staff for P3 in 2006

“When this program was started in 1997, I did not imagine that it would be this popular with students, and successful at providing benefits for business,” said Bruce Dvorak, associate professor of Civil Engineering and Biological Systems Engineering. “It is front-end environmentalism because it attacks the causes of pollution problems before they are a problem,” he said.

An average of 15 interns from five engineering majors from colleges/universities in Nebraska, Iowa, Kansas, and Missouri participate in the statewide program each summer. Interns complete two weeks of training before spending nine weeks providing assistance to clients. During the summer of 2006, 15 students fanned out across Nebraska and worked in Kearney, Columbus, Lincoln, Omaha, Central City, York, and other towns near Lincoln.

The P3 program has no full-time technical staff, but relies on graduate students, part-time staff, and faculty to assist clients in developing projects, and on student interns to deliver assistance. For more information about the UNL P3 program: www.p3.unl.edu/index.shtml.

Hall of Fame

Born and raised in Scribner, Nebraska, Dale Heermann received his B.S. in agricultural engineering at UNL during which time he was also a student trainee with USDA ARS. After graduating, he served in the U.S. Air Force from 1959–1962 and earned the rank of First Lieutenant. After his military service, Dale moved to Fort Collins, Colorado, and began graduate study in agricultural engineering at Colorado State University, where he received both a masters (1964) and a doctorate (1968). After graduation, he joined the USDA ARS in Ft. Collins, and became Research Leader of the Water Management Unit in 1981.

As a leader in promoting improved irrigation management throughout the U.S. and the world, some of his notable work includes deriving the mathematical formulas to describe the hydraulics of center pivot irrigation systems, and development of a computer program for center pivot evaluation and design that was incorporated into the USDA NRCS national toolbox. The methodology he derived for computing the uniformity of irrigation by center pivots was incorporated into both U.S. and International Standards. In 1969, he pioneered computer irrigation scheduling technology for center pivots based on local weather data and irrigation application depth. In 1980, Dale led a team that integrated irrigation scheduling technology into computerized controls for center pivots, and worked closely with industry to successfully transfer that technology to the marketplace. Over the



Dale Heermann

past decade, he has led an interdisciplinary team of ARS engineers, CSU scientists, and industry cooperators in a major project to integrate water, weed, pest, fertility, and economic sciences with state-of-the-art technology to assist farmers with interpreting spatial crop yield maps and to write prescriptions for site specific farming using moving sprinkler irrigation systems.

A recognized international authority on center pivot irrigation and precision farming, he has been an invited advisor in Saudi Arabia, England, The Netherlands, Israel, Portugal, Belgium, China, and Chile. Dale has published more than 150 technical papers and made more than 100 technical presentations at national and international meetings. He is a member of four national academic honorary societies, and has also been recognized as: Irrigation Association's Man of the Year in 1985; Alumnus of the Year in 1988 from CSU's College of Engineering; the John Deere Gold Medal recipient in 1990 and election as a Society Fellow in 1991, both from ASABE, and as team leader by the U.S. Department of Energy in 1994 with the national Water and Energy Conservation Award. In 1996, Dale received the Native Son award from his hometown. The U.S. Secretary of Agriculture presented him with the Secretary's Superior Service Award in 2002. Dale also served on a National Academy of Science panel that developed the report, Future of Irrigation in the Face of Competing Demands and Water Quality Constraints. He retired from USDA ARS in May 2005.

We welcome visitors to view the Biological Systems Engineering Hall of Fame
Foyer of
L. W. Chase Hall
East Campus
University of Nebraska–Lincoln

Vegetative Treatment Systems Help Small Livestock Producers Control Animal Waste

Kalee Olson
IANR News Service

The University of Nebraska-Lincoln Extension Livestock Producer Environmental Assistance Project continues to help small livestock producers make their operations more environmentally friendly.

With its second tour in six years, the project promoted methods to minimize the impact of livestock manure on the environment, said **Chris Henry**, UNL Biological Systems Engineer. “Vegetative treatment systems are excellent solutions for small- to medium-sized open lot livestock feeding operations. They are composed of a solids settling basin, an outlet structure, and a vegetative treatment area. The treatment area replaces the need for a conventional holding pond typically used in feedlots.”

About 85 participants from six states attended a day-long tour to learn more about the benefits of vegetative treatment systems for small livestock operations. Participants visited five sites across southeastern Nebraska and discussed system designs and how producers hope to contribute to a cleaner environment in the future.

UNL Extension’s Livestock Producer Environmental Assistance Project, a group formed to promote alternative methods of minimizing the impact of livestock on the environment, developed the tour to inform participants about vegetative treatment systems and the environmental challenges small producers face. “The projects we design and build are examples for producers, regulators, and technical service providers to evaluate and learn from. Many of our solutions are contrary to traditional thinking and practice for run-off control,” said Henry.

“A vegetative treatment system is a multi-step system used to control livestock waste

run-off,” Henry said. The system collects the run-off and separates solids from liquids. The liquids are stored in the root zone of the vegetation until the plants in the treatment area can use the nutrients. Because the producer can control the timing of release, either by a pump or a valve, run-off entering the treatment area is evenly distributed, and little or no run-off should leave the treatment system and pollute streams or groundwater. “Regardless of environmental impacts, vegetative treatment systems are appealing to producers for other reasons as well,” Henry said. “Although producers are responsible for the labor involved, management is relatively simple and loss of productive land is minimized because hay can be harvested from the treatment area,” he said.

“A vegetative treatment system is a multi-step system used to control livestock waste run-off”

Between the vegetative treatment system site stops, presentations were given by representatives from partner organizations including the Nebraska Department of Environmental Quality,

Nebraska Environmental Trust, Kansas State University, Natural Resources Conservation Service, and the U.S. Department of Agriculture, Agricultural Research Service. The presentations provided participants with updates from individual organizations and related research, as well as background on other vegetative treatment systems not visited on the tour. The project and tour were sponsored through a grant from the Nebraska Environmental Trust. The trust is funded by proceeds from the Nebraska Lottery and private donations, and has awarded more than \$100 million to conservation projects in Nebraska since 1994. Read more about Vegetative Treatment Systems: afo.unl.edu/lpeapj/pages/index.jsp



Leadership Education

Bit-by-bit and class-by-class, extension project manager **Jan Hygnstrom** worked on continuing her education. Her perseverance paid off this past May when she received a master’s degree in Leadership Education, with a specialization in distance education.

Future Engineers?

Viacheslav and **Kateryna Adamchuk** are the proud parents of **Petro Viacheslavovych**, their son, born in June.

Alan Boldt and **Carla McCullough** welcomed their daughter **Kathryn**, born in July.

Rick and **Amy Stowell** welcomed their second son, **Grant**, in August.

Tami Brown-Brandl (U.S. Meat Animal Research Center in Clay Center) and her husband, **Marcus**, welcomed **Thomas Michael** (their third son), who was born in October.



Congratulations to each of these families.

UNL Service Awards

Years of service to the University were acknowledged at the annual State of the University function in September.

30 years

Gary DeBerg
 Rene Gellatly
 Leonita Masek

15 years

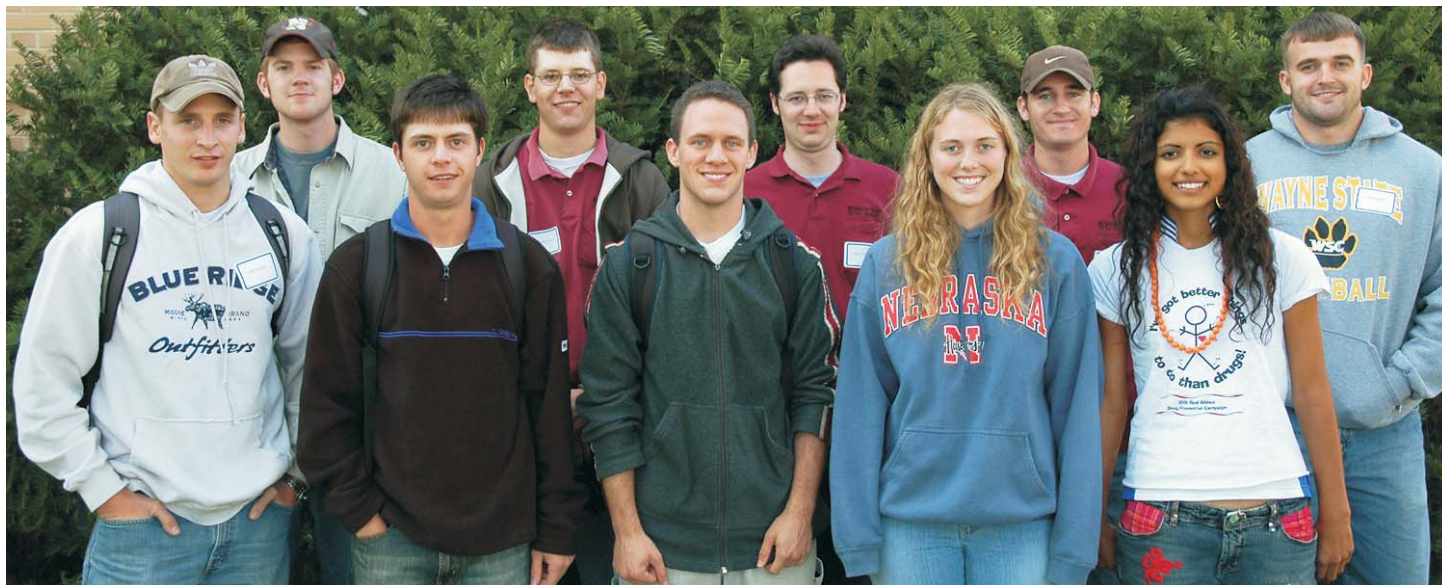
Wayne Woldt

5 years

Garret Coffman
 Monte Shomaker
 Richard Stowell
 Yiqi Yang

25 years

Paul Jasa



Back row, left to right: Jon Niebuhr, Tim Mattson, Bart Coffman, Tyler Saatman, Jake Marotz. Front row, left to right: Colby Gardine, Brad Salter; Brian Twombly, Bethany Barber, Paige Mathew.

Ice Cream Social & Scholarship Recognition

On a bright crisp Tuesday afternoon, September 19, four days before the official beginning of fall, the annual ice cream social and scholarship recognition was held on the front lawn of L. W. Chase Hall. Distinguished scoopers included NU Vice President and IANR Harlan Vice Chancellor John Owens, Associate Vice Chancellor Susan Fritz, and Associate Dean of the Agricultural Research Division, Z B Mayo. Receiving scholarships through the department were:



Vice Chancellor John Owens, faculty member Jeyam Subbiah, and Associate Vice Chancellor Susan Fritz served up ice cream.

CASE NEW HOLLAND

Bart Coffman
Jonathan Hazen
Jonathan Niebuhr
Tyler Saatmann

PAUL E. AND MARY BETH FISCHBACH AND FAMILY

DelShawn Brown
Kimberly Grieb

MR. AND MRS. W. F. HOPPE, SR. MEMORIAL

Craig Brester

LLOYD W. AND MARGARET V. HURLBUT MEMORIAL

Paige Mathew
Allison Smith

LESLIE AND HARRIET JOCHENS

Whitney Brown
Lisa Karel
Michaela McBride
Jonathan Sallach

JOHN DEERE MENTOR

Ryan Brott
Steven Fleer
Michael Hauger

FRED R. NOHAVEC

Violetta Balayan

WARREN P. PERSON MEMORIAL

Grant Janousek

GEORGE MILO PETERSEN

Ross Miller
Dane Mosel

EDGAR ROGERS MEMORIAL

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Jordan Carlson

LEONARD G. SCHOENLEBER

Crystal Bryan

WILLIAM E. AND ELEANOR L. SPLINTER

Bethany Barber
Kelsey Nordhues

JOHN SULEK MEMORIAL

Tyler Ruf

ELENORE GAKEMEIER SWARTS DISTINGUISHED SCHOLARSHIP

Robert Corn
Megan Krause
Erica Levorson

LEROY W. AND JEAN E. THOM

Shannon Bates
Clayton Bramble
Joshua Dodson
Luke Freeouf
Landon Heinrichs
Joseph Holoubek
Jamison Kaliff
Isaiah LaRue
Weldon (Jake) Marotz
Benjamin Robison
Brian Twombly

TOM THOMPSON MEMORIAL

Michael Bierle

WAYNE E. AND VIRGINIA R. THURMAN

Benjamin Carlson
Shannon Killion
Issac Mortensen
Bradley Salber

KEN VON BARGEN

Colby Gardine
Kurt Petersen

IVAN D. WOOD MEMORIAL

Adam Flaugh
Austin Merz
Kyle Wollenburg

Student News

Two of our students received Husker Harvest Days agriculture scholarships from the Nebraska Farmer and the Grand Island based Agriculture Institute of Nebraska. Congratulations to **Michael Rennau** (MSYM, Wood River) and **Justin Vonasek** (AGEN, Holdrege).

Kurt Peterson, an MSYM student from Burwell, Nebraska, received a scholarship from the Meat Industry Suppliers Alliance. The scholarship was awarded based on an interest in the meat processing industry. Kurt has found his classes in MSYM applicable to this field.

The Distinguished Fellowship Award Luncheon, hosted by the Agricultural Research Division, CASNR, and IANR, recognizes graduate students for their research and scholarship. **Kara Niemeir** received the Widaman Trust Distinguished Graduate Assistant Award. **Ajay Kumar**, **Heartwin Pushpadass**, and **Govindarajan Suresh Babu** each received a John and Louise Skala Fellowship

Brian Watt and **Martin Gakuria**, both Biological Systems Engineering majors, are editing the hard copy and online versions of *Blueprint Weekly*, the College of Engineering newsletter for students.

The UCARE Program provides students opportunities to assist faculty in a variety of research projects. This fall, the following students from our department are participating.

Brian Twombly

Hydrologic Effects of Conservation Systems on Groundwater Recharge and Deep Percolation
Faculty sponsor: Dean Eisenhauer

Prakash Chapain

Hyperspectral Imaging of Fractured Teeth
Faculty sponsor: Gregory Bashford

Bart Coffman

Evaluating Performance of Tractor CVT's Under Dynamically Varying Loads
Faculty sponsor: Michael Kocher

Joshua Dodson

Determination of Small-scale Variability of Soil pH Using a Portable Probe
Faculty sponsor: Viacheslav Adamchuk

Isaac Mortensen

Determination of Yolk Contamination in Egg White by Near Infrared Spectroscopy
Faculty sponsor: Jeyamkondan Subbiah

Rachelle Struebing

Effect of Sorghum on the Metabolism of Cholesterol
Faculty sponsor: Curt Weller

Quarter-scale Tractor

By *Bart Coffman*

The ASABE International Quarter-Scale Competition hosts colleges and universities from across the United States and the world. Teams compete in events such as maneuverability, serviceability, manufacturability, safety, and ergonomics, as well as performance pulls. Each team must also create a written design report and a production cost analysis, and present their design in an oral presentation.

The UNL Quarter-Scale Tractor Team traveled to Peoria, Illinois, last June to participate in the 2006 International Quarter-Scale Competition. The team performed well, placing fourth in the overall competition among 29 teams. The team also received third place in the oral report category and second in the Campbell Scientific judging, which rewards the use of testing and data acquisition. The UNL X-Team also performed well, receiving second place on the modifications they made to last year's tractor and returning it to competition.

The 2007 competition rules will be released soon, and the team is looking forward to a new design, and to competing in Illinois again. Participating in the Quarter-Scale Team is a great opportunity for students to gain hands-on, real-world experience applying the engineering principles being learned in their classes. The team is an extracurricular activity for its members, and is funded entirely by donations from individuals and businesses. The Quarter Scale Team greatly appreciates the support that makes its existence possible. For more information, visit the team's website at bse.unl.edu/qtrscale/.



Team members who attended the competition are, from left to right: Chris Junck, Kevin Tacke, Mark Tieszen, Brian Stahlecker, Bart Coffman, Tim Mattson, and Grant Janousek.

Coming and Going



Lincoln native **Ella Carson** is our new Accounting Clerk III. She has one grown son and has worked in accounting for the past 30 years. Ella is attending many training sessions and thanks everyone for their patience as she learns the procedures of the university accounting system. An avid reader, she also enjoys crossword puzzles and collects elephants, Tweety's, and candles.

Belinda Gillam, long time Accounting Clerk III in the department received a promotion as Project Specialist for Sponsored Programs Post-Awards and moved to the Office of Research Management.

Melissa Mathews, a secretary in the IAPC, has moved with her family to Colorado, where her husband has a new job.



Dr. Leonard Bashford retired on August 31. Recognition of his career as Director of the Nebraska Tractor Test Laboratory, and his work with agricultural engineering students over the years, provided many fond memories at the reception held in the East Union. His legacy continues through the many professionals he helped educate. And though retired, don't look for him to be resting on his laurels, or anything else: Leonard and his wife Karen are living on a farm near Seward, Nebraska.



Beth Plants is now secretary for the Industrial Agricultural Products Center (IAPC). A Lincoln native, she attended both Nebraska Wesleyan and Southeast Community College, and focused her studies on Human Services, and minored in American Sign Language. Beth was the office manager for Transfiguration, Inc., and is also currently a part-time employee with Vital Services;

both companies serve individuals with developmental disabilities. She and her husband Justin adore their daughter Winsome.



Tanya Gachovska has a postdoctoral appointment in the department working with Dr. Jeyam Subbiah. Her Ph.D. is in pulsed electric field use in agriculture for accelerated drying process of tobacco leaves from Rousse University in Ruse, Bulgaria. She taught and conducted research for two years at McGill University in Montreal, Canada. Her research focused on pulsed electric field use in food processing for pasteurization, extraction, and

drying.



Nancy Jimenez Gonzalez is a Research Technician in the Industrial Agricultural Products Center lab. She just completed her B.S. in Biology from UNL and has worked on soybean and plant genetics. Nancy has a passion for wildlife biology and enjoys sports and painting.



Left to right: Ron Yoder; Vice Chancellor John Owens; daughter, Jessica Curtis; Chancellor Harvey Perlman; Eileen Curtis; Regent Howard Hawks; and son, Brent Curtis.

University Kudos Award

Eileen Curtis, Department Secretary, received a University Kudos award during the June meeting of the NU Regents. The purpose of Kudos awards, which are presented to non-faculty staff members, is to identify accomplishments and activities worthy of note and give departments the opportunity to recognize and honor exemplary service to the university. Eileen has worked at the university since 1986, and was joined by her son and daughter at the ceremony.

IANR Outstanding Employee

Alan Boldt was recognized as IANR's Outstanding Employee of the Month in September for his consistent quality and service to the department. The first of his two primary departmental responsibilities is to assist with project management of research conducted by our department's soil and water faculty. This includes assisting with planning/organization of the research, assisting graduate students, purchasing or fabricating equipment, installing equipment, data collection, and quality control. His second responsibility is the management and setup of teaching labs, maintaining lab equipment, and overseeing safety concerns in the soil and water laboratory.



Alan is congratulated by Dr. Gary Cunningham, the Dean of the Agricultural Research Division.

We appreciate all who have established endowments, or made contributions to funds that support BSE programs. For information about establishing new endowed funds, or contributing to existing funds, contact Ann Bruntz, NU Foundation, 402-472-0372 or abruntz@foundation.nebraska.edu



The University of Nebraska-Lincoln is an equal opportunity educator and employer with a comprehensive plan for diversity.



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