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Spring 2016



Growing

A HEALTHY FUTURE

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INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES | UNIVERSITY OF NEBRASKA-LINCOLN



Much to Celebrate



Ronnie D. Green

Humbled, honored, privileged, excited, anxious . . . it's hard to pinpoint just one emotion for this next chapter of my life.

Honestly, I still see myself as a southwestern Virginia boy from meager means who just happened to be lucky enough to be first-

generation college educated through a land-grant university. That educational opportunity changed our family's life forever, and I feel blessed to be able to give back in a small way through leadership of the people's University of Nebraska-Lincoln.

It has truly been a pleasure to serve the UNL Institute of Agriculture and Natural Resources as the Harlan Vice Chancellor these past six years. Together we have significantly grown our student population, increased our faculty expertise and impact around the world, expanded our state-wide campus, enhanced our research efforts in significant ways and continued to reach even more families and communities through Nebraska Extension. Collectively, we are growing into a distinguished internationally leading land-grant university. But, as I often remind my family members — to those whom much is given, even more is expected. UNL's success the past several years has been phenomenal, but the challenges of sustainably feeding and clothing the world, while stewarding the environment, still loom very large — with the opportunity to be the world leader ours for the taking.

As I begin this exciting next chapter serving as your Chancellor, I ask for your continued support, confidence, enthusiasm and commitment. We are a fundamentally good and strong university. There is no doubt, however, that our best days are yet to come, as we are poised to grow substantially in the next decade. Through more students graduating earlier, with more degrees, while leading the world in particularly important research and creative activity of importance to Nebraskans — we will become a much brighter global beacon of light with unprecedented levels of excellence in delivering our tri-fold mission.

We are perfectly positioned to be one of the top institutions in the world, but turning that dream into a reality is going to be a team effort. I have been reminded countless times during the past six years how blessed we are to have some of the best stakeholders in the world. We truly couldn't do what we do without your support — and will need it like never before as we take UNL to a new playing field and level of play.

Lastly, I want to tip my hat to Chancellor Harvey Perlman for his 16 years of phenomenal service at the helm of UNL. Harvey has served Nebraska with grit, humor and sheer determination, sprinkled with a few "Perls of Knowledge" along the way. He has been a valued and exceptional mentor, and more importantly, a very dear friend for Jane and all of our family. We owe him our gratitude for leaving the people's University a much different and more impactful place than he found it.

There are simply no words to express how excited I am to work with all of Nebraska and the greater UNL global family to grow our University into a distinctive leader in the BIG 10 conference as we look to 2025. And remember, I am not leaving. I will continue to be the proudest person on the planet for the impact IANR makes every day and your biggest cheerleader.

Huskers, it is time to roll up our sleeves and grow, flourish and thrive. There is indeed no place like NEBRASKA and nowhere else that our family would rather be. Go Big Red!

Ronnie D. Green, Ph.D.
Chancellor-Elect,
University of Nebraska-Lincoln
Vice President, Agriculture and Natural Resources
University of Nebraska
IANR Harlan Vice Chancellor,
University of Nebraska-Lincoln

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GROWING A HEALTHY FUTURE

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DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY LAUNCHES 3+1 PROGRAM WITH CHINESE UNIVERSITY



A

major focus of the IANR Office of Global Engagement is to establish three to four strong, multidimensional institutional partnerships in diverse locations around the world.

students will study in China for three years and come to UNL to study for one year, hence the name 3+1. For the first two years, NWAUFU students are taught primarily by NWAUFU faculty members. During the third year, UNL faculty members will travel to China to teach students. NWAUFU students will travel to UNL in the fourth year of the program to complete their degrees.

“Although the two universities are far away from each other, they have many similarities in regard to discipline, research and university mission,” said Rolando Flores, head of the Department of Food Science and Technology at UNL. “The 3+1 program is a great opportunity for the two universities to develop education and research collaboration.”

The first group of 55 NWAUFU students will arrive at UNL in 2018. The department is currently in the process of hiring additional faculty members to support the additional students. The benefits of this program outweigh any challenges, according to Flores.

and private industry in China, as well as places like Brazil, India, the Netherlands, Turkey and Africa.

“The reality is that we’re interconnected in such a way now that our students have to be prepared to work, serve and live in a globalized world,” said Josh Davis, IANR assistant vice chancellor for global engagement.

Beyond educational capacity, it’s in the best interest for IANR to conduct activities in China because the quality of food there affects people in the United States. Globalization of the food chain has introduced food safety concerns. Partnerships in China give IANR professionals an opportunity to use their knowledge and expertise to improve practices detrimental to food safety.

The 3+1 program with NWAUFU is the first of its kind in the world. There is no prior experience to refer to, so officials from both universities continue to work out the dynamics of the



Northwest Agriculture and Forestry University (NWAUFU) in Yangling, China is one of those partners. In September of 2015, the Department of Food Science and Technology at the University of Nebraska–Lincoln launched a 3+1 program with NWAUFU in which students earn degrees from both NWAUFU and UNL.

NWAUFU is one of the top agricultural universities in China. For the past four years, UNL has hosted NWAUFU students

for undergraduate research experiences as well as for degree completion programs. UNL students have been studying abroad at NWAUFU for the past two years. The strength of the relationship was confirmed when NWAUFU officials approached UNL with their idea for a 3+1 program.

NWAUFU will follow the same undergraduate program of study as the UNL Department of Food Science and Technology. Participating

“In 2019 when these students graduate with a degree in food science and technology, we will have 50 more partners in the industry in China,” he said.

IANR’s expertise in agriculture and natural resources has the power to open doors around the world. It has fostered relationships with academic institutions, government ministries

program. IANR hopes this process can serve as a roadmap for future 3+1 opportunities.

“The mechanics of a 3+1 program take a lot to work out, but in the next five years we hope to establish similar programs with partners around the world,” said Davis.

by: Haley Steinkuhler



University of Nebraska–Lincoln Assistant Professor of Behavioral Economics and Health Disparities Christopher Gustafson spent nearly three years immersed in the Tanzanian culture. He studied the shelter, food and

lifestyle of the Tanzanian people. He also collaborated with producers struggling to manage livestock diseases. While his time in the impoverished area was enlightening, there were a few similarities to home when it came to behavioral tendencies.

“In Tanzania, there are a number of households that do not practice techniques which are known to reduce the chance they will contract illness,” said Gustafson. “Similarly, in the U.S., many health problems are the result of people eating diets that deviate from the healthy, balanced recommended diet.”

Oftentimes, there are significant barriers which people face that prevent them from making a healthier decision. In the case of Tanzanian pastoralist communities, or communities that rely on livestock for multiple purposes, many of the barriers are likely related to their economic situation. However, behavioral influences can also play a key role in choice decisions.

“Many people experience eating unhealthy food as an immediate benefit, while the potential negative effect on their health will occur later,” said Gustafson, a Robert B. Daugherty Water for Food Institute faculty fellow.

The study of these phenomena, including situations in which people come to regret their prior decisions, is central to behavioral economics, which can assist policymakers, health-care professionals and individuals themselves in making healthier choices. Techniques developed as a result of the findings in behavioral economics are not unique to a specific setting, meaning they can be applied in Tanzania and in the United States.

Education can play a key role in making healthier and safer choices. Understanding



“Many people experience eating unhealthy food as an immediate benefit, while the potential negative effect on their health will occur later”

**UNL RESEARCH
EMPOWERING PEOPLE TO
MAKE HEALTHIER CHOICES
AT HOME AND ABROAD**



the effects of what is put into the body have on overall health and well-being can be very empowering and lead to healthier decision making if the decision maker is motivated to make a change.

In Tanzania, Gustafson and his colleagues conducted multiple rounds of surveys with 196 households on livestock health and over 260 women on human nutrition, asking individuals what they need to live healthier lives.

“One of the big things that we heard from pastoralists was that education on livestock disease was a big need,” said Gustafson.

Being in a resource-limited area means that many people in Tanzania don't have access to a formal veterinary system. When new livestock diseases strike the area, pastoralists don't have any history of how to manage or control the spread of that disease. The researchers developed a series of livestock health workshops to help pastoralists and livestock extension officers in those areas, and continue to collect data on

relevant outcomes to measure the impact of the education on households.

Gustafson and colleagues have also focused on female income sources, including money earned from raising poultry and producing cultural items for sale. In pastoralist communities, women are in charge of raising chickens. Pastoralist women in this area tend to spend income that they control to supplement the household's food supply, send children to school and pay for health care for family members. Educational poultry materials targeted to women were distributed in the study area, and researchers hope to extend their work to address other barriers to women's earning potential, including low levels of literacy and numeracy.

The team expects the data collected from this work to indicate a positive effect on health, nutrition and economic outcomes as a result of education.

Drawing off of his experience in Tanzania, Gustafson is trying to provide a roadmap

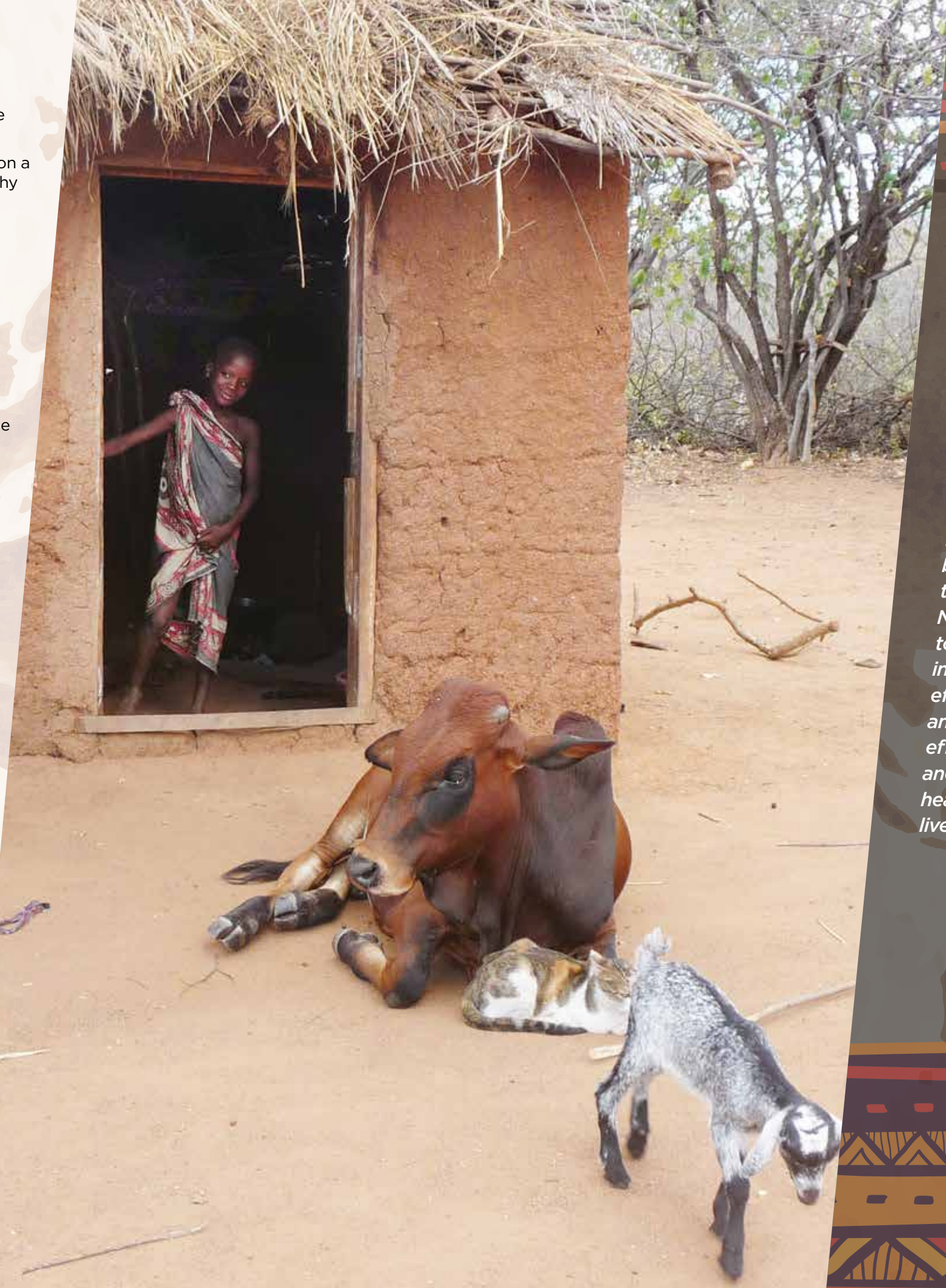
for communities to use education to help people make better decisions.

Currently, he is working on a project focused on healthy eating with the Rosebud Sioux Tribe in southern South Dakota.

During an assessment of retail food stores on the Rosebud Sioux Reservation, Gustafson and colleagues saw an opportunity for healthy food labeling materials to highlight healthy choices. In addition to the new labeling system, a community garden was established, leading to healthier food options being made available at retail food stores.

“It's about getting people resources they need to better their lives, wherever that may be,” Gustafson said.

by: **Haley Steinkuhler**



The Transdisciplinary Research for Creative Solutions to Poverty and Inequality Fund has been set up with the University of Nebraska Foundation to support these innovative outreach efforts to understand and alleviate the effects of poverty and inequality on health, well-being and livelihoods.





Rwandans learn about mycotoxins in Food Science and Technology Department

“The fellows knew some of the techniques we use, but they wanted to see and learn more about what would be economically feasible for them in Rwanda”



In the region of Rwanda where Janvier Ntwali teaches and does agricultural research, maize farmers have problems drying their crop sufficiently to prevent the development of mycotoxin-producing molds that can adversely affect plants, animals and humans.

That’s one reason Ntwali and Godelieve Mukamurezi came to the University of Nebraska–Lincoln as participants in the Borlaug Fellowship Program, funded by the USDA Foreign Agricultural Service. The fellowship program promotes food security and economic growth by providing training and collaborative research opportunities for scientists or policymakers from developing and middle-income countries.

Each fellow works one-on-one with a mentor at a U.S. land-grant university, international research center or government agency, usually for 6-12 weeks. Ntwali, a lecturer and scientist at the Institut d’Enseignement Supérieur de Ruhengeri, was mentored by Andreia Bianchini, and

Mukamurezi, who works at the Rwanda Agriculture Board, was mentored by Heather Hallen-Adams. Both mentors are UNL Food Science and Technology faculty members.

The fellows spent a lot of time at UNL in the lab, primarily learning more about molds and mycotoxins, which are found in plants all over the world.

“The problems and the techniques are similar, but the culture and climate are different,” Hallen-Adams said. “The fellows knew some of the techniques we use, but they wanted to see and learn more about what would be economically feasible for them in Rwanda. It was good for them to see what’s possible.”

Besides analyzing mycotoxins in grain samples used in research, the fellows visited a research farm where they learned about a grain dryer that may be useful in Rwanda.

The fellows traveled to Washington, D.C., where Mukamurezi was part of a panel discussion about Feed the Future, the U.S. government’s global hunger and food security initiative led by the U.S. Agency for International Development. They also

attended the Hatch multistate mycotoxins meeting in Lexington, Kentucky, and the World Food Prize in Des Moines, Iowa.

Liana Calegare, coordinator of IANR Global Engagement, and all of IANR’s Global Engagement staff, were critical to the success of the fellowships.

Working with the fellows requires an investment of time, but Hallen-Adams said, “it is very worthwhile.”

“Another benefit of hosting them at UNL was the opportunity to build or strengthen partnerships with academic and research institutions in Rwanda,” Bianchini added.

“Now that the training has ended, we intend to use the knowledge gained from the training to benefit our country,” Ntwali said.

He and Mukamurezi are planning a workshop where they will discuss the benefits of their UNL training to Rwandan farmers and their scientific community. The fellows will continue to work with their UNL mentors on a baseline study on aflatoxin contamination of maize grown in Rwanda. The project is funded by IANR Global Engagement through its International Impact Award.

by: Linda Ulrich

The Borlaug Fellowship Program is a competitive program of the United States Department of Agriculture. The USDA selects and matches the fellows and mentors who apply to the program and provides funding for the fellows’ travel, living expenses, visa, health insurance, supplies and books. After the fellowship ends, each mentor travels to the fellow’s home institution to continue the collaboration.



Borlaug, who grew up on a farm in northeast Iowa, received the Nobel Peace Prize in 1970 for a lifetime of work dedicated to feeding a hungry world. He founded the World Food Prize, which honors agricultural scientists who have made vital contributions to improving the quality, quantity or availability of food throughout the world.



IANR seizes opportunity in Brazil



The Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln has a long history of global engagement. Faculty members from UNL have maintained relationships across the world in arenas that span agriculture and natural resources. This has resulted in research collaborations and educational opportunities that have strengthened IANR's position in solving the greatest challenges in the world.

While worldwide linkages have never been lacking, prior to 2012 IANR's relationships in Brazil were more one-on-one individual interactions rather than institution-wide partnerships. The IANR Office of Global Engagement was formed in

2012 to coordinate multidimensional institutional partnerships around the world. Today that is occurring within the State of São Paulo, Brazil.

Fifty years ago Brazil was considered a country with a great deal of potential in agriculture, but they didn't have the technology necessary to meet production demands. Fast forward to 2016 and Brazil is the second largest soybean producer, behind the United States. While there is still a lot of potential to be explored, there is not another country in the world that can beat Brazil in crop production. These characteristics make Brazil an ideal partner in the eyes of IANR.

"It is much easier to seize opportunities with a country like Brazil if we are viewed as collaborators

rather than competitors," said Liana Calegare, coordinator of global engagement at IANR.

IANR has partnered with the University of São Paulo-ESALQ and has been working collaboratively in the area of water. In an effort to strengthen the partnership, IANR Harlan Vice Chancellor Ronnie Green led six faculty members to ESALQ in the summer of 2015 to explore areas such as animal science, agricultural economics, biological systems engineering, food science and plant pathology. As a result, four UNL faculty members will travel to ESALQ in 2016 to advance research collaborations and conduct seminars for graduate students in ruminant nutrition, genetics, genomics and commodity marketing.

IANR is also finalizing an agreement with FAPESP, the research funding agency in the State of São Paulo. This agreement could mean additional funding opportunities for UNL faculty members hoping to do work in Brazil.

Collaboration in the State of São Paulo is critical to positioning IANR as a more globally oriented and internationally connected institution. The IANR Office of Global Engagement is in place to strengthen, and find new partnerships to achieve this goal.

by: Haley Steinkuhler



INTERNATIONAL STUDENTS ENHANCING CASNR EXPERIENCE FOR ALL

by: Haley Steinkuhler



In recent years, international student enrollment in the College of Agricultural Sciences and Natural Resources at the University of Nebraska-Lincoln has increased significantly. This is the result of quality educational opportunities in CASNR, strong partnerships with institutions of higher education abroad and the overall interconnectedness of the world. Not only is the experience at CASNR an opportunity for international students, but it also benefits their classmates in the U.S.

Not all students and faculty members are able to travel abroad. Furthermore, internationalizing the curriculum cannot be done through a single course, it must be integrated across the degree. CASNR is faced with the challenge of giving students a meaningful experience with a global context, without actually traveling out of the country. The presence of international students in CASNR can fulfill the need to give students a global understanding.

“International students validate the importance of globalization in a real world context because domestic students are learning about global issues from the source, rather than a textbook,” said CASNR Dean Steve Waller. “Having international students in the classroom is equivalent to experiential learning through an internship.”

Tiffany Heng-Moss, associate dean for CASNR, has seen firsthand how the interactions between international and domestic students can benefit the learning process. During an entomology class focused on insect vectored diseases, international students from Africa shared how they have been personally affected by malaria. It opened the eyes of domestic students who had previously not thought about this deadly disease.

“Introducing international perspectives has really enriched discussions in the classroom,” said Heng-Moss. “It’s really good for domestic students to hear from someone who has lived different experiences.”

IANR has developed a number of new partnerships that are bringing international students to CASNR classrooms. One of those partnerships is in Rwanda. There is a handful of Rwandan students on campus today and that number is expected to grow significantly in the near future. As Rwandan presence at UNL grows, IANR is placing a priority on expanding the partnership to research and extension.

To support the undergraduate partnership with Rwanda, Peggy Wantwadi was hired in November 2015, and in January 2016 Blayne Sharpe also joined CASNR and the IANR Office of Global Engagement. Prior to UNL, Sharpe was the executive director of Bridge2Rwanda, which was formed to help expand Rwanda’s global network of friends, to encourage foreign direct investment and

“Introducing international perspectives has really enriched discussions in the classroom. It’s really good for domestic students to hear from someone who has lived different experiences.”

to create opportunities for Rwandan students to study abroad. Through this experience Sharpe sees a lot of lessons to be learned from the developing nation.

“We have as much to learn from Africa as Africa has to learn from us,” he said.

If they aren’t already, developing nations in Africa will be on the radar of multinational agricultural companies soon. International challenges cannot be ignored if we expect to solve the world’s greatest challenges, like how to feed a growing population. In searching for new employees, these companies are seeking individuals with a global understanding.

Today’s CASNR students must be prepared to live, work and serve in a new reality that is seeing people, goods and ideas flowing across international borders at a speed never seen before. A global student body enriches the learning environment and allows students to establish relationships, understanding and partnerships with peers from around the world. Those relationships will help solve global challenges in their shared future.

“We’ve invested in international programing for the right reasons,” said Heng-Moss. “It’s not to hit an enrollment goal or be more competitive in a research arena, but rather we see our responsibility in helping the world and how that has a direct impact on what happens here in Nebraska.”

In an effort to prepare students to perform at a high level in an ever increasing globalized world, the College of Agricultural Sciences and Natural Resources at the University of Nebraska–Lincoln has increased its focus on study abroad opportunities.

“Being at an institution of higher education is a time frame in life in which a person is supposed to grow,” said Jon Kerrigan, global exchange coordinator for CASNR and the College of Education and Human Sciences. “A study abroad experience can go a long way in terms of personal growth through self-understanding, independence, communication and appreciation of the world.”

That appreciation of the world will be very beneficial for students who will be faced with finding solutions to global issues. Poor nutrition, food security and drought can be difficult topics to grasp without seeing it firsthand. CASNR students who have traveled abroad and witnessed global challenges will be able to pull from these experiences for years to come.

Emily Long, a junior agricultural communications major from Springfield, Nebraska, traveled to New Zealand in January of 2016 to explore a country diverse in both agriculture and natural resources.

“Traveling to New Zealand to learn about agriculture and their culture in general was an incredible opportunity,” said Long. “I tell other

students that studying abroad is a must, because you will never have the chance to experience it again with the connections that UNL provides.”

All educational abroad trips are led by a faculty member with expertise in a subject of agriculture or natural resources prominent in that country. Days are spent in the classroom, field or production facility so students can gain a well-rounded view of the industry. When students return to the classroom, CASNR hopes that these experiences will have deepened their understanding of the world, which is the case for Long.

“You really can’t say you have an understanding of agriculture until you have experienced it in another country,” she said.

CASNR and UNL offer scholarships and financial aid to students interested in study abroad. Furthermore, in an effort to encourage students to apply for a passport, CASNR offers a global access travel grant that provides \$150 to students to apply to an education abroad experience. This grant is equivalent to the cost of a passport.



EDUCATION ABROAD HELPS CASNR STUDENTS EXPAND THEIR HORIZONS

CASNR is committed to fostering students’ global awareness and professional growth by offering a variety of learning opportunities outside of the United States. Here are just a few of the faculty-led programs students embarked on in the last year:

Argentina: Visits to farmer associations, universities and national research and extension programs were highlights of the experience, which started in Buenos Aires and proceeded through the humid Pampas to the semi-arid Mendoza area.

Botswana: A month-long camping trip in the bush learning about wildlife, plants and ecosystems of this unique country in southern Africa.

China: A study of Chinese culture and agriculture in the center of China at Northwest Agriculture and Forestry University. In addition to four weeks

studying and living in China, students also visited the Terra Cotta Warriors, Great Wall and the Forbidden City.

Ethiopia: Students studied the impact of poor nutrition, environmental degradation, drought and the challenges of agricultural production in a developing nation.

France and Spain: An exploration of the French and Spanish countryside while experiencing the unique cuisines of the region. Touring vineyards and olive oil facilities, students learned firsthand from European food production experts.

New Zealand: A two-week learning experience in a country that is a major player in the agricultural export market, including dairy, sheep, deer, cattle and wine.

by: Haley Steinkuhler



UNL graduate student studying conservation agriculture in Nepal



John Laborde
Agronomy and Horticulture Grad Student



The growing population of the world brings challenges when it comes to producing enough food to feed everyone. Not only does food production need to increase by 70 percent by 2050, but that production has to occur with less water than ever before due to climate change.

Scientists at the Institute of Agriculture and Natural Resources are committed to finding cropping systems that are sustainable while simultaneously increasing productivity. One cropping system with potential to meet that criteria is called Conservation Agriculture (CA). John Laborde, a graduate student in the Department of Agronomy and Horticulture at the University of Nebraska-Lincoln, is living and working in Nepal as part of an IANR graduate

productivity,” said Laborde. “My research is focused on how the adoption of CA might influence crop productivity, crop choice, soil characteristics and operational profitability.”

Nepal’s low agricultural production can be attributed to a variety of complex reasons such as water scarcity due to its monsoon/dry season climate, lack of fertilizers and pesticides, weak local markets, poor institutional supports and lack of infrastructure such as roads, processing facilities and storage facilities. Furthermore, a devastating earthquake hit Nepal in April 2015, which has hindered all aspects of life, including agriculture.

CA is intended to minimize the disruption of the soil’s structure, retain crop residue and allow for crop rotation. CA has proven potential to improve crop yields, while improving the



In Nepal, the largest impact on agronomic systems is climate. Four months out of the year it experiences heavy rainfalls and the remainder of the year is dominated by drought. Although this is a significant challenge to overcome for successful CA implementation in Nepal, the research station where Laborde is located plans to continue the research indefinitely to get to the point where a second crop could be grown during the dry season.

“If farmers are to successfully plant a secondary crop they will need to be educated on how to properly adopt CA management practices and when to plant this new crop,” said Laborde. “As more information on CA is collected over the years I suspect CA education will be incorporated into their extension activities.”

Laborde’s research is of particular interest to his colleagues at UNL. CA is widely practiced in

the Midwest, especially in corn production. However, the principles of preserving natural resources such as water while simultaneously boosting yields is a message that is gaining momentum with increased variability in rainfall and drought conditions. Minimizing soil disturbance, residue retention and crop rotation is essential to the future health of agriculture at home and abroad.

By Haley Steinkuhler

research assistantship. Laborde is conducting research at the International Maize and Wheat Improvement Center to determine whether CA might be a viable option in an area with immediate needs for increased production.

“Two out of three people in Nepal suffer from food insecurity each year as a result of low

long-term environmental impacts due to farming. However, according to Laborde the effectiveness of the soil management practice is not so clear-cut.

“Through my research in Nepal, I have found that the effectiveness of CA is highly dependent upon climactic conditions of the agroecology in which it is adopted,” he said.



CLOSING THE GAP: Turkey, a new partner in Global Yield Gap and Water Productivity Atlas



Turkey, the eighth largest country in the world in agricultural production, has been self-sufficient in food production since the 1980s.

But, said Taskin Oztas, an agronomist and soil scientist at Ataturk University in Turkey, “it does not mean that we fully use our agricultural production capacity.”



From left, Taskin Oztas, son Doguscan, wife Nazile and daughter Alev enjoyed spending time together in the Nebraska East Union while visiting from Turkey.

That’s one of the primary reasons Oztas wants to participate in the Global Yield Gap and Water Productivity Atlas project, which estimates the difference between actual and potential

yields and water productivity for major crops worldwide. The atlas is a collaborative project of agricultural researchers at the University of Nebraska-Lincoln and Wageningen University in the Netherlands.

Oztas, who earned his doctorate in the UNL Department of Agronomy in 1993, spent two months last summer at UNL preparing a research proposal for Turkey’s participation in the yield gap project. He also worked on crop modeling and produced yield gap maps for wheat and barley in the Erzurum province, where Ataturk University is located, under the supervision of Haishun Yang, UNL associate professor of agronomy and horticulture.

“The results of our demonstrative study for Erzurum clearly indicated that there was a great potential to increase wheat and barley yields up to 2.1 times,” Oztas said.

Oztas is in good company with this research. The atlas is a complex project that involves the collaboration of many researchers and analysis of large amounts of data worldwide.

“It is an amazing group of researchers. We are working with the best in the world,” said Patricio Grassini, atlas

project co-leader. Ken Cassman and Yang are the other UNL agronomists working on this project.

Agricultural crop yields must increase substantially in the coming decades to meet global food demand driven by population growth. The problem is particularly acute in Africa. In 10 sub-Saharan African countries, for example, the team found that currently farmers obtain only 20-30 percent of the yields possible.

“The atlas will tell us if a country can be food self-sufficient by closing the current yield gap on existing cropland area and if not possible, how much more land will be needed to produce that food, or if there is not more available farmland, how much food will have to be imported or received as aid to feed the population,” Grassini said. “Researchers, policymakers, food security experts and others can use the atlas to identify areas with the greatest potential to produce food sustainably and to use resources most effectively.”

Work on the atlas had a special bonus for Oztas. UNL helped found Ataturk when it was established in 1957, and returning to UNL gave him an opportunity to improve

and strengthen the relationship between the two universities.

“UNL is my second university and Lincoln is my second home. My son was born in Lincoln and was only 2 years old when we went back to Turkey. I have not found a chance to visit Nebraska again until last

Work on the Global Yield Gap and Water Productivity Atlas began in 2011. It was funded by a grant from the Bill and Melinda Gates Foundation, the Robert B. Daugherty Water for Food Institute at the University of Nebraska, Wageningen University in the



Taskin Oztas visited IANR’s South Central Agricultural Laboratory while working on the Global Yield Gap and Water Productivity Atlas project.

summer because of the yield gap project,” he said. “It was a great opportunity for my family and me so we visited almost every side of Nebraska that has a memory in our lives.”

Netherlands and the U.S. Agency for International Development.

By Linda Ulrich



EUROPE

DOUBLE MASTER'S DEGREE GEARED TOWARD FOOD SECURITY IN DEVELOPING COUNTRIES



The UNESCO-IHE graduates celebrate their commencement with faculty leaders. From left, Dean Eisenhauer, Evordius Rulazi, Christopher Neale, Gregory Williams, Roberto Lenton and Ron Yoder

The Advanced Water Management for Food Program is a unique global program providing in-depth training for professionals from developing countries who are interested in learning more about water for food production.

This program, which offers an Advanced Water Management for Food Production Double Master of Science Degree, is a partnership of the Robert B. Daugherty Water for Food Institute, the University of Nebraska-Lincoln and the UNESCO-IHE (a master's level institution) in Delft, the Netherlands. Students study at both institutions and complete an individual research project related to their home country, said Dean Eisenhauer, coordinator of the partnership for the Daugherty Water for Food Institute and professor emeritus of the UNL Department of Biological Systems Engineering.

One of the program's strengths is that it combines the extensive experience of UNESCO-IHE and UNL faculty members in water, irrigation and crop water productivity. Students first attend IHE, followed by 10 courses at UNL, each 15 weeks long. They also engage in hands-on learning experiences. It takes 20 months to complete the total program.

"Providing water managers with advanced education is essential for meeting the needs of global food security," Eisenhauer said.

The first two graduates of the double-degree program have water-related jobs in their home countries. Evordius Laurent Rulazi is an irrigation engineer in the Regional Commissioner's Office of the Department of Agriculture in Morogoro, Tanzania. Gregory Williams is a hydraulic engineer for SRKN'gineering in Georgetown, Guyana.

"These students are really hungry to learn and place high value on advanced education. It is a joy to teach them," Eisenhauer said. "Our biggest challenge is not finding students, but finding donors for scholarships. Students in this program come from the developing world and usually don't have access to financial resources to pay for the costs of advanced education."

By Linda Ulrich



Visiting UNESCO-IHE students participate in a lab project with Dean Eisenhauer, the program coordinator and Water for Food Institute Faculty Fellow.

National Drought Mitigation Center has international impact

“These nations lack groundwater and large surface water storage facilities for everything they need and use water for”

Drought and the Caribbean Islands may seem incongruent, but in reality, drought occurs worldwide, even on islands surrounded by water.

That’s one of the reasons the National Drought Mitigation Center has recently started working with the Organization of Eastern Caribbean States and officials with the nations of Saint Lucia, Antigua and Barbuda, and Saint Kitts and Nevis to develop better drought management strategies, said Mike Hayes, center director.

Tourists who enjoy the luxurious hotels with pristine white beaches may not realize that the drinking water supplies and water needed for agriculturally-dependent livelihoods are mainly dependent on rainfall.

“These nations lack groundwater and large surface water storage facilities for everything they need and use water for,” Hayes said.

The islands are very sensitive to climate change, and its effects on agriculture and aquaculture make the need for drought management even more critical, he said.

That’s just one example of the impact of the work of the National Drought Mitigation Center, which is based in the University of Nebraska–Lincoln School of Natural Resources. Some of the many projects include:

- Climatologist Tsegaye Tadesse is leading a three-year, multi-institution effort to help predict drought and flood in the Greater Horn of Africa. The project is funded by the National Aeronautics and Space Administration.
- Climatologists Mark Svoboda and Brian Fuchs and others at the center helped to establish a drought monitor prototype, similar to the U.S. Drought Monitor, for the nine northeastern states in Brazil. Funding was provided by the World Bank.
- The center has a longtime collaboration with drought researchers in the Czech Republic, which was especially important in 2014, when that country experienced drought.

- Center faculty members travel extensively and provide expertise in India, the Middle East, Asia and many other countries. And many scientists travel to Lincoln and are hosted by the center for periods of a few days to several years.
- Creation of drought monitoring maps, including the U.S. Drought Monitor product. The center is involved with researchers around the country investigating the effects of drought on human health, including how the stress created by drought affects mental health.

The National Drought Mitigation Center, which was established in 1995 by Don Wilhite, professor in the School of Natural Resources, has had an international component since its beginning. The way the center interacts with its international partners varies, but often long-term relationships are established.

That’s a good thing, Hayes said, because “We learn from each other.”

The center’s mission is to reduce the vulnerability of societies to future drought, he said. “Drought events are always going to happen, but if people can take a proactive approach, we can help lessen some of the hardships and negative impacts of drought.”

By Linda Ulrich



Participants from Dominica discuss work with Roché Mahon (back row, right), one of the National Drought Mitigation Center’s partners from the Caribbean Institute of Meteorology and Hydrology, during a drought risk policy workshop held in Antigua in February 2016.

Nebraska On-Farm Research Network Introduces Project SENSE

by: Haley Steinkuhler

In 2015, the Nebraska On-Farm Research Network launched a new project focused on improving the efficiency of nitrogen fertilizer use. Project SENSE, which stands for sensors for efficient nitrogen use and stewardship of the environment, was implemented at 17 research sites across five natural resources districts in Nebraska.

Nitrogen is a very dynamically moving nutrient, making it difficult to manage because it can be lost through many pathways in the environment. Project SENSE is testing the use of crop canopy sensors to improve nitrogen use efficiency during in-season application

in corn. This strategy has the potential to increase farmer profitability and reduce environmental impacts.

The sensors work by emitting light onto the crop canopy. Photodetectors on the bottom of the sensor measure specific wavelengths of light that are reflected by a leaf. The wavelength information is recorded by the crop canopy sensor and combined to form an index that has been correlated to the nitrogen status of the crop. This information is used by the system to generate a recommended rate of additional fertilizer that is then applied to the crop real-time.

“Using crop sensors, we can vary the amount of nitrogen applied in different areas,” said Nebraska Extension Educator Laura Thompson. “This approach lets us be reactive to conditions that are occurring in that specific growing season and manage nitrogen use spatially rather than applying a bulk amount of nitrogen across the field.”

Results from the project’s first growing season are encouraging. Use of the sensors reduced the nitrogen rate by 40 pounds per acre compared with the grower’s standard management practice. While this did cause a yield reduction of five bushels per acre, producers saw an increase in profit because of their reduced fertilizer cost. The Project SENSE team is evaluating ways to reduce the yield loss in the future.

Project SENSE is a collaborative effort of Nebraska Extension, Nebraska Corn Board and Nebraska Natural Resources Districts.



“Using crop sensors, we can vary the amount of nitrogen applied in different areas.”



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UNL leads \$13.5 million research project to enhance sorghum for biofuel

Sorghum is one of the five top cereal crops in the world and provides food for animals as well as people, but it also has the potential to be an important sustainable source for biofuels.

Most biofuels in the United States currently are made from corn, but sorghum can create more biomass for cellulosic ethanol, is drought-tolerant and can be grown on more marginal lands than corn. To improve sorghum for biofuel production, the University of Nebraska–Lincoln is leading a \$13.5 million, multi-institutional research project to learn which sorghum germplasm grows better with less water and nitrogen, said project leader Daniel Schachtman, professor of agronomy and horticulture and director of UNL's Center for Biotechnology. Other UNL team members are Ismail Dweikat, sorghum breeder and professor of agronomy and horticulture, and Arthur Zygielbaum, remote sensing expert and associate research professor of natural resources.

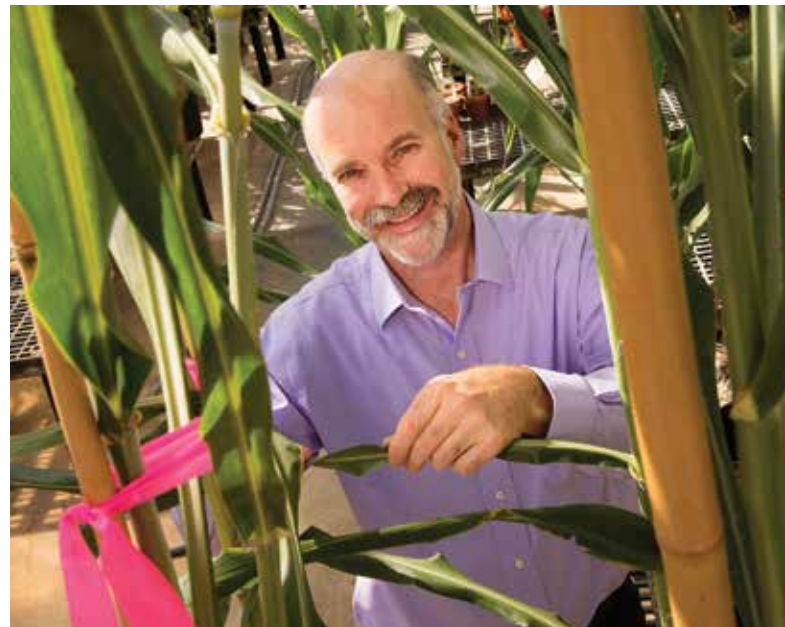
This five-year U.S. Department of Energy grant, which takes a comprehensive systems approach to better understand how plants and microbes interact, is a complex undertaking involving sorghum genetics, marker-assisted breeding, metagenomics and computational genomic analysis. Collaborators include scientists at Danforth Plant Science Center, Washington State University, University of North Carolina–Chapel Hill, Boyce Thompson Institute, Clemson University, Iowa State University, Colorado State University and the DOE-Joint Genome Institute.

"It is an interdisciplinary, very big team," Schachtman said. "I'm learning a lot from these people. It's a lot of fun."

A substantial amount of the research is being done in Nebraska, including sorghum field trials across the state in a variety of growing conditions — important because the sorghum suited for biofuels is different than grain sorghum.

"The best varieties grow to about 15 feet tall and have thick stalks similar to bamboo that create huge amounts of biomass that could be made into ethanol," Schachtman said.

The soil molecular biology work is being done in Schachtman's lab and at three other institutions involved in the grant. "The grant is giving us the money to get a good jump-start to do a really comprehensive census of soil microbes that interact with sorghum roots," he said.



Identifying the right soil microbes that interact with sorghum will help enhance nitrogen use efficiency and protection from disease as well as lead to the development of strategies to further improve the drought tolerance of sorghum lines. Microbial solutions to improve plant productivity have not been extensively studied so the project also will advance scientific understanding for other crops.

In addition, the researchers are creating an extensive repository of sorghum-related microbes and their genetic sequences as a resource for the entire scientific community.

"This is highly significant work because we could be creating a more sustainable biofuel system for the United States," Schachtman said, "and we need to move some of the biofuel production to more marginal lands so it's not competing with food crops such as corn."

By Linda Ulrich



UNL FINDING SAFER ALTERNATIVES TO FIGHT WILDFIRES

By Haley Steinkuhler

A multidisciplinary team of experts at the University of Nebraska–Lincoln is testing new technology that could make fighting wildfires safer and more affordable.

Dirac Twidwell, an assistant professor and rangeland ecologist in the Department of Agronomy and Horticulture at UNL, and his colleagues Sebastian Elbaum and Carrick Detweiler from the Department of Computer Science and Engineering, and Craig Allen from the School of Natural Resources have developed an unmanned aerial device, or UAV, that can ignite fires and help ranchers and agency personnel overcome challenges associated with managing wildfires.

According to the U.S. Forest Service, more than 70,000 communities are located within or adjacent to forests and rangelands. To prevent dangerous and potentially catastrophic wildfires, prescribed burns are conducted to eliminate invasive species and

restore native ecosystems. While prescribed burns have proven to be effective, they are often very difficult to execute.

Many federal agencies use helicopters to ignite prescribed burns, but that practice is too costly to use on private land. The terrain of that land presents another challenge. Much of the ground that is being burned is very harsh and remote. Currently, prescribed burners are placed in those areas to manipulate how fire moves, which can be a dangerous job. In the near future, this UAV could ignite fires in remote areas without placing personnel in danger.

"This drone could encourage resource-limited areas to conduct more prescribed burns because the financial implications and risk to human safety would diminish," said Twidwell.

The drones carry a cargo of ping pong-like balls filled with potassium permanganate powder. Before being dropped through a chute, each ball is manipulated and

injected with liquid glycol, creating a chemical reaction-based flame after several seconds.

The team has successfully performed indoor tests on a prototype and has received approval from the Federal Aviation Administration to partner with prescribed burning operations and test the capabilities of the drone in actual prescribed fires.

"It has been a great experience to work with experts in areas such as aerial robotics and computer science to develop a unique piece of technology that addresses a major environmental challenge," Twidwell said. "We're looking forward to getting the drone in the field to see how it performs in actual fire management situations."





The Nebraska Beef Industry Scholars 2016 Class at the National Cattlemen's Beef Association Trade Show and Convention in San Diego

Required courses

- Beef Industry Scholars – Freshman Seminar
 - Beef Industry Scholars – Issues Introduction to Commodity Marketing
 - Beef Industry Study Tour
 - Agriculture, the Environment and Science in the Media
 - Beef Industry Scholars – Practicum
 - Internship Experience
 - Beef Industry Scholars – Beef Summit
 - Beef Industry Scholars – National Beef Industry Policy
- Students must choose two of the four following elective courses:
- Fresh Meats
 - Animal Welfare
 - Beef Cow-Calf Management
 - Beef Feedlot Management

Preparing future leaders for the beef industry

The Nebraska Beef Industry Scholars (NBIS) program is a unique University of Nebraska-Lincoln program to help develop future leaders for the beef industry.

The program combines the knowledge, insights and direct involvement of leaders in the beef industry with science-based courses led by faculty members in the UNL departments of animal science, agricultural economics, and agricultural leadership, education and communication. The program is completed as part of a four-year bachelor of science in animal science, agricultural economics, grazing livestock systems or another major in the UNL College of Agricultural Sciences and Natural Resources.

“Graduates of the Nebraska Beef Industry Scholars program will be among the best trained individuals entering jobs in

the beef industry,” said Matt Spangler, program coordinator and associate professor of animal science. “Their specialized education couples scientific and practical skills with a strong network of colleagues gained through the program.”

The NBIS minor prepares students to enter many facets of the beef industry, including seedstock breeders, ranchers, feedlot managers, processing managers, bankers, veterinarians and executive directors of beef and cattlemen’s associations, Spangler added.

Scholarships, which are available through the animal science department, are funded by the Nebraska Cattlemen. In addition to the 120 credits required for a bachelor of science degree, a block of 19-21 credits is specifically required for the beef scholars program.

By Linda Ulrich



WASEEM HUSSAIN

Home country: India

Area of study: Researching how to improve wheat under multiple environments using molecular markers based on genotyping by sequencing technology

“The quality of research and teaching is great here. It has been a dream to work with my advisor, Stephen Baenziger who is a great scientist known worldwide for wheat research.”



ROBERT MUGABI

Home country: Uganda

Area of study: Food science and technology with a research interest in food process engineering

“There is a diversity of nations in the Department of Food Science and Technology at UNL. Not only have I been able to build relationships with people from Nebraska, but also from South America, Asia and other regions. It has established a network of collaborators that I will be able to rely on for many years into the future.”

FACES TO WATCH

Students in the College of Agricultural Sciences and Natural Resources will be faced with finding ways to sustainably feed the world’s growing population. To fully understand what that means, CASNR is making a coordinated effort to internationalize and embrace the people, and ideas that flow across international borders. The international graduate students currently studying and conducting research within CASNR are positioned to help find solutions to the greatest challenge of the 21st century.



THAO VU

Home country: Vietnam

Area of study: Statistics

“The environment at UNL is very welcoming to an international student. Everyone is extremely friendly and willing to help. This was especially true when I first arrived and was still working on my English.”



ADRIANO DIOTTO

Home country: Brazil

Area of study: Researching soil water management

“Getting to conduct research at UNL is huge for an international researcher because you have the opportunity to work on several different large-scale projects with many groups of people to learn from.”

PROUD DAUGHTER PLANTS A SEED FOR THE FUTURE — A CASNR SCHOLARSHIP — IN MEMORY OF HER FATHER

The tree of the life of this one humble man continues to grow:

Hiram Hisanori Kano.

That was his name. He came from Japan as a young man in 1916 to study agriculture at the University of Nebraska. He came from royal roots. His father was a viscount. William Jennings Bryan had visited his family in Tokyo and planted this seed in Hiram's heart:

Nebraska.

He worked hard while in Lincoln. He knew English. He'd been tutored in the language from childhood. But Nebraska was a long way from home in many ways. He had to go from East to West. From rice fields to corn fields. From mansions with tennis courts to bunkhouses with bedbugs.

He spent his first Nebraska summers working as a hired hand for farmers near Lincoln because he wanted to learn how to work the Nebraska soil. He grew to be a good corn picker. Walking beside a moving wagon, he'd throw more ears inside it than the other, much bigger men.

But those first Nebraska winters surprised him. One clear winter day, Hiram rode with a veterinarian 10 miles outside of Lincoln to help inoculate pigs for hog cholera. As an old man, Hiram wrote about this day in his memoir, "Nikkei Farmer on the Nebraska Plains":

Our vehicle was an open car. On the way home it was about 10 degrees Fahrenheit. A strong wind blew. The wind chill quickly froze my ears. When I returned to the college, they were white with frostbite.

By Colleen Fleischer

Hiram graduated from the university with a master's degree in 1919. He bought a 300-acre farm near Litchfield, Nebraska, which is about 30 miles north of Kearney, and became a farmer and a husband. He and his bride, Aiko (Ivy), worked the Nebraska soil. They planted corn, oats, alfalfa and barley. They raised chickens and cattle.

Aiko was beautiful, loving and strong. She gathered the eggs every day. On Mondays, she washed and sewed ... On Wednesdays, she baked. ... On Sundays,

they both prayed at the Episcopal Church in town. God had planted a seed, too.

In his high school days back in Japan, he'd almost died after appendicitis turned into peritonitis:

I saw God. The visit was real, but I cannot tell what kind of form he was in, nor can I describe it with pen and ink. I was given a feeling of calm. I remember a pleasant feeling that my body was gaining strength.

That "miracle" changed everything for him. He was baptized a Christian when he was 20, and

he vowed to go wherever God wanted him to. So in Nebraska, Hiram saw himself not just as a farmer but also as a missionary to the Japanese families in the state. He became an advocate for them and a leader. One day, an Episcopalian bishop visited the farm and asked Hiram if he'd like to become a priest to those Japanese people. At first, Hiram said no. He wanted to farm and raise his family. But eventually, after the bishop asked again, Hiram said yes. He felt it must be where God wanted him to go.

He became Father Hiram Hisanori Kano.

He also was a father to a son, Cyrus, who was born in Litchfield, and a daughter, Adeline, who was born in 1927 after the family had moved to Scottsbluff.

Dec. 7, 1941 – the day Japan bombed Pearl Harbor – changed everything for the family.

The FBI arrested Hiram that very day because of his close ties to the Japanese elite and because of his leadership role in the Japanese community. (He was not yet a citizen. Foreign-born Japanese could not be U.S. citizens until 1952.) He stayed interned, behind bars or guarded walls or on house arrest, for most of the war.

But he stayed close to God.

In his memoir, he wrote about how he viewed each new place of internment as one of his "churches." By then he was middle age. Most of the men he ministered to in those internment camps were much younger. They were Japanese, German, Italian. Many were scared or angry. Many needed God.

Hiram planted many seeds.

Of the 700 Japanese living in Nebraska at the time, he had been the only one arrested and interned. But he didn't let it harden his heart.

"He might have been bitter in the beginning," his daughter, Adeline Kano, said recently in a phone interview from Colorado. "But bitterness does you no good. It just wears you out. I think he figured out that the best thing to do is go with the flow and do the best you can.

"And he thought it was God's plan."

Adeline Kano lives in Fort Collins, Colo., and is a retired lab technician in the biochemistry department at Colorado State University. She was 14 years old when Japan bombed Pearl Harbor. She is 88 years old now.

She also is a graduate of the University of Nebraska ('48). She said she'll never forget the look of pride on her parents' faces on her graduation day. Her father, she said, always felt pride in Nebraska and its university:

I gave thanks to God for sending me to such a wonderful place.

Hiram lived for 40 years in Nebraska. He retired in 1957 and moved to Colorado with his wife to live near Adeline. He lived to be 99. He died in 1988.

He saw his four decades in Nebraska as a great gift from God. Near the end of his memoir, he wrote about how he'd acquired a burial plot in Nebraska:

... where I consider it an honor and look forward to returning to its soil when I die.

The Episcopal Church named him a candidate for its high honor – "holy man" – because in the end, the fruit of the tree of this humble man's life was this:

Love.

To honor her father, Adeline Kano recently created the "Hiram H. Kano Scholarship Fund" for international students at IANR. If you would like to contribute to the fund, or to any other fund that benefits IANR, please contact the University of Nebraska Foundation's Josh Egley at Josh.Egley@nufoundation.org or call 402-458-1202.

"Hiram Hisanori Kano, that was his name. He came from Japan as a young man in 1916 to study agriculture at the University of Nebraska."





Kyle Arganbright, a CASNR alum and co-founder of Sandhills State Bank, enjoys spending time on his family's ranch.

Banking on bright future for agriculture and small communities

Two of Kyle Arganbright's passions are agriculture and community development.

"Banking in the Sandhills is at the crossroads of both," he said.

Arganbright, who earned his undergraduate degree in agricultural economics from the University of Nebraska-Lincoln in 2006, is co-founder and chief development officer of Sandhills State Bank in Valentine.

Although banking wasn't a career goal when he was at UNL, he took advantage of a unique opportunity to move home. "It was an opportunity to re-establish locally owned banks in the Sandhills," Arganbright said. "Our customers are our friends and neighbors, which is part of the fun."

One of the things Arganbright most appreciates about the time he spent as an undergraduate in the Department of Agricultural Economics is that the faculty encouraged him to pursue a variety of academic and personal interests within his degree program.

"They allowed me to approach my education in an entrepreneurial fashion. They wanted me to succeed, and they wanted to see me develop in the way that I wanted to develop," he said.

Arganbright also appreciated the many opportunities to get involved outside the classroom. He served as student body president and on the College of Agricultural Sciences and

Natural Resources Advisory Board. He also was selected for membership in the Innocents Society, the Chancellor's senior honorary, and was a member of SigEp Fraternity. In addition, he is one of the 2016 recipients of the Nebraska Alumni Association's Early Achiever Awards.

Arganbright, whose family ranches near Valentine, believes in giving back to his community, which includes serving as the mayor of Valentine.

He and his wife Amy, also a UNL graduate and a registered dietitian, have an 18-month-old daughter Claire.

By Linda Ulrich

We each have a strong connection to our college.

I have many fond memories of my alma mater, be it academically, professionally, or personally. Whatever the link, our mission through the CASNR Alumni Association is to keep that connection strong and help it grow so that more students can share similar experiences, gain an excellent education, and create their own memories. We have several upcoming events to help you stay connected with the college.



Enjoy a UNL Dairy Store ice cream cone with us at the Nebraska State Fair, Sunday, September 4th, from 1:00-3:00pm at the Hospitality Loft, Five Points Bank Livestock Arena. All potential, current, and former CASNR students are welcome to attend. Also, plan to join us for the #UNLREDOUT pep rally at 4:00pm in the Family Fun Zone.

Our CASNR Alumni Football Tailgate and Silent Auction Scholarship Fundraiser will be happening Saturday, October 1st, preceding the homecoming football game against Illinois. There will be free parking, free food and a free shuttle service between the union and the stadium. If you are interested in donating items for the silent auction scholarship fundraiser, please contact Jill Brown at 402-472-3224 or jbrown14@unl.edu or Meg Kester at 402-472-7909 or mkester2@unl.edu.

The Burr/Fedde & Friends Reunion will take place in the summer of 2017. You can keep up to date about the event by going to casnr.unl.edu/burr-fedde-reunion or facebook.com/burrfedde. Please continue to add old photos, reconnect with friends, and reminisce about good times in Burr/Fedde.

Our Buy a Brick program is off to a great start, so let's continue promoting this scholarship endowment fund. All bricks purchased by August 1 will be included in the annual brick installation, which will take place at the start of the CASNR Alumni Tailgate on October 1. More information about the CASNR Alumni Brick Program can be found at nufoundation.org/casnrbuyabrick.

As always, thank you for your ongoing support of CASNR. Many wonderful things are happening in CASNR thanks to your continued connection.

Steve Kaiser 
CASNR Alumni Association President



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