



AGRICULTURE,  
FOOD SYSTEMS,  
AND NATURAL  
RESOURCES

# ALUMNI NEWS

2014-15

Student's research  
earns national  
acclaim

**NDSU** NORTH DAKOTA  
STATE UNIVERSITY

## Research with cockroaches brings student national acclaim

People often cringe when they see NDSU junior Bridget Eklund's laboratory specimens. That's not surprising; most of us think cockroaches are dirty, yucky creatures.

But for the microbiology major, the cockroaches are helping her with research that is gaining widespread attention. She's earned a rare opportunity to share what she's learned on a national stage.

Working in the laboratory of Nathan Fisher, assistant professor of veterinary and microbiological sciences, Eklund is studying a bacterium that can cause a potentially deadly disease called tularemia. The rare infectious disease can attack the skin, eyes, lymph nodes, lungs, and sometimes, internal organs. The affliction goes by other names, like rabbit fever or deer fly fever.



"We use the cockroaches as a model, like other researchers might use mice, to study the bacteria," Eklund explained, noting cockroaches are good subjects because they have a strong immune system and are good hosts for antibiotics. "We're focusing on one specific gene in our work. If we can contribute to the overall knowledge of this bacteria, the closer we are to a cure."

Eklund's work is quickly receiving acclaim. She gave a highlighted oral presentation about her research at the American Society for Microbiology's Biodefense and Emerging Diseases Research Meeting Feb. 9-11 in Washington, D.C.

According to Fisher, Eklund's presentation is like winning a championship ring in sports.

"One conference organizer told me that he thought she is the only undergraduate to deliver an oral presentation in the 13-year history of the conference. Another prominent scientist said she gave one of the best presentations of the entire conference," Fisher said. "This accomplishment resulted from Bridget's incredible work ethic. She is tireless, with a professional drive and level of responsibility that rivals anyone with whom I've ever worked."

And Eklund fully understands its significance.

"It is really important for my future – all the other presenters were either PhDs, post-docs or graduate students. It was something I never imagined I could do so early in my career," said Eklund, who expects to graduate in May 2016. "It's nice that people will know how seriously I take research and how dedicated I am. It's great to get my name out there."

Eklund seems to enjoy sharing the lab with cockroaches. She said she likes the outdoors and, as a child, she would go camping with her family every year. Bugs don't scare her.

"Our cockroaches are a special breed. They're really docile – they don't climb, hiss, jump or fly – so it could be worse," said Eklund, who grew up in Scandia, Minnesota. "They're not so bad, really."

Eklund plans to attend graduate school following commencement next spring. She wants to earn a doctorate in infectious diseases.

"I think NDSU is great. The opportunity to work in a lab doing my own research is really something special," she said. "At most colleges, students wouldn't be able to do what I'm doing right now."

Eklund recently received the prestigious Goldwater Scholarship.



## Caribbean to South Pacific: senior learns world's lessons

NDSU senior John Breker is a firm believer in learning the lessons other lands can offer.

Breker, a soil science major who is minoring in crop and weed sciences, has had two life-changing study abroad experiences during his NDSU education – the first being a weeklong soils, crops and land-use study tour in the Caribbean Sea's Puerto Rico as a freshman.



"I was surprised how much I learned in just a week," said Breker, who examined the composition and uses of the tropical soils on the island. "I said, 'Wow. I've got to go somewhere else and see what I can learn.' My Puerto Rico experience was like a gateway, really."

He later journeyed to the southwestern Pacific Ocean and spent spring semester during 2014 in New Zealand, attending Lincoln University. The agricultural institution of 3,000 students is located outside of Christchurch on the country's south island.

He discovered the island nation with a population of 4.5 million people has an agricultural focus unlike what he was used to. The country emphasizes pasture systems and livestock production across its mountainous terrain.

"I come from a grain farm fairly typical of North Dakota," said Breker, who grew up near Rutland, North Dakota. "As a soil scientist, it was very different to think about managing soils for pasture and livestock production rather than crop production."

**"I gained a whole new set of lenses to look at agricultural problems."**

And that is what a study abroad experience is all about, according to Alicia Kauffman, NDSU director of International Student and Study Abroad Services. "Not only do students get a chance to experience learning in a new environment, but they gain new knowledge related to their academic major," she said. "Additionally, students begin to understand and navigate other cultures as well as see the world around them from other perspectives."

Breker sees himself as a strong example of how the study abroad program impacts lives.

"I gained a whole new set of lenses to look at agricultural problems in North Dakota, the greater United States and the world," Breker said. "I now have tools to think about things in a much different way."

Breker's future plans are to pursue a Master of Science at NDSU and eventually earn a doctorate. "I want to help farmers solve their soil-related problems, so that could be a career in private industry, Extension or academia," he said.

## Student's innovation takes top prize

NDSU crop and weed science major Paul Subart has come up with an idea that may someday be used in fields across the country. The junior's weed-killing concept is so good that he won \$5,000 for first place in the corn division of NDSU's Innovation Challenge '15.

The annual competition, sponsored by NDSU and the NDSU Research and Technology Park, showcases and encourages student innovation and creativity.

Subart is working on a prototype for a modified rotary hammer mill that would be mounted in the rear of a combine. The mill damages weed seed, which reduces weed pressure and volunteer crop regrowth the following year. After passing through the mill, chaff and the no-longer-viable weed seed are spread back onto the field.

The idea stemmed from Subart's experience working on an organic farm near his hometown of Robinson, North Dakota. To combat weeds, the only answer was tilling, but aggressive tilling is not good for soil structure.

"There has to be a better way," Subart explained. "I came up with an organic solution – it's mechanical because you can't use a chemical solution. This works for both organic and conventional farmers."

His design has progressed since the Innovation Challenge '15 in February, and it's gone through several changes. "Growers would like to see something like this, as long as it is affordable," Subart said, noting one weed seed destructor now on the market costs more than \$200,000.

"I think I can do this for considerably cheaper; hopefully under \$10,000," he said. "That's not a high price to pay to solve your weed issues."

Subart hopes a major implement manufacturer will take an interest and install his

device as part of a combine assembly line. "There haven't been major changes in combine technology the last couple of years," he said. "I think they are looking for a way to get the edge on competitors."

The endeavor goes by the unlikely title of "A Displaced Farmer." It's a name derived from a trivia team made of Farmhouse Fraternity friends called the Displaced Farmers. Subart was one of the members.

**"Growers would like to see something like this, as long as it is affordable."**

The Innovation Challenge helped move Subart's project forward, encouraging him to conduct extra research and feasibility studies. "It also put me in contact with many helpful people, so the event was very good to me," Subart said, noting his faculty adviser was Marisol Berti, associate professor of plant sciences.

Subart says his future plans are to farm in North Dakota's Kidder County and seek a full-time agronomy position. He is the son of Robert and Margaret Subart of Robinson.





## Student receives National Science Foundation Fellowship



Heather Dose hated getting dirty as a child. Now, it's part of her job.

As an NDSU doctoral student studying soil science, she samples and processes topsoil. It leaves dirt under her fingernails, in her hair and on her clothes. And she loves it.

Dose is really good at what she does. She was one of 20 students and early career scientists from the United States and Africa selected for a National Science Foundation Fellowship in Senegal this past summer. The fellowship provided advanced training in tropical soil ecology from May 19 to June 13 in Dakar.

During her fellowship, Dose partnered with a student from Zimbabwe. Her instructors included soil microbiologists, a soil physicist, plant pathologists, a plant physiologist and soil ecologists from around the world.

"Academically, the experience made me excited about my field of study. It demonstrated there are vast opportunities across the globe and here in North Dakota," said Dose, who grew up in St. Paul, Minnesota. "Personally, I am so grateful to have gone to Africa – the fellowship changed how I view different cultures."

What Dose learned almost 5,000 miles from Fargo may help improve crop growth in North Dakota. She studied new laboratory techniques that she can adapt anywhere to increase soil health.

Initially, she was a chemistry major at NDSU, but she fell in love with soil during the undergraduate class Soil 210. The instructor, David Hopkins, associate professor of soil science, had a contagious passion for the subject, and Dose was hooked.

She later worked for three years with the Natural Resources Conservation Service and an additional year with the Agricultural Research Service. Dose earned a bachelor's in natural resources management at NDSU in 2007 and her master's in soil science in 2009.

Dose expects to earn her doctorate by May 2016. "In the future, I'd like to continue my research with soil health. I feel I have a good handle on the issues farmers face," she said. "I really enjoy the Northern Great Plains, so it would be excellent if I could stay in the area. "

## In the frontier: Alumni bring pioneer, giving spirit to Africa

A father and son, both NDSU alumni, are on a heartfelt mission to make a difference in Africa. Wallie and Josh Hardie are bringing their combined agricultural skills to Mozambique, a nation of about 25 million people in the southeastern sector of the continent.

Their story in Africa goes back about eight years, according to Wallie, BS '74, MS '76, agricultural economics. His daughter Ginna, who was a senior NDSU nursing student at the time, accompanied a church mission medical team. She later spent a year working with AIDS patients in Mozambique.

The Hardie family visited her for a month, and fell in love with the place.

“Josh and I started looking around at the land and the climate, and said, ‘Wow, we could grow crops here,’ “ Wallie said. “The natural resources are there. So, it’s just a matter of putting it all to good use.”

And that’s what they decided to do. Using techniques and knowledge gained from their successful operation at Fairmount, North Dakota, the Hardies wanted to join what they call the last frontier for agriculture. Being men of faith, they also saw it as an opportunity to have a positive impact on the local residents.

Initially, the Hardies worked with the African operations of Asian Group Global, and that led them to another opportunity of taking over an 8,000-acre castor oil farm that had fallen into financial trouble. Only 2,000 acres had been cleared of brush. The Hardie farm, located about 50 miles south of the provincial capital of Nampula, raises corn and soybeans to be used for chicken feed.

“At our farm in North Dakota, we have three objectives: work with nature, develop innovative systems and improve lives. We’ve tried to transfer those values to our operation in Africa,” explained Wallie, who is a past president of the National Corn Growers Association.

But there are obstacles. The people of Mozambique are poor and sometimes starving. The nation is still suffering the lasting effects of a brutal civil war.

“The primary agricultural implement is a hoe. People are still farming the way they did 2,000 years ago,” said Josh, BS '04, agribusiness. “We feel this is one of the last places on earth where you can do pioneering in agriculture.”

But, even in the poor, remote rural areas, most people have a cell phone.

“They don’t have many other material possessions, but they are being exposed to technology,” Josh said. “They want something more from their lives than just growing maize on a hectare of land and surviving.”

The Hardies’ goal for their African operation is to introduce appropriate modern methods, better seed and an improved quality of life. At the same time, they know they need to make a profit to stay sustainable. They see the farm becoming a hub for information as it helps create an entrepreneurial mindset among the local community.



The Hardies’ goal for their African operation is to introduce appropriate modern methods, better seed and an improved quality of life.

Joshua Hardie discusses soybean production with local agriculture students.

“What I hear is that the farmer is the profession choice of last resort in Mozambique – the culture does not seem to highly value the agriculture producer,” said Josh. “We want to promote the idea that growing crops is an honorable profession and you can make a nice livelihood.”

The Hardies say they are in Africa for the long haul, and each of them annually spends about one to two months there. Their hope is that in three, five or 10 years, the local area will look much different as people’s lives and opportunities are greatly enhanced.

“There is power in a family working together and having clear multi-generational objectives – there is magic to that,” said Wallie. “We want to instill that concept. If we do it right, hopefully lives will be improved.”



## NDSU research shows horses are good therapy

The close interplay between horse and human may be a key element in therapies for troubled youth.

Researchers are putting that concept to the test in a program where NDSU is partnering with Home on the Range, a residential childcare facility near the western North Dakota community of Sentinel Butte. Erika Berg, assistant professor of equine science, is directing the research.

In the program, social workers and equine specialists follow the Equine Assisted Growth and Learning Association model of equine-assisted psychotherapy. The idea is that clients have the solution to their unique situation within themselves, and horses play an integral role in that journey.

“Horses are very sensitive animals. They know when you are stressed, happy, angry or sad.”

According to Berg, a horse is a highly effective therapy partner for youth demonstrating aggression or defiance. “Horses are prey animals and their very survival depends on effectively reading the body language of every living being around them,” Berg explained. “About 95 percent of equine communication is non-verbal, as is the vast majority of human communication. A person simply cannot fake emotions with a horse – they demand authenticity and provide natural consequences to human actions.”

The horse-human connection helps youth regulate their emotions and respond more appropriately both verbally and behaviorally in their interactions with people. “Every day brings something different and memorable,” Berg said. “It might be something monumental like a child speaking their first words, but it can also be something that seems smaller like a rider using reins for the first time. Whatever it is, the impact is just as profound.”

Recent NDSU graduate Molly Lass could not agree more. She sees therapeutic horsemanship as a wonderful option for people looking for alternatives to traditional therapy.

Lass, BS '14, equine science, is now a graduate teaching assistant at Kansas State University where she teaches a course called Equine Assisted Therapies. It's a new course with 36 students.

“Horses are very sensitive animals. They know when you are stressed, happy, angry or sad, and will mirror those emotions,” Lass said. “By learning how to get along and work with the horse, teens and adolescents will better understand their own emotions and body language. The results have been fantastic.”



Molly Lass

While encouraged by what she sees, Lass suggests further research on the subject. “I hope it will help solidify the importance of equine-assisted activities and therapies,” she said. “This area of the equine industry is only going to get bigger and bigger.”

Berg said horses can be incorporated into such areas as physical, occupational and speech therapy; mental health therapy; and leadership training.

And interest is building. “The momentum in this field is incredible,” Berg said. “It's very exciting to be a part of it.”

## Distinguished Alumnus explores genetic building blocks



Nature's tiniest materials can lead to big success. That's certainly the case for Perry Cregan, the 2014 Distinguished Alumnus for the NDSU College of Agriculture, Food Systems, and Natural Resources.

Cregan, MS '75, PhD '77, agronomy, is a renowned researcher in the high-tech world of developing DNA markers in soybeans and other plants. He recently retired as research leader for USDA's Soybean Genomics and Improvement Laboratory in Beltsville, Maryland.

The groundbreaking research created genetic markers and genetic maps to help plant breeders work toward disease and insect resistance, and improve seed characteristics. Cregan and colleagues used a large set of soybean genetic markers to define the position of a gene that controls resistance to soybean rust disease. The work paved the way to identify resistant plants with a single, inexpensive DNA marker analysis.

Cregan got his start as an NDSU student, when he spent his last few months on campus working on protein-based genetic markers. "I thought it would be a very interesting thing to do," he explained during a visit to campus Nov. 18. "The next step is to use DNA, and that fits in so nicely."

That introduction to genetics led to a career that has had a huge impact on America's \$42 billion soybean industry.

He began his professional research with 141 soybean DNA sequences from the National Institutes of Health GenBank. His efforts led to hundreds of genetic markers referred to as microsatellite or simple sequence repeat markers.

Cregan also was a major player in a team of Agricultural Research Service, Department of Energy and university scientists that created the "Genome Sequence of the Soybean."

"When we started developing markers, I had people on the phone continuously," Cregan said. "Then, the wheat people contacted us, and we developed 600 to 800 similar markers for wheat. We saw an amazing demand."

In the past, it could take weeks to identify a handful of markers, but today's technology speeds up the research. "The last sequencing run we did, we got 570 billion bases of DNA sequence data," said Cregan, who is a fellow of the Crop Science Society of America. "Genetic analysis can be so much more thorough these days, on such a grander scale. There is a lot of potential, but also a great deal yet to be done to continue crop improvement."

In September, Cregan was inducted into the USDA Agricultural Research Service Science Hall of Fame. He and his wife, Carolyn, live in Clarksville, Maryland.





## NDSU HARVEST BOWL AGRIBUSINESS AWARD RECIPIENT NAMED

Jerry Doan, BS '75, animal science, a fourth-generation rancher and producer from McKenzie, North Dakota, received the 2014 Agribusiness Award during the 41st annual Harvest Bowl program Nov. 21-22. The honor recognizes individuals who have distinguished themselves in the field of agriculture and business.

Doan, a respected leader in North Dakota agriculture, was the first chair of the State Board of Agricultural Research and Education, known as SBARE. The North Dakota Legislature established the 17-member SBARE organization in 1997 with responsibilities to oversee agricultural research and Extension at NDSU.

His many contributions include chairing the North Dakota Ag Coalition and North Dakota Beef Commission. He is a past director of the North Dakota Stockmen's Association and chaired the association's Animal Health and Research Committees. He is past chair of the Mandan Professional Cowboys Association Rodeo.

Doan was a board member for the state 4-H Foundation, NDSU Alumni Association, North Dakota Junior High Rodeo Association and North Dakota High School Rodeo Association. He has served on the National Beef Industry Council and National Livestock and Meat Board. In addition, he was active with the North Dakota Consultation Board, Governor's Value-added Agriculture Board, Vision 2000 Committee, NDSU President's Advisory Council and NDSU President's Ag Club.

Currently, Doan is president of Rural Leadership North Dakota, Central Grasslands Research Center advisory board chair and a mentor with the North Dakota Grazing Lands Coalition. He chairs the 4-H MVFA youth rodeo in Bismarck and chaired the Joann Hetzel Memorial 4-H building campaign and continues as chair of the building committee.

Doan and his wife, Renae, have four children.

## College enrollment soars for 7 consecutive years

NDSU was clearly the right choice for alumna Christine (Nodsle) Eck.

“Not only did I walk away with an exceptional education and the degree I had dreamed of, but with a deeper confidence in myself and an appreciation for what I am capable of when I put my mind to it,” said the 2014 graduate in veterinary technology who is one of growing number of students who have selected NDSU’s College of Agriculture, Food Systems, and Natural Resources to make a difference in their lives.

Eck had previously earned a degree in business, but she found herself burned out working as an administrative and marketing assistant. She needed a change; she wanted something more.

Since childhood, Eck loved working with animals. So at age 25, she made a deliberate, mature choice – she would go to NDSU to study veterinary technology.

“Not only does NDSU have a vet tech program that is highly regarded nationwide, but the value of the four-year education received for the investment simply could not be matched,” said Eck, who commuted each day from her hometown of Detroit Lakes, Minnesota.



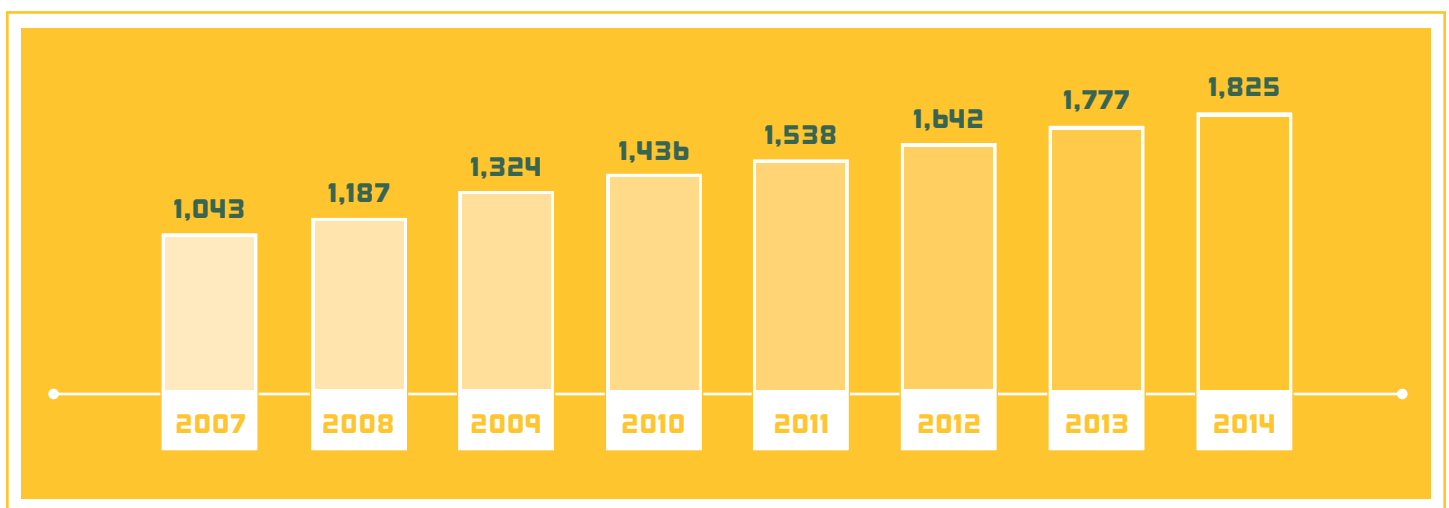
Eck is certainly not alone. More and more students are turning to opportunities in agriculture, as the college has seen enrollment increases each of the past seven years. The college has risen from 1,043 students in 2007 to 1,825 currently.

“That’s nearly an 80 percent increase,” said David Buchanan, associate dean for academic programs. “We’ve seen a substantial increase in both graduate and undergraduate students and a near doubling of our female students.”

The enrollment jump comes practically across the board, with growth in almost every program. “Young people and their families are realizing there are good careers in agriculture. There are many opportunities for growth,” said Buchanan, noting students are attracted by the quality of NDSU programs. “We provide a good education that is up-to-date and complete. We deliver on our promises.”

That statement is quickly confirmed by Eck, who recently married and now works at a veterinary clinic in Bemidji, Minnesota. With her NDSU experience, she feels prepared for a bright future. “My goals continue to be to enjoy life every day and to do my best no matter what life throws my way,” she said. “I want to live a life that I and my loved ones can be proud of.”

**COLLEGE ENROLLMENT** More and more students are turning to opportunities in agriculture, as the college has seen enrollment increases each of the past seven years.





## NDSU recognized by leadership organization

It's a partnership that works.

For 10 years, the NDSU College of Agriculture, Food Systems, and Natural Resources has worked closely with Agriculture Future of America, an organization dedicated to preparing the next generation of agricultural leaders.

The college was recognized for its decade of collaboration during the annual AFA Leaders Conference in Kansas City, Missouri, during November.

"We are deeply honored to be recognized by AFA," said Ken Grafton, vice president for agricultural affairs, dean of the College of Agriculture, Food Systems, and Natural Resources and director of the N.D. Agricultural Experiment Station. "It is extremely important that we provide our students with opportunities to learn or enhance their leadership skills. Working with organizations like AFA helps us achieve our goals of ensuring that the next generation of agricultural leaders in North Dakota and the region are well equipped for the challenges and opportunities that agriculture will address in the future."

According to NDSU's AFA campus ambassador, Jodi Boe, the organization provides development opportunities for NDSU students who have been identified as leaders. "Students who attend the AFA Leaders Conference each fall develop professionally and personally while expanding their networks with industry leaders and other student leaders," she explained. "Attendees

then spread their knowledge from the conference to other students through friendships and organizations."

**"These real-life experiences are key for young agricultural leaders and their understanding of the challenges faced by agriculture."**

The conference experience, combined with the student-led organizations within the college and across campus, internships, field trips and study abroad experiences give NDSU students many opportunities to test their leadership skills. "These real-life experiences are key for young agricultural leaders and their understanding of the challenges faced by agriculture," said Boe, a senior from Golden Valley, North Dakota. "Understanding these challenges helps students identify ways they can work to solve them."

AFA was founded in 1996. More than 10,000 students and young professionals have participated in the organization's leadership training. Students have represented more than 200 colleges and universities in 43 states and six countries or territories.

Catch up with all the latest news of your  
classmates and fellow NDSU alumni.

**[WWW.NDSU.EDU/CLASSNOTES](http://WWW.NDSU.EDU/CLASSNOTES)**



**NDSU**

COLLEGE OF  
AGRICULTURE, FOOD SYSTEMS,  
AND NATURAL RESOURCES

NORTH DAKOTA STATE UNIVERSITY  
DEPT 2200 PO BOX 6050  
FARGO, ND 58108-6050

[www.ag.ndsu.edu/academics](http://www.ag.ndsu.edu/academics)



Non Profit Org.  
U.S. Postage  
**PAID**  
Fargo, N.Dak.  
Permit No. 818

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, race, religion, sex, sexual orientation or status as a U.S. veteran. Direct inquiries to the Vice President for Equity, Diversity, and Global Outreach, 102 Putnam Hall, (701) 231-7708.

Members of the newly formed NDSU Ag Week Coalition display the sponsor banner for NDSU Ag Week held April 13-18. These students, representing nearly all of the 32 agricultural clubs on campus, organized the week's activities to promote agriculture and to celebrate its rich history at NDSU. *Photo credit: Heather Milbrath, a senior majoring in agricultural communications*

