Three ACES students undergo intense agricultural development to impact global food security during 40 Chances Fellowship.
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Our college addresses a wide scope of research, academic, and outreach needs, representing some of society’s most pressing and important issues. And the demand for our scholarship continues to increase in terms of challenge, audience, and geography, as evidenced by growing international work and recognition.

Will the growth in demand continue? The White House inquired about this issue via a survey from its Office of Science and Technology Policy by asking: “Over the next 10 years, what are the most important research gaps that must be addressed to advance agricultural innovation?” The ACES director of planning and research development, Richard Vogen, along with our associate dean for research, Neal Merchen, led the effort to answer this question on behalf of the college. Allow me to summarize our response about research gaps facing our college relative to agricultural innovation, grouped here by theme:

**Agricultural Data Systems and Analytics** — Broad research gaps exist related to better data gathering, better data security and privacy, governance related to agricultural data, greater openness in understanding agricultural marketplace dynamics, tools to understand the “big data” space and its purported benefits, and multidisciplinary learning opportunities.

**Food, Energy, and Water Nexus** — The tradition has been to pursue research as separate nodes of inquiry. However, better knowledge is required about the interdependency between food and agricultural systems, energy inputs and outputs, and water needs and uses.

**Agriculture and Climate** — Changing environmental conditions and climate impacts on agriculture will require production practices to address emerging challenges. Many of those challenges relate to atmospheric and geological conditions, pests, invasive species, and diseases for economically important plant and animal species, changing microbiomes, and zoonotic disease epidemiology.

**Agriculture and Ecosystem** — Sustainable and flexible nutrient management strategies are required in agriculture and its environment to reduce deleterious effects on water and land ecosystems, while enhancing agricultural productivity and growth in food systems.

**Agriculture and Health** — Individualized health care, nutritional interventions, and biomedical spinoffs from agricultural research will present opportunities and potential value from integrating agricultural sciences with life and medical sciences and engineering.

**Agriculture and Bioscience** — Science and technology advances are needed to improve efficiencies, reduce water usage, and increase renewable energy production, including innovation for next-generation biofuels, and to create novel biochemicals and value-added products derived from agriculture and biomass.

**Food Security and Safety** — Applications of integrated science in food systems frameworks should be more effectively leveraged to safely secure food for all populations and to address the physical, biological, and social risk factors present in food systems.

**Agricultural Market and Financial Risk Management** — Functioning food systems will require improved knowledge and performance of risk management strategies and financial products for agricultural producers and others, with new knowledge, data analytics, decision tools, and education to manage risks in existing and evolving food systems and markets.

**Agricultural Transportation and Logistics** — Research is needed to enable functional physical infrastructures, such as production, transportation, manufacturing, broadband technology, and distribution systems, as well as virtual infrastructure, such as markets, financial systems, and policy frameworks, to contribute to growth of the food and agricultural sector and to satisfy changing consumer demands.

**Consumer and Social Behaviors** — Modern societies and their consumers usually have limited and indirect experience with agriculture and other aspects of food systems, yet consumer attitudes and behaviors have profound influences on agriculture and related functions. Understanding consumer preferences is critical.

**Financing and Venture Capital for Agricultural Innovation** — An important gap to be filled is to create effective means for catalyzing innovative ideas from public agricultural research, to help accelerate innovation in the private agricultural and food economy.

As you can see, there is plenty to do. As over the past 150 years, the University of Illinois will lead the way. The College of ACES will do so through its scholarship and outreach and by educating the next generation of innovators to tackle the wide-ranging, critical challenges of food and agriculture, worldwide.

Robert Hauser, Dean of the College of ACES
Chances

By Jennifer Shike

If you had the resources to accomplish something great in the world, what would you do?
When renowned investor Warren Buffett announced 10 years ago that he was leaving the bulk of his fortune to philanthropy, he posed a question to his son: If you had the resources to accomplish something great in the world, what would you do?

In response Howard G. Buffett set out to help some of the most vulnerable people on earth — the hungry. On his website 40Chances.com, he notes that "hunger permeates our society in a way that most people don’t understand."

Having come to the conviction — through his passion for farming — that each of us has about 40 productive seasons of life, Howard gave himself a deadline of 40 years to put more than $3 billion to work fighting hunger. He captured the start of that journey in a book, 40 Chances: Finding Hope in a Hungry World, where he shares lessons he has learned in his travels.

One of the ways he has invested his resources is by helping develop agriculture’s future leaders. In 2012, the Howard G. Buffett Foundation partnered with Agriculture Future of America (AFA) to send 40 students, then college freshmen, to the annual AFA Leaders Conference for the next three years.

The students, named the 40 Chances Fellows, were chosen based on their desire and potential to impact global food security. Three University of Illinois students, all from the College of ACES, were selected for this once-in-a-lifetime opportunity — Danielle Cooney, Shelby Cooper, and Sarah Maurer.

"By investing in 40 future leaders, Howard G. Buffett hopes there will be 40 students ready to go make an impact in agriculture upon graduation," says Cooper, a senior in agricultural leadership and science education. "This program was designed to help us gain experiences that may otherwise have taken us many years to learn as young professionals."

Although their reasons for applying for the program were varied, the three fellows all agree on one thing: they want to find a way to make the world better.

"I’ve always wanted to help fight world hunger," says crop sciences student Cooney. "But everyone made me think my goal was unrealistic. When I received this opportunity, I suddenly had something tangible to help me accomplish my goal. With my love for plants and farming, I realized I could combine all of these passions to make a difference."

Cooper knew she needed to grow her knowledge of agriculture.

"I also wanted to deepen my understanding of global development," Cooper says.

For Maurer, a senior in agricultural and consumer economics, the program seemed like a good way to differentiate herself in a competitive agricultural business world.

"With the landscape of agriculture constantly changing, it’s important to know what’s happening outside the borders of our country," she says.

AFA enhanced the 40 Chances Fellows experience to include educational opportunities each year focusing on one of AFA’s programmatic pillars: self-assessment, communication, managing change, and lifelong learning.

"We wanted our fellows to achieve a broader view of international agriculture," says Nancy Barcus, AFA chief operating officer.

The fellows have created professional portfolios, traveled to Minneapolis for a domestic hunger experience, and recently completed a capstone international experience.

"Our fellows traveled to Bolivia, Thailand, and the Netherlands, where they experienced differing levels of economic development, poverty and hunger, and market access," Barcus says. "This extension of the original program was supported by industry partners Bunge, CHS, Cargill, and Monsanto and executed with support of the Institute of International Education (IIE)."

Maurer was selected to travel to Bolivia to explore the quinoa industry and identify key targets to improve poverty and market access for the local Bolivian population. Throughout the experience, students met with local experts and producers to better understand the history and impact of this crop on Bolivian agribusiness — including its role in hunger relief.

Meanwhile, Cooney and Cooper traveled to Thailand, where their groups looked at sustainability and resiliency in the Thai agriculture system. Their project focused on improvements on rural farms to increase yield and income, stabilize market prices, decrease plant disease, increase the efficiency of transportation of goods throughout the country, and educate farmers about modern technology.

At the end of their journey abroad, the groups met in Washington, DC, for a debriefing with industry professionals and AFA staff.

"We had quite an audience for our final presentations," Cooper says. "We saw opposite ends of various spectrums in our differing countries. Bolivian agriculture sees a great deal of quinoa production and relates to Thailand’s struggle to find a stable, open market in which to sell the crop. The Netherlands is extremely advanced in almost every area of technology and land/space efficiency, but some said they lack the sustainability to provide for themselves in various climates and seasons."

We invite you to travel along with Cooney, Cooper, and Maurer as they share personal reflections about their experiences abroad.
“During this trip, I learned more about myself and the people I was with than I could have ever imagined.”

Sarah Maurer

December 28: It’s 2:35 a.m. and we are finally in Bolivia. I flew from Indianapolis to Washington, DC, where I met up with the 40 Chances Fellows who were going to Bolivia with me. From there we flew to Bogota, then to La Paz (where we are currently), and we still have one more flight to Santa Cruz. We arrived at our hotel at 8:30 a.m. After breakfast, we had a quick orientation meeting. I called my parents to tell them I made it to the hotel safely.

December 29: This morning we visited Soya y Vida (Soybeans and Life), a foundation made up of volunteers who teach Bolivian farmers how to save money by using their soybeans as both a protein and a milk. We learned more about the relationship between the government and farmers. The government highly regulates farms, ultimately making them less profitable. The government is anti-GMO and big farming and pro-organic farming. The government believes each farmer should produce enough to feed their family. In my opinion, that’s crazy. There are more people that live in Bolivia than there are farmers. If the farmers produce just enough food for their families, what will the rest of the population eat?

December 30: Today we visited farms in Santa Rosa where the Save the Children Foundation is helping farmers diversify their operations. In the first village we visited, Save the Children was helping farmers diversify to increase their income through beekeeping. At the next farm we visited, Save the Children helped farmers identify a root that has medicinal purposes, is a natural dye, and can also be used as a spice in food. There is high demand for this root that sells in powder form for $100 per kilogram. I’m shocked at how poor the infrastructure is in the rural areas. Market access for these rural farmers is a serious issue.

January 1: We woke up at 3 a.m. to leave for the airport. We are on our way to Uyuni. Our hotel, Tonito Hotel, has a restaurant known for its pizza. At dinner, we ordered a spicy llama pizza. It has a tomato sauce base with some pesto and spiced llama meat. Uyuni is a really dirty town. There are piles of trash everywhere and dogs running wild in the streets.

January 2: Today we visit the salt flats. Since there are no paved roads and no road signs, it is easy to get lost. It’s a good thing our tour guides know where they are going because it looks like the desert out here!

January 3: Today is our first visit to a quinoa farm. The plants are only a few inches above the soil, when they should be about two or three feet tall at this point. These farmers have replanted twice now. Their crop has been unsuccessful this year because they have been in a drought since May of 2014. The soil here is almost completely stripped. It was discouraging to learn of the organic farming practices from yet another farmer who doesn’t understand the basic principles of crop rotation, cover cropping, and soil health.

January 6: Today we are traveling to a cañahua operation and sheep farm run by the Samiri family. Cañahua is similar to quinoa, but has different nutritional content. They have 725 sheep, which is a huge operation. They are also experiencing a drought so they have been building retention ponds and ditches by hand to help collect water. The family is very connected to the “Pachamama,” or mother earth. They perform rituals to thank Pachamama and ask for things. This year, they asked for rain by burying a pot of water and a pot of soil just outside of their holy circle. This is a stark contrast to the Catholic beliefs that many Bolivians have.

January 8: Today we had lunch with Sembrar, a microfinancing company that provides small loans to rural farmers so that they can increase their production. Microfinancing companies are essential in countries like Bolivia because the big banks will not loan small farmers money, mainly because they don’t have an official title to their land to offer as collateral.

January 12: During our group’s presentation today, we shared that Bolivia produces 46% of the world’s supply of quinoa, but most of the farmers that grow quinoa are some of the country’s poorest people. With limited or no access to education, one poor and uneducated generation leads to another. Microfinancing organizations offer small loans to farmers, $2,300 on average, but at an unaffordable 22% interest rate. Additionally, with purely organic production, lack of proper fertilization and crop rotation practices, and limited use of cover cropping, farmers aren’t able to maximize their yield. We recommended creating greater access to education, establishing a co-op for the Bolivian quinoa producers, and building up the rural infrastructure.
I am embarking with mixed anticipation. Just a week before my trip of a lifetime I was informed that I would be unable to attend my much-researched trip in Ethiopia. However, I was redirected to Thailand, so here I go!

Danielle Cooney

December 26–27: What a start to my journey! We left Sunday morning, and then we finally reached our destination on Monday night.

December 29: Orientation was important for my group today because this is only the second time we’ve been briefed on concepts. The local guide provided insight on the culture and background of ag.

December 30: Our first stop was Chiang Mai University, where we met with the dean of agriculture. I learned that no matter what country you go to, research is motivated by similar reasons and problems. We visited a cattle farm researching gestational period. Next we visited a vegetable farm studying hydroponics. Back at Illinois, I learned about tissue culture in a horticulture class, and was able to have a quality conversation with a Chiang Mai professor about how they utilize tissue culture. That night we ventured to a restaurant known for its pad thai. To get there, we rode in a famous tuk tuk. What an experience! The driving here is certainly different.

December 31: Happy New Year’s Eve! Since most businesses are not open today, we visited the Queen’s Botanical Garden. This was a wonderful opportunity to see how she has preserved native Thailand vegetation and flowers. After viewing the museum, we purchased lunch — a roasted chicken on a stick and sticky rice. That night we explored the city and learned that most Thai stay home and pray for the new year. One awesome tradition I’ll never forget was when they released thousands of large paper lanterns into the sky at the same time. Later we all ran into the street, counted down, and cheered as the new year rang in surrounded by fireworks.

January 2: It’s our first morning in a new hotel with a new breakfast buffet; yet again, it featured rice. By this time, rice was not a welcome sight, and I was ready for American breakfast! Today we learned about the king’s passion for improving the lives of the hill people and the challenges faced by the northern portion of Thailand. We went on a special tour to see the food-processing factory. Since it was a holiday, the worker who was guiding us went out of his way to share information and experiences about his role in the royal factory. Later, we switched from the vans into trucks that could take us up the mountain, where we saw a large variety of plants and hillside terracing gardens. One noteworthy thing I learned by eating at a restaurant with bathrooms tonight: toilet paper is hardly used. Instead there is a hose and sprayer next to the toilet called the bum gun. I’m not entirely sure of the proper way to use it, but this is certainly something new!

January 4: We started the first day of our homestay with a beautiful sunrise bike ride. After talking with the host leader, we asked to see a temple. Our host took us to one of the local community temples. We asked many questions about the religion. This was a great way to learn about a perspective so different from our own. This evening, I learned northern Thailand traditional dances — it was certainly more challenging than it first looked! Everyone went out of their way to ensure things were going as smoothly as possible. I can’t think of a better way to slow down the trip while fully appreciating what the Thai culture can teach us.

January 8: Today I hit the wall of frustration in the culture shock development curve. This was our first morning in Bangkok, and, boy, was it a challenge to get up! Our first stop was at a temple ruin in Ayutthaya. I was challenged to understand the foundation that governs this country, respect what they view as important, and see how that impacts choices they might make regarding agriculture and millions of Thai people. The final stop of the trip was a bottled tea company. Information we knew to be untrue was portrayed as foundational to the company’s beliefs. We had to remain composed and open to what information was being shared while considering how we could bridge this communication and misinformation gap.

January 12: We’re back in Washington, DC, for our final presentations! One key area our Thailand group identified that needed extra consideration was the culture. We worked hard to establish feasible suggestions for improvement. For example, since my background is crop sciences and organic is very prevalent in this society, we recommended utilizing traditional breeding for insect tolerance to improve the vigor of the vegetable crops. Improving one country is only a start in positively impacting issues of global hunger, but we believe this experience moved us in the right direction. We each offer valuable perspectives and realize that only by working together to utilize our strengths can we possibly alleviate this global issue.

December 30:

Thailand

January 2:
December 26–27: Traveling is for the birds! I began my trip in Bloomington and flew to Chicago to meet up with the rest of the group. We boarded an international flight to Shanghai, China, and connected there to eventually land in our final destination of Chiang Mai, Thailand. I’ve never traveled this far, and I can tell it’s taking a toll on my system. I can’t wait for a shower and a clean bed. I know I will sleep well tonight!

December 28: This morning I’m learning brief cultural concepts in Thailand. Being in a new country is not unlike being a child again. Our group learns simple greetings such as “hello” and “thank you.” A very important concept in Thailand is greng jai, the desire to maintain harmony with those around you. Learning these cultural concepts will prove very important in the coming weeks. For lunch, we enjoyed traditional steamed rice and cashew chicken, shrimp curry soup, and drinks straight from a coconut! This afternoon we visited a mountaintop temple in Chiang Mai. To get there, we took a 40-minute ride in the back of a truck, making hairpin turns and narrowly missing other cars and cyclists along the way. The bird’s-eye view of Chiang Mai is breathtaking, and the intricacy of the temples is unlike anything I’ve seen before. There is a certain peace to the place of worship that is respected by Buddhists and tourists alike.

December 29: Listening to Dr. Attachai Jintrawet speak about Thailand’s economy and agriculture today allowed us to learn more about the history of production and the current state of Thailand and its people. Rice is a large piece of the agriculture system here, as well as temperate crops like vegetables, fruits, and beverage crops such as coffee and tea. This briefing allowed us to see the levels and topics of agriculture that Thais are involved in while comparing it to what we know about life and agriculture at home.

January 1: We spent the first day of the New Year with animals large and... larger! In the morning, we visited Maesa Elephant Camp and rode elephants through a trail in the forest, stopping to feed our mammoth mode of transportation and even get sprayed with water. I have never felt so small as I have standing near these resilient and gentle creatures.

January 2: The Royal Project is an initiative started 50 years ago by the Thai royal family when people of the hill tribes in northern Chiang Mai were growing opium for drug production and living in poverty. When the current king took reign, he realized a need for the people to grow productive, economical crops so they could support themselves without the limitations of opium. He began an initiative to distribute seeds, supplies, and educators to communities to teach the ways of temperate crops. This initiative has brought thousands out of poverty, and continues to improve the agricultural and economic environment in the hills of Thailand.

January 3: Today we visited the Thanathon Orange Farm and Orchard. The owner started his business 30 years ago with five acres of land and now owns over 3,000 acres, becoming the largest orange and onion producer in Thailand. We visited on a Sunday, and learned he had called in special production to be done at his plant so we could see fresh fruit processed even though it wasn’t a workday. It was a great example of how strong agritourism is in Thailand.

January 4–5: We spent two days at Pun Pun Organic Farms to learn about subsistence farming. This small community lives and works with the idea of growing and harvesting only what you need. They farm organically and save seeds for future seasons based on taste and yield. It was eye opening for our group to see a system that was committed to staying small in size and did not work for profit. As with all things, I see diversity as a strength in agriculture, and it’s important to learn how various systems work to improve efficiency.

January 10: This morning we dived into reflections and connected what we have seen to how we could improve Thailand agriculture. We haven’t only observed food security, production, and processing on our trip; we have witnessed it all within a cultural context much different than what we see at home. Fellows suggested everything from stabilizing market prices for rice to establishing co-ops in local villages to bring farmers together. I focused on education and the lack of formal schooling for the majority of farmers in rural regions.

January 12: It’s debriefing day in Washington, DC. In our Thailand group presentation, we shared that mechanization is more expensive than human labor in Thailand, market prices are inconsistent from season to season, and many don’t have above an elementary level education. These factors combined with a lack of modern infrastructure causes inefficiency and weakness in their agricultural system. I believe the underlying problem is a lack of education. With a greater understanding of production opportunities, Thailand can empower its people and decrease the level of poverty and food insecurity nationwide.

Thailand

“I was fascinated by the advantage that indigenous knowledge has in the areas we visited. Often we discount life experience and devalue it compared to formal education. In reality agricultural education is fundamentally working for that practical knowledge and practice of a trade. I will work harder than ever to learn something from every person I meet from now on.”

Shelby Cooper

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IMPROVING...

Companion Animal

Nutrition

Helping your pets live longer and better lives

By Stephanie Henry
It’s dinnertime, and tonight’s selection is a bowl of rotisserie chicken with sweet potato and wild rice. It’s loaded with all the essential vitamins and minerals. And you can tell by the wagging tail that your healthy, growing pup is loving every bite.

Like most pet owners, you consider your companion animal a member of the family, and you want the best for her so she will live a long and happy life.

Over the years, the importance of pets in our lives has changed dramatically, along with what we know about the role nutrition plays in human and animal health. Trends in what people eat and consider “healthy,” as well as love for our furry, four-legged friends have brought about changes in what pet food makers offer today.

Today’s prepared meals for dogs and cats have been specially formulated for that pet’s breed, size, or specific health needs, and they contain ingredients and flavors that sound good enough to show up on our own dinner plates. Years of science-based research have helped the larger-than-ever pet food industry offer a variety of nutritious, fully balanced diets.

For decades, researchers in ACES’ companion animal program have studied how to best meet pets’ unique nutrition needs. And graduates of the program are making significant contributions throughout the pet food industry. George Fahey, now an emeritus professor of animal sciences, was with the department in the 1970s, when ACES first began its teaching program in companion animal biology (eventually including nutrition). The program was the first of its kind in the nation.

In 1974 the head of the Department of Animal Sciences, D.E. Becker, was looking ahead to a day when students coming to U of I to study swine, poultry, or dairy might be less common. “He was a visionary,” Fahey says. “He foresaw the day that the pet animal would be first and foremost in the minds of young people coming to campus.”

So Becker hired Jim Corbin, then research director of the Ralston Purina pet food company and a U of I graduate, to start the program. “As you might guess, there wasn’t 100 percent buy-in,” Fahey remembers. “Becker swam upstream. But Corbin came, and the program became one of the most important in the department.”

While Corbin acted as the “big picture guy” for the new teaching program, he was not a lab scientist, Fahey says. So Corbin soon asked Fahey to partner with him. Four graduate students working with Fahey and Corbin earned their master’s degrees with an emphasis in companion animal nutrition in the early 1980s.

In the mid-1980s, a graduate of the U of I program who was the R&D director for the IAMS company encouraged Fahey to do more companion animal research. “I enjoyed working with Corbin as a sidelight; it was interesting,” Fahey says. “But this alumna said that there was a need for more research — that IAMS was moving toward doing science, not just marketing, and that they would be offering research funding.”

At the time, Fahey and colleague Neal Merchen both worked in ruminant nutrition. The two decided to start a research program in nutrition for companion animals. “We had considerable experience advising students, and we could place them in jobs,” Fahey says. “It was not an easy transition, though. We were stepping out of our comfort zone. But we did, and it was one of the best things that ever happened to us.”

Since then, the Companion Animal Biology and Humane Education Program, as it is now called, has continued to grow and remains unique. Though Fahey retired in 2010, he maintains a research program, and Merchen is ACES’ associate dean for research. The teaching program has four lead instructors: Kelly Swanson, Maria R.C. de Godoy, Amy Fischer-Brown, and Sarah Albert.

The Companion Animal Nutrition Group is known worldwide for providing the most up-to-date information on ingredient adequacy and safety in pet foods, as well as on the impact of nutrition on pets’ health and well-being.

In the U.S. today, Fahey says, pet food is a $23-billion industry. “That’s just the food — not the veterinary care, the toys, or the supplies. That tells you it’s a huge business.”

“It’s basically because we’re so in love with our pets,” Fahey notes. “The industry is doing so well, and they need new young people with innovative ideas to take the industry forward. I think everyone from our program can find a job.”

The pet food industry wasn’t always so huge, though, Fahey adds. Before the 1970s, there were still a lot of backyard dogs and barn cats. “Back then, cats might get in the house, but they were shooed back out,” he says.

Fahey tells how the first dog food was made in the 1800s — before pet nutrition was big business. Farmers brought their work dogs with them to grain elevators, and the operators made food for the dogs from the same corn-based mix used for feeding swine.
Attracting Future Industry Leaders

It was the reputation of U of I’s program in companion animal nutrition that brought former grad student Marcial Guevara to Illinois from his hometown in Venezuela. Though Guevara had hoped to avoid a school with cold winters, he had been advised that if he wanted a PhD in pet nutrition, U of I was the place he should be.

Guevara arrived in Illinois in January 2006 to start work on his master’s degree and eventually a PhD, both working with George Fahey. Today Guevara is a research scientist for Mars Petcare, one of the world’s leading pet care providers, including such brands as Pedigree, IAMS, Whiskas, Nutro, and Eukanuba. “The program at Illinois is recognized as a leader in the field,” Guevara says. “Most companies keep close relationships with Illinois, and if you drop the school’s name, industry is interested in you because they know the quality of the program.”

Guevara notes that the pet food industry has changed greatly in the last 5 to 8 years. “Pet nutrition follows the trends of human nutrition,” Guevara says. “Today, consumers want to eat more natural, more wholesome food that is safer and higher quality. This translates to the pet food category, where we are seeing pet parents more interested in knowing about what they are feeding their four-legged friends.”

Between 1900 and the 1950s, Fahey says, there wasn’t much progress in pet food and nutrition until Jim Corbin and Ralston Purina started doing their work. Purina Dog Chow was introduced in the 1950s, and Corbin’s picture was on the bag, Fahey adds.

Today, Maria R.C. de Godoy, an assistant professor in the U of I program, focuses her research efforts on ingredient and food matrices evaluation for pet animals, the impact of food technology on the quality and safety of pet foods, and the impact of nutraceuticals (defined as an ingredient or food source with health benefits in addition to its basic nutritional value) on health and management of disease in pets.

“Obesity is the main disease in dogs and cats, with more than 50 percent of dogs and almost 60 percent of cats in the U.S. being overweight or obese,” Godoy says. “A common side effect of obesity is the development of comorbidities such as insulin resistance, type 2 diabetes, joint distress, and heart and respiratory problems.”

Other common concerns seen as cats and dogs age are oral health, kidney health, and joint disease. Godoy says nutrition studies can assist in managing these conditions, or even postponing their onset.

“In the past, we didn’t have such close relationships with our pets,” Godoy says. “Now they are like our four-legged children. We want them to live a really long life and to live well. “So providing a food that just meets an animal’s nutrition requirements is not enough. Now owners want a food that improves the health of their animals and the quality of their lives and their longevity.”

Godoy adds that the same trends you see for humans are also seen for pets. “These include, but are not limited to, organic, non-GMO, natural, and nutraceutical ingredients. A great example is fish oil, which is rich in omega-3 polyunsaturated fatty acids and has anti-inflammatory properties,” Godoy says.

Along with communicating research results, educating pet owners is important. Godoy explains that in the process of developing strong emotional bonds with our companion animals, a phenomenon called “pet anthropomorphism” can take place. That is when pet owners attribute human characteristics to their pet animals and also transfer many daily life behaviors and needs to them.

“Pet owners do that because they love and care for their animals; however, what is good for us humans is not always good for pets. Dogs and cats are different species and have different nutritional requirements than humans.

“Identifying the differences is a main goal of academia, and education needs to come into play so pet owners can make informed decisions,” she says.

And the benefits of the education and research? Godoy says that the lifespan of animals has increased by 20 percent over the last 20 years. “Our understanding of the role of nutrition has changed, so nowadays we know that very small changes in nutrition can really help animals to live not only longer but better lives.”
By combining their disciplines of crop sciences and economics, ACES faculty members — and brothers — Donald and David Bullock are helping reduce environmental damage and raise farm profits around the world.

Don and David agree that their disciplines have traditionally not understood each other very well.

“If you read ag econ journals, there is a lot of bad crop science,” David says, “and if you read crop science journals, there is a lot of bad economics.”

“The argument is over which is worse,” quips Don.

The brothers’ large body of work — accumulated over 20 years — has helped crop scientists and agricultural economists better understand each other. Their newest project goes further, being truly multidisciplinary — they are also working with agricultural engineers and environmental scientists. The two Bullocks have learned that good interdisciplinary research benefits all of the players, but it requires understanding other “languages.”

“People from different disciplines see things in different ways. When you get around to understanding what the other person is saying, it makes sense; it’s just seen from a different viewpoint,” David says.

Don adds that “interdisciplinary collaboration allows you to see some of your own ignorance. When you work on big projects, it is easy to quickly get beyond your area of expertise. When you bring groups and additional expertise to the table, all of you can do a better job.”

The Bullocks note that PAT, which makes use of the satellite-based Global Positioning System, has not always been used correctly. So their project uses it to focus on gathering the right information.

“Our project is about generating the data you need to use precision technology. We are trying to figure out what information we need to collect to make good decisions. Technology and information are complimentary. The technology is worth so much more with the information. And the information is only valuable with the technology,” Don says.

“Our overall goal is to change how advice about nitrogen use is given. We want to make it very data intensive. By collecting data on how yields and water quality respond to nitrogen, we can increase farmers’ production and reduce environmental damage from overfertilization,” David explains.

So is it harder or easier to collaborate with a brother than another colleague? “It’s harder,” Don says, “because you say things you wouldn’t say to anyone else.”

“So, yes, it’s harder to keep the relationship,” David jokes. However, it’s pretty hard to offend your brother, they agree. And their results suggest that their working relationship has definitely been productive.

By Leslie Sweet Myrick

Funding for this project has included a Future Interdisciplinary Research Explorations grant from the College of ACES Office of Research, support from the Lemann Foundation, and travel funds from the ACES Office of International Programs.
In the early 1900s, Chicago’s ingenious 96-mile network of canals and locks solved the city’s sewage problem, carrying waste away from the city and providing an avenue for commerce and shipping. The downside is that the waterways now also provide a route for Asian carp and other invasive fish species to pass between the Great Lakes and Mississippi basins.

Some of the entry points are problematic only when spring rains flood the area, allowing fish to swim from one body of water to another. At those points, concrete walls function like levees when water is high.

At others, complex electric barriers emit a low-voltage charge to discourage fish from crossing. Unfortunately, the barriers have drawbacks: they are prone to shutting down for periodic maintenance and power outages, leaving the canals vulnerable to aquatic invaders. Fish can also dodge the electric barriers using the “protective cover” of steel-hulled barges.

Asian carp are an invasive species. They grow rapidly and eat the zooplankton (small animals) and phytoplankton (small plants) depended on by other fish and other aquatic organisms, competing with almost every small fish in the river.

They’ve already invaded the Mississippi River and the area about 21 miles downstream from the electric barriers in the Chicago Area Waterway System. As the Asian carp population grows, the urgency to find a safe and reliable solution looms large.

A SECOND LINE OF DEFENSE

University of Illinois researcher Cory Suski believes the answer is redundancy: two barrier methods are better than one.

Suski began experimenting with adding carbon dioxide (CO$_2$) to water as a nonphysical fish barrier. He believes CO$_2$ can supplement the electric fence to repel fish from an area, offering a second line of defense. The gas technique has
already proved effective at fish hatcheries; adding CO₂ helped move fish from one area to another, making it easier to harvest them. Suski wondered, Could a similar strategy help protect the Chicago River canals and other vulnerable entry points into the Great Lakes?

“In one experiment using tanks, we chased fish with the gas,” Suski says. “Once carbon dioxide reached a threshold, fish would ‘choose’ to leave the area of the tank that had CO₂. The fish initially showed signs of being irritated or agitated after exposure, but eventually they lost equilibrium. The carbon dioxide causes acute hypercarbia [elevated CO₂ in the blood] — like the effect of an anesthetic gas for patients who are undergoing surgery.”

To test fishes’ avoidance of CO₂, Suski used a laboratory tank called a shuttle box that contains two chambers and a connecting canal. Carbon dioxide levels can be set in either chamber. Suski thought the carp, known for their jumping, might try to jump out of the shuttle box to escape the carbon dioxide. “We covered the tanks to keep the fish contained, but surprisingly, they didn’t jump,” he says.

Four fish species were tested: bighead carp, silver carp, bluegill, and largemouth bass. CO₂ produced the same wooziness in the four species, causing the fish to avoid the area with the higher concentration of gas.

“What we learned is that CO₂ does not appear to be species specific,” Suski says. “This is good, as there are species besides Asian carp that we don’t want swimming back and forth between the river and the Great Lakes.”

Next Suski tested the CO₂ method without fish at a small pond. “We wanted to see how easy it would be to put CO₂ into a larger body of water,” Suski says. “As it turns out, it’s shockingly easy. We just bubbled it in with a hose and a gas source.”

SMALL FRY CAUSE BIG PROBLEMS

Another drawback with the electric barriers is that the electric wavelength allows little fish to swim through. To address this, Suski tested the CO₂ method on fingerling fish, some the size of an eyelash.

“We conducted carbon dioxide challenge experiments on juveniles and on 8-day-old hatched fry,” Suski says. “Results show that all four species of juvenile fishes actively avoid areas of water with elevated CO₂ — just 200 milligrams per liter, less than the amount in a can of carbonated soda.”

The larvae are so tiny that their behavior can’t be tested, Suski explains. For that size, gene expression data were used. “Even at only 8 days old, those animals experience physiological problems when they are put into a high CO₂ environment,” he says. “The biomarkers of stress turn on. So we now have evidence all the way from large adult fish down to 8-day-old fish that CO₂ causes disturbance.

“We’ve found is that none of these nonphysical barriers is 100 percent effective — electricity, strobe lights, bubble curtains, and I’d even put CO₂ in that category. They all have drawbacks. The electric barriers also pose health and safety concerns for the maintenance crew and ship workers.”

Suski says the CO₂ method has relatively few risks and is cheap and portable, with little installation or equipment required. The gas can be easily pumped into a small backwater area where there are known populations of carp, with just a hose and a tank of CO₂.

“Our suppliers collect waste CO₂ from oil and gas refineries and from soybean processing plants, so we’re not smelting coal to generate carbon dioxide,” he adds. “We’re taking waste CO₂ and repurposing it.”

NO STONE UNTURNED

Suski describes his work on CO₂ as a progression, more of a research program than a research project. Every step in the progression is investigated and peer reviewed. For instance, adding CO₂ makes water slightly more acidic. This led Suski to study how the higher acidity affects fish, the water, and nonfish organisms. He tested a variety of scales and a range of species, including the sea lamprey, another Great Lakes invader.

“Lamprey is an ancient species,” Suski says. “So from an evolutionary perspective, we have data on ancient species, on carp that originated in Asia, and on largemouth bass and bluegill that originated in North America — a great diversity of fish spanning a huge evolutionary timeframe.”

To date, the CO₂ method has been tested in small laboratory tanks, in ponds, and most recently at the Upper Midwest Environmental Science Center in Lacrosse, Wisconsin, on a much larger scale — 1.6 million gallons of water covering half an acre. The preliminary findings from the most recent test mirror those on a smaller scale.

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If there is ever a time for thinking clearly, it’s when you are choosing a marriage partner. However, false perceptions and inaccurate memories plague many couples when they are making this decision, says a U of I relationship expert.

“When couples begin dating, they are hungry for everything they can learn about the other person. But they relax after they have been together for a while. As they grow comfortable together, though, they need to recognize the importance of continuing to work on their relationship,” says Brian Ogolsky, an ACES professor of human development and family studies.

The expert suggests that couples commit to being open, staying positive, assuring their partner that they are in the relationship for the long haul, contributing jointly to household tasks, and sharing a group of friends.

So far, so good. But Ogolsky has studied relationship maintenance, and he knows that couples can draw wrong conclusions about each other as they try to keep their love alive and strong.

“For one thing, it’s only natural to want to know that your partner is putting as much work into the relationship as you are. You want to see that your partner views your commitment the same way you do. So you might silently measure your partner’s actions,” he adds.

Ogolsky’s research shows that what you do doesn’t matter as much as whether your partner notices that you’re doing it. Perception is key, he says.

“Although a couple’s relationship is at risk when they’re not working on it, the bigger risk occurs when one partner believes the other is not making an effort or that their partner doesn’t recognize the efforts they are making themselves,” the researcher explains.

False perceptions can happen all too easily. Sometimes a person’s thoughts don’t transfer into action, he says.

“Let’s say you’ve come home from work and your intention all day was to buy some flowers for your partner and make dinner. Then you get wrapped up in a business phone call, and your good intentions fall by the wayside. You feel as if you’ve put considerable effort into your relationship, but your partner didn’t see it, so it does the relationship little good.”

Conflict can also set the stage for flawed perceptions, Ogolsky says. “If you have an argument and let bad feelings linger, that negative climate can hinder your ability to recognize that your partner is reaching out to you.”

“It’s important to have good communication skills and be able to apply them when your feelings are hurt,” he says. “If you become contemptuous or critical, a deep freeze can set in. If you withdraw or avoid the issue, you may find yourself stalled with no way to move forward.”

Taking a moment after an argument to gather your thoughts is never a bad thing. But good problem solvers — people who talk things out and work through problems constructively — are able to engage with each other in the moment of conflict or shortly after, he says.
Another Ogolsky study showed that what partners believe about the amount of housework each person is doing matters a lot to partners who live together.

“If two people have agreed to divide household work equally, one partner’s perception that the other person isn’t carrying their fair share of the load can cause real dissatisfaction,” he says.

The important thing is to enter marriage with a clear understanding of where your partner stands on these issues, he notes.

“Such an understanding helps couples avoid becoming disillusioned as time goes on.”

Memory can also trick you when you are trying to assess how things are going in a serious relationship. A recent Ogolsky study shows that couples who are moving toward marriage tend to remember things accurately as they look back on their romantic history.

But couples whose commitment has stagnated or regressed are far less accurate in the way they remember their relationship, the expert says.

“People like to feel that they’re making progress as a couple. If they’re not making progress — if, in fact, the relationship is in trouble — they may have distorted recollections that help them feel like they’re moving forward because they need a psychological justification to stay in the relationship,” he notes.

“If a couple’s relationship is undergoing a slow and painful death, it no longer serves their purpose to remember the course of the relationship accurately. To avoid constant disappointment, they misremember how things are going,” Ogolsky says.

Making sure you’re perceiving your partner’s actions correctly and remembering relationship details accurately can be a tricky business. It may help to have some insight into how a person’s mind works when they have a lot invested in a relationship, the expert says.

“If you realize that your mind has a tendency to perceive things in your favor, that may give you a reason to step back and look at the situation from the other person’s point of view. That reassessment may prompt some productive talks about how your relationship is going and how you would like it to go,” he says.

And make sure you’re not misremembering the past to justify staying in a relationship that doesn’t have a future. When a couple is considering making a lifelong commitment, they have a lot at stake. “It pays not to get caught up in mind games,” Ogolsky cautions.

“If you become contemptuous or critical, a deep freeze can set in. If you withdraw or avoid the issue, you may find yourself stalled with no way to move forward.
ACE senior Dylan Bone (left) and instructor Jon Scholl discuss grain storage and merchandising at a grain storage site near LeRoy, Illinois.
ACE students see production agriculture firsthand

By Marla Todd

Growing up in Freeburg, Illinois, Dylan Bone, a senior in agricultural and consumer economics (ACE), dreamed of attending the University of Illinois. He aspired to be an attorney — until junior year, when he took the ACE course in farm, food, and financial policy.

In addition to exploring issues confronting west coast agriculture, students visited modern grain and livestock operations near campus, through a component called First Link. Other destinations included an agriculture supply retailer, a farm equipment dealer, and a grain elevator. By comparing practices in Illinois and California, students learned how regional differences influence agricultural policy, explains Jon Scholl, course instructor.

First Link represents production agriculture as the start of the supply chain, Scholl says. “It’s not just the farmer but the people that support and provide advice and inputs to that farmer.”

Before this course, Bone says, his production agriculture experience consisted of seeing the corn field next to his high school football field. But First Link and the course trip to California sparked his interest in agricultural careers.

The impetus for First Link came from agricultural industry leaders who sit on the ACE departmental advisory committee, notes Paul Ellinger, head of the department. They observed that ACE graduates were extremely proficient in subject matter but limited in experience on the farm.

At the same time, Scholl had a group of students ask if they could visit his family’s farm. “It became very evident to me that in teaching students about agricultural policy, perhaps I was not doing enough to connect them to where the whole process starts,” Scholl says.

Scholl partnered with Champaign County Farm Bureau to create the First Link on-farm experience. Financial support from Illinois Farm Bureau and Growmark paid for transportation, meals, and materials for the farm and agribusiness visits.

These students will take positions in the agricultural industry or influence policy decisions at the state or federal level, says Brad Uken, Champaign County Farm Bureau manager. “With First Link they were given the chance to learn about today’s agriculture — its challenges, technology, succession planning, and future direction.”

After the policy course, Bone couldn’t help himself. He wanted to learn more about production agriculture.

“Here I am, taking classes on natural resources economics, food world economy, and ag law, but when I looked out on a field while driving down the interstate, I really had no idea how the crop was created,” Bone says. “I wanted some hands-on knowledge of how you go from putting seed in the ground to ending up with a commodity on the Board of Trade in Chicago.”

Scholl agreed to help Bone with a central Illinois management and marketing independent study. They made visits to Scholl’s family farm to explore grain production, harvest, and marketing. Through the study, Bone hypothetically managed 80 acres of corn and 60 acres of soybeans.

“I felt more in touch with agriculture than through any book I have ever read,” Bone notes.

ACE is exploring options for expanding First Link, Ellinger says. Opportunities for growth depend on external funding, as well as continued student interest.

Scholl plans to continue including First Link in his courses. He is also encouraging other faculty members to explore this out-of-the-classroom experience.

Bone is interviewing for positions with agricultural companies, hoping to land a role in sales. “The field of agriculture is skyrocketing, and I want to be a part of it,” he says.
Years of research in the laboratory of University of Illinois scientist John Erdman have shown that lycopene, the bioactive red pigment found in tomatoes, reduces growth of prostate tumors in animals. Now his team has developed a tool that will revolutionize future studies by allowing the scientists to track lycopene’s anti-cancer activity in the human body.

“Our team learned to grow tomato plant cells that can produce lycopene that is heavier than what is found in nature, which lets us trace lycopene’s activity in the body. In the future, we will be able to do studies in men who have prostate cancer, and that will give us vital information about lycopene’s anti-cancer activity,” says John W. Erdman Jr., a U of I professor of nutrition.

The U of I team began about 10 years ago developing the tomato cultures that would yield heavier, traceable lycopene. Erdman, doctoral student Nancy Engelmann, and “plant gurus” Randy Rogers and Mary Ann Lila first learned to boost the amount of lycopene in the plant cells. They then grew the best performers with “heavy,” non-radioactive carbon-13 sugars. Because most carbon in nature is carbon-12, the heavier carbon atoms are easy to follow in the body.

Soon after the U of I team developed this tool, Engelmann, now Moran, took a postdoctoral research position at Ohio State University, and scientists at Illinois and Ohio State began studies in humans.

In their new study, the team followed lycopene movement in eight persons by feeding them a meal containing the heavy lycopene. The researchers drew blood hourly for 10 hours after dosing. They then followed up with blood draws 1, 3, and 28 days later.

“The results give us new information about how much lycopene is absorbed and how quickly it is lost from the body. We also now understand the changes that occur after lycopene is absorbed,” Erdman says.

Moran notes that “outside the body, most lycopene exists in a rigid and straight form. In the body, its form tends to be more bent and flexible. Scientists think that the more bent form of lycopene may be responsible for reducing the risk of disease.”

This change in lycopene’s structure occurs soon after we absorb it from our food, Moran adds.

The team is now using the technique that produces the heavier lycopene to make heavier versions of other food components. In another trial, phytoene, a second carbon-13 tomato compound, has been produced and tested in four persons.

“Our most recent project involves producing a heavy carbon version of lutein, which is found in green leafy vegetables and egg yolks. Lutein is important for eye and brain health. We began with carrot cells, and we have already produced small amounts of ‘heavy’ lutein for studies in animals,” Rogers says.

Right now, though, the Illinois–Ohio State team is excited about the new information they have gained from the lycopene study.

“These new techniques could help us better understand how lycopene reduces prostate cancer risk and severity,” Erdman says.

“The long-term goal is to be able to develop evidence-based dietary recommendations for prostate cancer prevention.”

By Phyllis Picklesimer
Reducing nutrient loss in Illinois and beyond

By Stephanie Henry

Water. We often take it for granted, but water is a basic resource essential to nearly every aspect of life. Our bodies need it to survive, and it is vital to growing the food we eat. It’s a habitat for fish and other living beings. And it supports transportation and recreation as well.

Environmentalists and researchers know that there are threats to the quality of water throughout the U.S.; in the Midwest, those threats exist both locally and downstream from the region’s farm fields and streams. One of those issues in particular — nutrient loss from agricultural fields — has been on the radar of ACES researchers for several years.

The challenge: finding new ways to reduce the loss of nutrients, which are essential for crops to grow, from farm fields through the artificial drainage systems that have long been an important part of agricultural production.

Through ACES-led research and outreach, the agricultural community and the public are learning how they can be part of the solution.

This year the Illinois Nutrient Loss Reduction Strategy was rolled out by the state to improve water quality across Illinois and in the Gulf of Mexico. As part of the strategy, Mark David, a biogeochemist in the Department of Natural Resources and Environmental Sciences, along with other ACES researchers identified practices to help reduce nutrients leaving farm fields and entering streams. The effort was a response to the federal EPA for Illinois and 11 other states along the mainstem of the Mississippi River to create these plans.
George Czapar, director of U of I Extension and an expert on water quality, explains that part of the challenge is that nutrient loss from the Midwest affects the Gulf of Mexico. Though Illinois is hundreds of miles away from the gulf, nutrients from farm fields, wastewater treatment plants, and even from city streets flow into the Mississippi River and eventually enter the gulf.

This has contributed to a hypoxic, or “dead,” zone in the Gulf of Mexico that stretches hundreds of miles — think an area the size of Rhode Island. As water flows down the Mississippi River carrying runoff to the gulf, those nutrients cause algae to grow. When algae decomposes and settles to the bottom, it consumes the available oxygen. This creates a challenge for bottom-dwelling aquatic life to survive.

To some, the solution to the problem of nutrients in water supplies, particularly the nitrogen and phosphorus contributed by agricultural runoff, might seem simple. “The size of the hypoxic zone is measured each summer, but it’s just not a simple cause-and-effect issue,” Czapar explains. “Although it’s incredibly complicated, sometimes you’ll hear the comment that if farmers simply reduced their fertilizer rates that would solve the problem. Obviously much more is required to have a meaningful impact. What Extension tries to do is to provide as much basic information as we can and to make the science understandable.”

Czapar adds that simply mapping the hypoxic zone each year may not be the best way to measure progress toward improving water quality. “When the zone is measured each July, it’s a snapshot. Because the size is constantly changing, it’s often difficult to see if management changes at the local level are making a difference,” he says.

Laura Christianson, an assistant professor in crop sciences researching water quality issues, agrees that the hypoxic zone in the gulf can be hard to relate to in Illinois. “We’re so disconnected from a problem that is driving new actions that farmers need to take locally,” she says.

“What Extension tries to do is to provide as much basic information as we can and to make the science understandable.”
“My interest is in figuring out how we can still farm productively, have good crop yields, produce food, have thriving rural economies and food security — all these things that we want agriculture to do — in a way where farmers are a part of the solution to improve water,” she adds.

And a story that may not get told as often, Christianson says, is that nitrogen and phosphorus have also impaired bodies of water in Illinois. “There is a local impact because a lot of folks, both farmers and nonfarmers, like to hunt, fish, swim, and boat in Illinois.”

This local awareness and participation is a part of the new Illinois Nutrient Loss Reduction Strategy that Czapar is encouraged about. “There has really been buy-in and ownership from the agricultural community. Public meetings were held to allow people to voice their opinions. They realize that nutrient loss is a problem, and will not go away without an organized effort.”

Mark David has spent many years studying practices to reduce the loss of nutrients, especially nitrate, from fields in east-central Illinois. He has researched the effectiveness of edge-of-field methods such as constructed wetlands (a bermed area near a stream slows the flow of tile water, allowing for nitrate removal) and woodchip bioreactors (trenches at the edge of the field filled with woodchips are used to remove nitrate from tile water).

David led a science assessment over three years that became the core of the Illinois Nutrient Loss Reduction Strategy, which was released in the summer of 2015. He and the ACES team identified the quantities of nitrogen and phosphorus that are leaving Illinois, where each is coming from within the state, and the sources.

Other collaborators included Extension's Illinois Water Resource Center (IWRC), Illinois-Indiana Sea Grant, the Illinois Environmental Protection Agency, the Illinois Department of Agriculture, and representatives from state and federal agencies, agriculture, and nonprofit organizations as well as scientists and wastewater treatment professionals.

The team also assessed management practices to reduce the nutrients entering streams and rivers. “We looked at whether we could put these practices fully in place across Illinois, how much of a difference they would make, and how much they would cost,” David says. “It turns out there is no one practice, and nothing that is incredibly cheap, that solves all the problems.

“There is no single practice for every acre, but every acre needs at least one practice,” David adds, explaining that this was a motto adopted during the study.

Some of the in-field practices assessed in developing the strategy include better management of fertilizer (nitrogen), planting cover crops, using soil tests for phosphorus, and doing less tillage to reduce erosion. Point source reductions for phosphorus, such as more efficient water treatment at municipal water treatment plants, could also lead to large decreases in nutrient loads.

Implementing these practices could help Illinois reduce its phosphorus load by 25 percent and its nitrate-nitrogen load by 15 percent by 2025. The eventual goal is a 45 percent reduction in the quantities of these nutrients reaching the Mississippi River. The strategy is a long-term path, David says. And for now, the practices are voluntary for farmers.
“If we can start making progress, that’s good. If the average load of nutrients goes down, even if we don’t meet a certain target, it will show that a voluntary approach works. If it stays the same or goes up, then something will have to change,” he says.

David and U of I Extension staff have been busy with “road shows,” making presentations of the final nutrient reduction strategy throughout the state, and the IWRC has made videos available online of David explaining the strategy and suggested reduction practices.

“It’s clear that it has everybody’s attention,” David says.

“But if farmers don’t change what they are doing, then we’re not going to get anywhere, and there could be a push for regulations,” he adds.

Through the course of two other projects funded by the USDA National Water Quality Program, David, Czapar, and ACES researchers and students have worked with farmers on two nearby watersheds — the Upper Salt Fork River and the Embarras River — to look further at the effectiveness of some of the reduction practices.

The Embarras River project focuses on the use of constructed wetlands and bioreactors, as well as monitoring greenhouse gas emissions from these nitrate removal methods (when nitrogen is removed, nitrous oxide can be released). So far the study has shown a 62 percent rate of nitrate removal through the use of wetlands, and very little emission of nitrous oxide with the use of wetlands and bioreactors.

The Salt Fork project focused on drainage water management techniques, such as holding back tile water during the winter. Farms in the watershed were also monitored for nutrient levels in tile drainage systems.

In both projects, farmers in each watershed were surveyed about their views on water quality issues and conservation practices. There were strong environmental concerns and stewardship ethics among farmers and landowners, David says, but the many financial and operational constraints they operate under limited their willingness to adopt new practices to reduce nutrient losses. During 8-week classes for undergraduates that David and Czapar led on the Upper Salt Fork and Embarras watersheds, students worked with the survey data, learned about the components of what is happening in each watershed, learned where nutrients are coming from, visited farms and wetlands, and saw practices in place.

Because the projects involve extension, research, and teaching, Czapar says, they were able to accomplish a lot. “That integration is a great way to do the work,” he says.

The findings from the concluded Salt Fork project were shared at a field demonstration day and sent to all farmers/landowners. The Embarras River project will wrap up in August 2016, and findings will be shared later in a field day.

As researchers and producers make progress in reducing nutrient runoff and improving water quality, Czapar says, the water quality concerns will continue to change.

“Twenty years ago pesticide runoff was a bigger concern affecting water quality, but that has steadily improved as we changed our practices and products. Nutrients are the issue now. In the future we may face other challenges, such as concerns about water supply,” he explains.

“Water issues are interconnected and it is likely that we will continue to face new problems in the future, because water affects everything we do, whether in agriculture, business, or everyday life.”

“Water issues are interconnected and it is likely that we will continue to face new problems in the future, because water affects everything we do, whether in agriculture, business, or everyday life.”
Safety at work — it was a frequent topic of discussion in young Andrés Saldaña's house. While he was growing up in Chicago, with both parents working blue-collar jobs, he often heard them voicing concerns about safety in the factories.

But when Saldaña came to the University of Illinois, he had no idea that a career in safety and health was even an option as he entered the Technology Systems Management (TSM) program in the Department of Agricultural and Biological Engineering (ABE).

“I knew employee safety was important, but it was Dr. Aherin and the TSM classes in ag safety that opened my eyes to this career track,” Saldaña says.

Robert Aherin, a professor and extension agricultural safety specialist in ABE, is the director of the Agricultural Safety and Health minor offered by the department. Aherin also oversees AgrAbility Unlimited, an organization that helps identify ways to accommodate disabilities on the farm, and he is a founding member of the Grain Handling Safety Coalition (GHSC), a volunteer group that offers community-based grain safety education.

Saldaña went on to earn a master’s in public health at the University of Illinois at Chicago. He worked first as a consultant for U.S. Compliance Corporation, then became a compliance officer with OSHA, the federal Occupational Safety and Health Administration, in the Calumet City (Illinois) area office.

“My job was to ensure safe working conditions for all workers,” he says. “I addressed safety complaints and inspected any accidents or fatalities that took place. I was also boots on the ground, providing outreach assistance to employers with OSHA regulations.”

Saldaña is fluent in Spanish as well as English, and in his OSHA role he often addressed Spanish-speaking constituents in unions and nonprofit organizations on their rights as employees.

In 2014, Saldaña was promoted to regional safety and health manager, overseeing the grant programs, alliance programs, and partnerships in OSHA Region 5. One of his responsibilities is to evaluate the programs developed by recipients of OSHA’s Susan Harwood Training Grants. Aherin received a Harwood grant to establish the GHSC, and Saldaña has been to campus to evaluate the program.

Aherin began working more than a decade ago to obtain funding and approval for an ag safety and health minor. “Agriculture has one of the highest injury and death rates of any industry,” Aherin says. “There was a real need for those who work in agriculture to have a basic understanding of occupational injury and illness causation and prevention.”

Robert “Chip” Petrea, an ABE research specialist, and Aherin surveyed nearly 250 Midwest agricultural and rural health employers. They discovered that more than 80 percent wanted their employees to have academic training in ag safety and health.

“Learning that helped us obtain the funding we needed, and the minor was offered beginning in the fall of 2004,” Aherin says.

Job opportunities for graduates with this minor are as varied as the students themselves. TSM graduate Brittany Durdle worked in Carle Hospital’s Department of Farm Safety on an emergency response project while studying for her minor in ag safety and health. The goal of the project was to make maps of rural farmsteads and agricultural businesses readily available to fire departments in six surrounding counties.

Durdle says classroom lectures offered real-life examples that helped students understand the consequences of injuries and health hazards, and they received hands-on training, including first aid and CPR, that equipped them to help others in an emergency.

Today Durdle works at Dow AgroSciences as a quality and scheduling coordinator. “My minor made me stand out among other candidates interviewing with Dow,” she says. “I was able to begin my position with an understanding of the principles behind the safety and health procedures I was responsible for following. I can have in-depth conversations with other employees while analyzing a task for risks.”

She believes the minor allows students to add value to their education, and ultimately, to make the agricultural industry safer.

“Dr. Aherin helped make this possible,” Durdle says, “and many of us, including those we will keep out of harm’s way in the future, are very grateful for that.”
Two years ago the University of Illinois and people around the state were celebrating the 100th anniversary of Cooperative Extension. At the same time, George Czapar, the new Extension director at Illinois, was working with ACES Dean Robert Hauser and the university’s Office of the Provost on an ambitious new initiative. A call went out across the Urbana campus for innovative, high-impact outreach projects — for new partnerships between Extension and faculty and researchers in campus units beyond the College of ACES.

More than 70 proposals poured in, and eight were funded. The projects, with partnering units including Engineering, Business, Fine and Applied Arts, and the Spurlock Museum, are described at web.extension.illinois.edu/initiative. This article tells the story of one of these partnerships.

More than 800 students attended a manufacturing career expo in Peoria. 4-H Teen Teachers partnered with project staff to lead hands-on activities in vinyl cutting, 3-D printing, and digital embroidery.
“As the world changes and becomes more reliant on technology, we need to make our communities more digitally inclusive and digitally literate,” says Jon Gant, research associate professor with the Graduate School of Library and Information Science and principal investigator for the Illinois Digital Innovation Leadership Project (DILP). “We appreciate the opportunity to partner with U of I Extension and put our research into practice.”

The digital innovation project focuses on three learning areas, explains Gant: digital manufacturing, digital media production, and data analytics. Whether participants are programming a robot, producing a movie, or running a local government, they learn to build, create, and think using an iterative design process.

“There is certainly a need for more digital literacy in the communities I serve,” says Jody Johnson, county extension director serving Alexander, Johnson, Massac, Pulaski, and Union counties in the southern part of Illinois. “Youth are isolated by geographic, cultural, and economic conditions. Our teachers are often limited in what they can offer as well.”

The DILP/Extension team moved quickly. The 4-H “Teens as Teachers” initiative offered a ready model for reaching large numbers of younger children while building deeper, sustained engagement with teens ready for a challenge and a creative outlet. The project’s teen teachers have reached thousands of youth at events in southern Illinois and Peoria. They continue to train during the current school year, and will travel to Chicago in March.

Alvarez Dixon, a youth development educator, also saw an opportunity to better serve youth in the city of Champaign: “We wanted to create a space where young people could hang out, mess around, and geek out.” The new Extension Creative Community Commons, known as EC3, in north Champaign was designed in consultation with the digital innovation team and teenagers from the surrounding community. Dixon calls EC3 a convergence of technology, creativity, critical thinking, and self-expression. “Youth express their ideas and their creativity through physical objects, through making.”

This spring EC3 will host the Ghetto Genius Fab Lab, a makerspace mash-up of youth from an area youth center, students from a U of I Hip Hop Entrepreneurship course, and maker enthusiasts from the CU Community Fab Lab, a collaborative workshop space for makers.

Gant’s research suggests that problem solving and creativity are crucial components of digital literacy. “We focus on the people, not the tool,” explains Jeff Ginger, operations lead at the Fab Lab. “We teach people how to use digital technology, but also to understand what they do with it, why they do it, and how to share that with other people.”

“These cross-campus initiatives have helped many faculty better understand what Extension is all about,” Czapar says. “We focus on the engagement and impact, but faculty and students tell us these projects advance their research and scholarship as well.”

Each project in the Extension and Outreach Initiative has outreach, research, and teaching components — embodying the land-grant mission — and each involves students. Kirsten Phelps, the DILP project manager, is a doctoral student in the Graduate School of Library and Information Sciences. As she implements and coordinates the project, she studies the role of the leaders and how stakeholders work together to organize projects in their communities.

“We want to deploy digital tools combined with our design thinking approach to deal with problems,” says Gant. “We are building bridges to key organizations and coming together as a group to build this type of training. We’re helping to train the next generation, with students that are part of the project. We’re training teachers that are part of the communities we work in. I want to see us scale to the rest of the state, expand within the Extension framework, and develop new models that could be used by Extension throughout the country.”

**PARTNERS IN THE DIGITAL INNOVATION LEADERSHIP PROJECT**

- Graduate School of Library and Information Science at the University of Illinois
- Center for Digital Inclusion
- University of Illinois Extension
- Illinois 4-H
- CU Community Fab Lab
- Illinois Informatics Institute
- Engineering at Illinois
- School of Art and Design at the University of Illinois
- College of Media at the University of Illinois
- College of Business at the University of Illinois
Curly black hair like his mom’s; his father’s long, thin fingers. The genetic traits we pass down to our children fascinate us, even as our epigenetic heritage remains unknown and mysterious.

“Epigenetics teaches us that lifestyle choices you make today can extend beyond your own lifetime. Your bad choices — smoking, or an unhealthy diet — may affect not only you. They can trigger a change in gene expression that puts your children and grandchildren at higher risk for developing disease,” says University of Illinois expert Yuan-Xiang Pan.

“But the beauty of epigenetic modification is that it’s reversible,” fellow U of I epigeneticist Hong Chen counters. “It’s true that you can make bad lifestyle choices that affect gene expression in your children. But you can also adopt healthier food preferences that give your descendants epigenetic marks that cause disease resistance.”

Many people don’t know they have an epigenome, the scientists admit. Chen says that our bodies consist of heritable materials: the genome, which contains our DNA; and the epigenome, which are the modifications to DNA and nuclear proteins called histones. These modifications don’t affect the genes we get from our parents; rather, they change how and when those genes will be expressed in a certain environment.

Changes in the epigenome can occur in only one generation; they can also be “remembered” and passed on to future generations. An “insult” to your body, such as anorexia, extreme anxiety, or exposure to an environmental chemical, can also affect your children’s and grandchildren’s health. These insults are even more dangerous when they occur during critical windows of development, such as pregnancy, lactation, or puberty.

Research in epigenetics has implications for an array of human health conditions, but nutrition professors Pan and Chen are interested in how nutrients modify the epigenome.

Pan relates an early study that put the epigenome on the map. “In the 1980s, a Swedish scientist used historical records to study the effects of feast and famine in that country’s northernmost county in the 1800s. In some years, the harvest failed, and people starved. In other years, grain was plentiful, and children who had starved in other winters were able to overeat for months,” he says.

The study compared the descendants of those “overeaters” with the descendants of children who had lived through a poor harvest that year, Pan explains.

A single winter of extreme overeating as a child led to changes in gene expression that shortened the lives of the gluttons’ grandsons by six years on average, he says.

“There’s evidence that overeating can cause obesity-related genes to express themselves irregularly. The result is that future generations are at increased risk for disorders such as diabetes,” he says.

Chen compares our DNA to a book and epigenetic marks to bookmarks that our bodies have memorized as a result of certain life experiences.

“Our DNA may then open at certain bookmarks made by environmental cues such as over- or undernutrition so that our life experience reads out differently than it would have. We hope we will soon be able to reverse the creation of these epigenetic bookmarks so that the health problems that were caused will no longer exist,” she says.

When Chen and Pan joined ACES’ Department of Food Science and Human Nutrition, their goal was to develop one of the world’s leading programs studying interactions between specific nutrients and the epigenome. They’re off to a good start.

In a landmark study, Pan showed that a high-fat diet fed to obesity-resistant rats during pregnancy changed the gene expression in their offspring’s livers, making the babies more...
likely to overproduce glucose. The young rats also displayed other changes in genes that control glucose metabolism.

These changes in the epigenome mean a greatly increased risk of early insulin resistance and metabolic disorders such as diabetes in succeeding generations, he says. “Significantly, offspring whose mothers ate the high-fat diet had blood sugar levels at birth that were twice as high as the babies of mothers who did not.”

In another study, Chen used a diet rich in soy to decrease the expression of certain genes in the colon and repress a signaling process that was causing colon cancer. The study shows that colon cancer is an epigenetic disease, she says, meaning that dietary and environmental factors can influence genes to be switched on and off.

“We saw a different pattern of gene expression, leading to a change in disease susceptibility. In this study, diet changed the epigenome and made it resistant to carcinogens,” Chen adds.

In the not-too-distant future, both scientists believe, blood tests will reveal epigenetic profiles that can be changed by individualized nutrition.

How would that work? Epigenetic changes occur when a methyl group (one carbon and three hydrogen atoms) attaches to a specific spot on a gene, causing a change in gene expression. “Therefore, some scientists believe that methyl-rich diets containing folate, choline, butane, and methionine will counter methyl deficiencies and imbalances,” Chen says.

Others suggest a low-carb, high-fat ketogenic diet to correct conditions like attention deficit disorder and autism, Pan adds.

“Even now scientists are beginning to recommend specialized diets to treat certain symptoms,” he notes. “It’s hit or miss, though, because the same symptom can come from a variety of causes. For example, a cough can be a symptom of an allergy, the flu, or a cold, and you have to take the right medicine to cure the cough. In the same way, a diet will work best if it’s addressing the right cause, the change in the epigenome.”

Nevertheless, Chen and Pan believe that future scientists will be able to offer nutritional guidance — a certain combination of carbohydrates, protein, fat, and vitamins for a certain person — that will eventually erase troublesome epigenetic marks.

And, when the mysteries of the epigenome are fully revealed, the U of I’s Yuan-Xiang Pan and Hong Chen will have played an important part.
ACCOLADES

Highlighting some of the successes of our ACES family in their pursuits to make an impact on society and find solutions to some of the world’s greatest challenges.

Four graduate students in the Department of Animal Sciences received 2016 Midwest Young Scholar Awards from the American Society of Animal Science (ASAS) and American Dairy Science Association (ADSA). The recipients were Emily Arkfeld, Caroline González Vega, and Josh McCann, ASAS; and Zheng Zhou, ADSA.

The ADM Institute for the Prevention of Postharvest Loss made it possible for six ACES students to attend the First International Congress on Postharvest Loss Prevention in Rome in October. The students included Alex Brockamp, Kara Brockamp, and Chelsea Peterson, all freshmen in agricultural and biological engineering; Anna Kanfer, sophomore in agricultural and consumer economics; Matthew Niewiara, sophomore in agricultural and biological engineering; and Alyssa Volland, junior in animal sciences.

Clayton Carley, a 2015 graduate of crop sciences and a senior in agricultural education, was one of 20 ag ed majors selected to attend the Future Agriscience Teacher Symposium in Washington, DC, last September. The event is one of a number of efforts to recruit, develop, and retain agricultural educators.

Manuel Colón, former undergraduate recruiter for the Department of Natural Resources and Environmental Sciences, received the 2015 Larine Y. Cowan “Make a Difference Award” for Advocacy for LGBTQ Affairs.

The American Society of Agronomy named Brian Diers, a professor of soybean breeding in the Department of Crop Sciences, a Fellow at its 2015 annual meeting in Minneapolis.

James Drackley, a professor of animal sciences, was honored with the American Dairy Science Association Fellow Award at the organization’s annual meeting in Orlando in July. The award recognizes individuals who have given distinguished service to the dairy industry. Drackley’s research focuses on cow and calf nutrition and feed composition for maintaining productivity and health.

A new permanent endowment fund has established the Robert A. Easter Chair in the College of ACES, to be held by the college’s next dean. The endowed chair will serve as an enduring legacy of Easter’s service to the university and the college, as well as a lasting reminder of his leadership and commitment to advance Illinois agriculture.

The Society for Couple and Family Psychology presented its 2015 Distinguished Service Contribution Award to Barbara Fiese, professor and director of the Family Resiliency Center in the Department of Human Development and Family Studies.

Mike Gray, professor emeritus in the Department of Crop Sciences, was chosen in 2015 as an Honorary Member of the Entomological Society of America, in acknowledgement of involvement in the society that has reached an “extraordinary” level.

The Chicago Council on Global Affairs welcomed Craig Gundersen, Hope Michelson, and Alex Winter-Nelson to their expanding network of affiliated experts conducting timely research on topics central to their mission. These nonresident fellows will enhance the council’s overall expertise and reach into new areas of intellectual inquiry and policy leadership. The Chicago Council on Global Affairs is an independent, nonpartisan organization committed to educating the public—and influencing the public discourse—on global issues of the day.

The American Society of Agricultural and Biological Engineers (ASABE)

We welcome to ACES Charles “Chad” Vogel as associate dean for development. Chad oversees the operations of the college’s Office of Advancement and the team charged with obtaining external funding to support the college’s land-grant mission. Chad came to Illinois from the College of Agriculture and Life Sciences at Iowa State University, where he was senior director of development. He has a bachelor’s degree in business administration and a master’s in education policy and administration. As a doctoral candidate in political science-public administration, he is focusing his dissertation research on development officer performance metrics. Chad can be reached at chadv@illinois.edu.
inducted Alan Hansen, professor of agricultural engineering, as an ASABE Fellow at the society's 2015 annual meeting. Also in 2015, the Association of Public and Land-Grant Universities recognized Hansen with its Excellence in College and University Teaching Award for the North Central Region. The award honors university faculty for their use of innovative teaching methods and service to students.

Several in ACES were honored by the Illinois Specialty Growers. The organization’s 2015 Award of Excellence was presented to Jeff Kindhart, senior research specialist in agriculture, and Michael Probst, principal research specialist in agriculture. Rick Weinzierl, professor of crop sciences, received from the Illinois State Horticultural Society both the C. Chris Doll Industry Recognition Award and the Hall of Fame Award for outstanding service to the Illinois Fruit Industry.

Stephan Lane was one of 50 graduate students and early career scientists selected to participate in Journey through Science Day, hosted by the New York Academy of Sciences and PepsiCo in New York City in December. Lane is a graduate research assistant in the Department of Food Science and Human Nutrition and a student focusing on metabolic engineering.

The National Association of Farm Broadcasting Foundation’s 2015 Orion Samuelson Scholarship was awarded to Kelsey Litchfield, a junior in agricultural communications.

The Endocrine Society named Zeynep Madak-Ergogan, assistant professor of food science and human nutrition, as a 2015 recipient of its Early Investigators Award and Eugenia Rosemberg Memorial Fund Abstract Travel Award.

Human development and family studies graduate student Katie Magecko received the 2015 University of Illinois Seymour Sudman Dissertation Award for “Healthy Hearts In Family Child Care: What Is the Current State of Provider Health?”

The Student Alumni Ambassadors of the University of Illinois Alumni Association honored Lyle Orwig, a 1974 agricultural communications and economics graduate, as an “Illini comeback guest” during the 2015 Homecoming festivities in October.

Ramona Oswald, professor and director of graduate studies in the Department of Human Development and Family Studies, was conferred Fellow status in the National Council on Family Relations in recognition of her outstanding contributions in scholarship, teaching/mentoring, policy relevant outreach, and service.

Senior Michael Probst, a student in crop sciences, placed first overall in the speech contest at the November annual meeting of Students of Agronomy, Soils, and Enironmental Sciences.

The 2015 Regional Illini Soil Judging Team finished second place overall and first place in the two group pits at the Region Three Collegiate Soils Contest in Columbus, Indiana, in October. Abigail Peterson, a senior in natural resources and environmental sciences, finished third place overall and received the Burt Ray Award.

Diana Rodriguez, an ACES graduate of the Department of Human Development and Family Studies, is the new coordinator of the Illinois Center for Urban Agricultural Education based in the Chicago High School for Agricultural Sciences. She will help promote the ag-related career opportunities available through the academic programs offered by the College of ACES, interfacing with Chicagoland students, counselors, youth-serving organizations, and employers. Several positions have prepared Rodriguez to carry out this key role. At the Hispanic Center of Excellence in Medicine at the UIC College of Medicine, she recruited underrepresented students into the health sciences. She was the college and career coach at John F. Kennedy High School, a Chicago public school, and in the ACES Department of Human Development and Family Studies, she helped develop and deliver outreach programs with Latino and immigrant families. In addition to her Illinois degree, Rodriguez has a master’s in higher education leadership and administration from Northeastern Illinois University.

Dave Rosch, assistant professor of agricultural leadership education, earned the Best Research Paper award from the Association of Leadership Educators in Washington, DC, in July for “Lessons that Last: LeaderShape Institute Participants’ Durable Gains in Leadership Capacity.”

Vuiy Singh, professor of food and bioprocess engineering, was named a 2015 University Scholar, a program that recognizes outstanding members of the faculty and provides them with a funding allocation to enhance their scholarly activities. Singh’s research focuses on the science and engineering required to produce sustainable food, biofuels, and bioproducts. He is internationally recognized as an authority in the area of corn processing for food and fuels.

The University of Illinois Ag Ed team brought home first place in Debate and Parliamentary Procedure and Top Secretary in Parliamentary Procedure at the annual Alpha Tau Alpha Conclave held in conjunction with the National FFA Convention. This event offers college members the opportunity to sharpen their skills and compete against others in the same major from all over the country.

The University of Illinois Tax School (originally the Farm Income Tax School) has been offering continuing education seminars to tax practitioners in the state of Illinois for a landmark 75 years.

Bryan White, a microbial ecologist in the Department of Animal Sciences, was elected a 2015 Fellow of the American Academy of Microbiology. White’s research has been instrumental in advancing our understanding of microbial communities, or microbiomes, and how these contribute to nutrient utilization, food safety, and health and well-being in food animals and human and nonhuman primates.
Sometimes it’s the little things that make the biggest impact.

Cindy (Boston) Warren grew up in a small Illinois farming community, where she was exposed early to both agriculture and business. As an 18-year-old freshman in the Department of Agricultural and Consumer Economics (ACE) at the University of Illinois, she had no idea how her world was about to expand.

“I was shy,” Warren says. “One of my 4-H House sorority sisters teased that I could barely introduce myself when I came to campus. By the time I left, my confidence had grown so much that I moved to the Netherlands without knowing a soul.”

That growth started with a professor noticing a student who wasn’t afraid to dig deeper and take risks.

“Cindy was always asking the next question,” says Paul Ellinger, now head of the Department of Agricultural and Consumer Economics. He credits her career success to her competitive, inquisitive nature.

Warren says, “Coming from Greenfield, it was exciting to be part of a huge university. But I never felt like I would slip through the cracks because I was part of the College of ACES. They never let me get lost in the crowd.”

She quickly became involved in student organizations, from ACE Club to Dairy Club, that expanded her career network and grew her circle of relationships. In ACE Club, Ellinger challenged her to attend the American Agricultural Economic Association meeting in Nashville, Tenn., as a sophomore.

“I was the only undergrad who signed up to go, not to mention a very shy one at that,” she recalls.

Ellinger encouraged Warren to figure out how ACE undergrads could become more involved in the AAEA meeting. His challenge led her to network with students across the country.

“I discovered ways that ACE students could participate in academic paper presentations and quiz bowl contests,” she says. “I also made a connection that later helped me land my first full-time position.”
It didn’t take much convincing for Warren to attend the next ACE trip. In New York she met alumni in investment banking, the fashion industry, and the Farm Credit Funding Corporation. At first Warren stayed about 10 inches from the group, Ellinger recalls, but by the end of the trip, she was navigating the subway on her own.

“Experiences where you gain confidence to do things you never thought you would change your life,” she says. ACE trips allowed Warren to start her career with a network of connections in major cities.

“I met people who came from backgrounds like mine who now had amazing careers in big cities and were making an impact in the world,” Warren says. “I wanted to experience that someday, too.”

And it’s no surprise that she went on to do just that, Ellinger says.

Following an internship with Dow AgroSciences after graduation, Warren enrolled in graduate school at Wageningen University in the Netherlands. She discovered she enjoys doing research and conducting in-person interviews, which led to the next step in her career path — business consulting.

“While I was finishing up at Wageningen, I sent my resume to someone I met at my first AAEA conference. He gave it to his HR department and before I knew it, I was interviewing for a consulting job with AgriBusiness Group,” she says.

Warren enjoyed working with clients to develop business solutions, but four years later, she felt a pull to business school to focus on the execution side of investment banking. She completed an MBA at Indiana University and interned in 2008 with Deutsche Bank in New York City. Then she moved on to Credit Suisse in Chicago, working as an investment banker in the Global Industrials Group before returning to Indianapolis in 2010.

“I loved this time in my career,” she recalls. “It was very demanding, but worth it. However, my husband and I decided that for our family it was time for me to return to Indy, so I posted a note on LinkedIn looking for opportunities in the area.”

Warren’s intern manager at Dow AgroSciences (DAS) saw her post and helped Warren navigate the company’s recruiting path to land a position in the New Ventures department.

“In pursuing new ventures, the answer is often ‘no,’ which can feel like you are not accomplishing a lot,” Warren says. “But it’s important to monitor new companies and technologies and understand what competitors are looking at.”

From 2011 to 2013, Warren worked for the US Crop Protection marketing team at DAS. In 2013, she moved into finance and served as a financial analyst for US Seeds within DAS. She developed forecasts and budgets, financial and strategy plans, and analytical support for business and marketing decisions. Earning a voice at the table was a significant accomplishment in this role, she says.

“I gained the trust of business leaders,” she explains. “They appreciated that I knew the numbers inside and out. I always tried to think of what analyses and metrics needed tracking for them to do a good job of managing the business.”

While at DAS, Warren and her husband, Chet Warren, had two boys. With a third child on the way, she decided to take a year’s leave to consider her future.

“The company has been very supportive,” she says. “They’ve been great at looking at my skills to help make an impact.”

Her journey has been exciting, Warren says. And although she can’t pinpoint a single experience that started it all, she credits the confidence she gained during her years at the University of Illinois.

“ACE allowed me to explore new opportunities, from job-shadowing an investment banker to riding the subway,” Warren says. “When I discovered that I could find my way around New York and network on my own at a professional conference, I realized I had gained something far more important — an inner confidence that I could go out and do even more.”
2015 was a great year for the ACES Alumni Association. The main focus was our inaugural ACES Family Academies last July. The association's staff and interns pulled all of the logistics together beautifully, and the ACES faculty who participated designed engaging mini-courses to give our young guests a taste of college life.

Our goal for next summer is to double our guests to 200. If you'd like to talk with someone who lives near you about their experience with ACES Family Academies last summer, contact the College of ACES Alumni Association office.

Our successful ACES in Places events last fall led off with a tour of the U.S. Customs and Border Protection facilities at O'Hare International Airport in August. We followed that in mid-October with a gathering at the Barber & Oberwortman Horticultural Center maintained by the Joliet Park District. Both events drew nice crowds who enjoyed good food, fellowship, and programs. We are looking forward to several alumni events in 2016.

On April 11, the newest Award of Merit winners will be honored at a luncheon at the I-Hotel and Conference Center in Champaign. That evening, the winners will also be recognized at the annual Funk banquet where faculty and staff are honored for their excellence in both academic roles and non-academic positions. Just a month later, on May 15, our “Tassel Turn” party will celebrate ACES grads with their families at the Colonndes Club at Memorial Stadium.

The only low point of the year for me was having to say goodbye to two devoted board members, Katheryne Rehberg and Roger Sanders, who represented Districts 5 and 7 tirelessly. While others may have taken on their positions, they will both leave huge shoes to fill as great ambassadors for the University of Illinois College of ACES and the Illinois agriculture industry. The two are now members of our Round Barn Society, so we’ll be inviting them to come and help out when we need extra hands at events.

ALUMNI IN ACTION

ACES Alumni Association

THE PRESIDENT’S MESSAGE

By Bill Francis

The College of ACES Alumni Association will host the second ACES Family Academies on July 7 and 8! To allow more youth to attend, we have extended the age range from 8 to 13 years old. We invite ACES alumni to bring youth to the University of Illinois and College of ACES campus to experience educational sessions, stay in the new Bousfield residence hall, and share your Illini experiences with the next generation. Watch the ACES Alumni website for registration announcements. We look forward to another outstanding year!
ON THE HORIZON

April 11 :: ACES Award of Merit Luncheon; College of ACES and Paul A. Funk Recognition Awards

May 10 :: ACES in Places, Caterpillar Visitors Center, Peoria

May 13 :: Family Spirit and Young Alumni Nominations Due

May 15 :: ACES Tassel Turn, Colonnades Club, Memorial Stadium

May 16 :: ACES Alumni Board of Directors Meeting

July 7–8 :: ACES Family Academies

September 9 :: ACES College Connection, Hilton Hotel and Conference Center, Champaign

September 10 :: Salute to Ag Day

September 23 :: ACES Alumni Board of Directors Meeting

December 2 :: ACES Alumni Board of Directors Meeting

For more event announcements, including regional alumni events, visit acesalumni.illinois.edu. All events are on campus unless specified.

Award of Merit Winners

The College of ACES Alumni Association will honor four alumni with the ACES Award of Merit, its most prestigious award, during a luncheon on April 11. These are our award winners for 2016:

- **Donna Greene**, BS ’75 Home Economics Education; Champaign, Illinois; senior managing director and executive vice president, Busey Wealth Management

- **Dr. Robert Gustafson**, BS ’71 Ag Engineering, MS ’72 Ag Engineering; Worthington, Ohio; retired director of the Engineering Education Innovation Center, emeritus Honda Professor for Engineering Education and professor of Food, Agricultural and Biological Engineering, Ohio State University

- **Scott McAdam**, BS ’80 Horticulture; Lemont, Illinois; president and co-owner, McAdam Landscaping

- **Jim Shearl**, MS ’76 Extension Education; Loda, Illinois; director of quality assurance, Ag Reliant Genetics

Our website is refreshed

New features include Awards Database of all ACES and campus award winners. Check it out at acesalumni.illinois.edu.

Welcome to new board members

The College of ACES Alumni Board of Directors is pleased to welcome three new ACES Alumni Board members:

- **Kurt Hansen**, BS ’14, Lake Zurich, is the Young Alumni Director for Chicago

- **Charlyn Fargo Ware**, BS ’78, Jacksonville, is the District 5 Director

- **Ed Marburger**, BS ’79, Mount Olive, is the District 7 Director

ACES E-Alumni Newsletter

Stay connected to the College of ACES! Be sure your email is up to date with us to have the latest news delivered to your inbox every other month. Email us at acesalumni@illinois.edu.

ACES Alumni Class Notes

Check out Class Notes online at go.illinois.edu/acesclassnotes! Be sure to share any special times in your life with the ACES Alumni Association to keep your fellow alumni updated. Newly married or a new parent? A different job or a promotion? Publication of a book? We hope to hear from you!
You can study it. Or you can get out into the world and experience it as well. Each fall, students in Natural Resources and Environmental Sciences take their education outdoors during an all-day field experience and put into practice what they are learning in their courses.