

THE **m**agazine

Volume 19, No.2



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Food and Environment

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Committed to Doing It Right

This fall brings two important milestones for the college: the second year's progress report of the 2015 CAFE Strategic Plan and a repeat of the university's 2015 UK@Work Survey.

These two different processes have some important things in common. Both of them are based on a foundation of making sure we are doing the right things as a college and university. They are both infused by the inclusion of diverse points of view and honest feedback. In the case of the strategic plan, a team of college leaders held listening sessions across the state to learn from more than 1,200 external stakeholders as well as faculty, staff, and students about their vision for the future direction of the college. For the UK@Work Survey in September, all staff and faculty had an opportunity to provide feedback on how they feel about UK as a place to work.

The College of Agriculture, Food and Environment's administrative team takes both processes very seriously.

In the past two years, both these initiatives have driven planning for the future of the college. Our strategic plan has provided a guide for goals that build on our legacy and strengthen our culture, our focus on students, faculty, and staff, diversity, multidisciplinary collaborations, state-of-the-art facilities, and building relationships with our stakeholders. The Work-Life Survey has allowed us to focus on areas that clearly are tied to the strategic plan.

Strategic Plan teams have developed implementation plans for each goal, and I enthusiastically look forward to seeing their results in a few months. Department chairs and unit directors, as well as the college's leadership team, have been working on quarterly work-life strategies and implementation, with an eye on final reports this fall as well. Both these reports will be available on the college's website, and I hope you will join me in viewing the strides this college has made.

These plans will help strengthen the college and will send a better message of who we are and what we value. An important component of both initiatives is our dire need of a better physical environment for the college. The college has not had a new building since the early 2000s with the Plant Science Building, which was funded by revenue from selling a research farm. We are happy to announce a new long-range plan to transform our

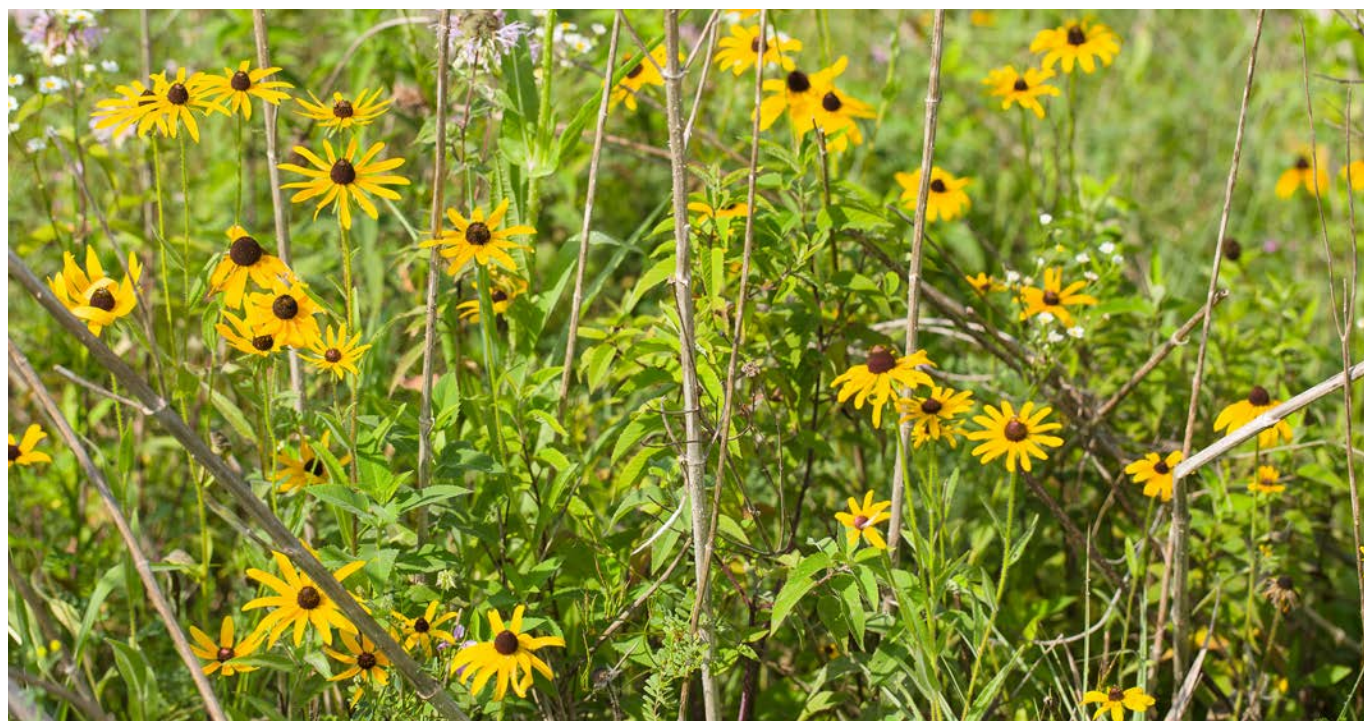


college's built environment that will begin with renovation of the Cooper House, a new classroom building on the main campus, and an expansion of the Research and Education Center in Princeton to support the Grain and Forage Center of Excellence.

As 2017 winds down, I am confident that next year and in the years after, the College of Agriculture, Food and Environment will thrive, building on the foundation of our visionary strategic plan and our committed faculty and staff and driven by our commitment to the people of Kentucky and beyond.

—Nancy Cox
*Dean, College of Agriculture,
Food and Environment*

It starts with us



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MANRRS Matters



MANRRS helped Sylvester Miller II develop a network and led him to the career he has today.

PROVIDED BY SYLVESTER MILLER II

Sylvester Miller II spends hours traveling the roads of eastern Iowa as a regional sales representative for Monsanto's BioAg division. When not on the road, he spends time giving back to Minorities in Agriculture, Natural Resources and Related Sciences, MANRRS, an organization that helped him find his way from the football field to the cornfields and continues to help him today.

MANRRS began in 1986 nationally, and UK formed its chapter in 1998. The organization's goal is to develop a network between minority agriculture and natural resources students and professionals from academic institutions, government, and industry. Members help promote the advancement of underrepresented groups in agricultural and related sciences. It provides members with training that supports their academic and professional development and achievement.

Miller came to Lexington from Chicago with a plan to play football and become an engineer. While football was a success, he decided engineering wasn't for him. Mentors and folks in UK Athletics recommended the College of Agriculture, Food and Environment. It proved to be the right place for him, and he began pursuing a degree in agricultural economics.

But a degree didn't come right away. First, after completing his college football eligibility, Miller pursued professional sports for a few years. In 2008, he returned to UK.

That is when he became active in MANRRS.

UK's MANRRS chapter is among the elite, being named the top chapter in the country for the past five years. Individual members have also received many honors, but winning honors isn't the most important part, said Mia Farrell, co-advisor and human resources specialist in the UK Cooperative Extension Service. The most important part of the program is the successful students and graduates it helps nurture.

"It gave me a chance to develop my network and led me to my first full-time job in agriculture," Miller said. "I was looking at the consumer side of agriculture. Through MANRRS, I became exposed to the crop side."

Marcus Tyler Jr., a UK agricultural economics senior, began his MANRRS journey in high school and has just completed his term as national undergraduate president. As the immediate past president, his responsibilities include partner and stakeholder relations and board member recruitment.

"This organization has sparked a sense of curiosity within me," Tyler said. "MANRRS has shown me that complacency is always the enemy. This organization



Marcus Tyler Jr. and Mia Farrell recruit new members to MANRRS, an organization that provides Tyler with "countless opportunities."

STEPHEN PATTON

has provided me with countless opportunities to further my personal and professional development through mentorship, leadership trainings and conferences, and exposure to leaders of industry."

As an alumnus, Miller still finds value in the MANRRS organization.

"It continues to guide me through my career journey," he said. "It is great to continue to develop through their professional development opportunities."

He remains active as a contest judge, ad hoc alumni advisory committee member, and mentor to undergraduate members.

"Seeing these young students become young adults is rewarding—especially those one-on-one mentoring opportunities, seeing them from their college career to their professional career and helping them navigate over," he said. "A great part of what we do is giving them the understanding of what it looks like when they graduate—how they can build their career roadmap."

MANRRS membership is open to all students and professionals interested in promoting diversity and inclusion in agriculture, natural resources, and related sciences.

In addition to UK's collegiate chapter, Kentucky is home to twelve Junior MANRRS chapters. College students act as mentors to the younger students through networking opportunities with them as well as with university faculty and industry professionals nationwide. Kentucky chapters are in Jefferson, Fayette, Estill, Calloway, McCracken, Christian, Franklin, Daviess, Madison, Pulaski, Cumberland, and Owen counties and are coordinated by UK 4-H youth development extension agents.

As students look to find their niche in the classroom and beyond, Tyler wants them to know MANRRS can help.

"Regardless of your educational background, your ethnicity, or your weaknesses," he said, "MANRRS embraces your flaws and shapes them into your greatest assets."

—Laura Skillman



For students, it's often about balance—balancing an academic life with a personal life with a professional life. For the college, it's about making knowledge accessible and adapting education to 21st century lifestyles. Many of the departments in the college offer a flexible way to earn credits toward a degree. This fall, the Department of Retailing and Tourism Management is proud to introduce a new, entirely online Master of Science degree, in which students may concentrate on either Hospitality Management and Tourism or Merchandising, Apparel and Textiles, both with a thesis or a non-thesis option.

Agriculture, Food and Environment Distance Learning Enrollment Fall 2014—Summer 2017

Agricultural Economics **409**

Animal Science **133**

Community and
Leadership Development **231**

Dietetics and Human Nutrition **844**

Family Science **230**

Retailing and Tourism Management **721**

Preparing for the Worst



Kentucky participants directed logistics from the Emergency Operations Center in Frankfort.

STEPHEN PATTON

The day began much like other rainy days. Weather forecasts called for prolonged periods of rain with possible flash flooding. Flooding began to worsen, livestock were in danger. Farmers had to evacuate their families to safety. Animals were stranded and disaster response teams in the affected states discovered they needed help.

This was only a drill, part of a Multijurisdictional Animal Resource Coordination Exercise. Had it been a real emergency, MARCE participants would have leapt into action. The exercise was sponsored by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, through a cooperative agreement with the UK College of Agriculture, Food and Environment. Participants came from animal health agencies and state emergency management offices.

"MARCE gives states the opportunity to practice requesting resources from other states, from

nongovernmental organizations, and from the federal government," said Anne McCann, National Emergency Programs coordinator with USDA APHIS, explaining that it's critical that states know the extent of resources available when a large disaster strikes.

"During natural disasters such as hurricanes, tornadoes, floods, and winter storms, animals are especially vulnerable, and they rely on humans for help," said Andrea Higdon, Emergency Management System director for the college. "Exercises like this enhance responders' preparedness."

During the drill, players were located in situation rooms around the country. Kentucky players directed logistics from the Emergency Operations Center in Frankfort. Organizers gave the teams realistic animal-related scenarios during the two-day exercise. Kentucky played the disaster-affected state on one day and responded to another state's emergency situation on the other.

Kentucky state veterinarian Robert Stout brought his team to practice what they'd already planned and to learn more.

"This gives us a chance to get familiar with our process... who does what, when and where," he said. "The situation was definitely realistic."

Bradley Keough, deputy state veterinarian, said such exercises help increase response capabilities.

"In our own preparation, we developed mission-ready packages and organized assets we felt could be valuable to other states," he said. "We are also looking at other states' resources and learning what we could do to become regionally relevant in a real disaster."

Higdon was impressed with the states' abilities to improvise and creatively address fictional problems. Many players have a strong depth of knowledge and experience. MARCE helped them understand they need to document the information in their heads.

"Players said the exercise opened their eyes to the wide array of potential resources they never knew existed," she said. "State emergency management and animal health agencies typically do not interact throughout the year. The exercise resulted in strengthened relationships that will help improve animal resource coordination within and across state lines."

"Understanding the steps in the process and what resources are available is key to rapid and effective response in an actual disaster," McCann said.

— Aimee Nielson



STEPHEN PATTON

Animals are vulnerable during natural disasters, Andrea Higdon said. Exercises like MARCE can shorten response time.

SPOTLIGHT:

ROGER BROWN



Growing up in Estill County, Roger Brown was a curious boy. Out of school, he read a lot. In school, he liked to challenge what he heard. He might not have been the easiest student to have in class, but he expected a lot from his teachers. Today, he has those same expectations for himself as an assistant professor in agricultural economics and in his many roles on the University Senate.

Q: What do you like most about being a professor in agricultural economics?

A: To me, helping students with the challenges they face, that's what I relish, which makes this such a wonderful job. I think those challenges could be daunting to a lot of people, and maybe that's why they don't choose this as a career.

Q: This year you were awarded the 2017 Outstanding Senator Award by your University Senate peers. That had to be a thrill.

A: I consider that one of the greatest honors I have received. When you are involved with the University Senate, and especially on the Senate Council, you realize how much work people do that goes unrecognized. They have that award for recognizing those contributions.

Q: You use technology a lot in teaching. How important is that?

A: Technology shouldn't be the focus, and it isn't the focus for me. I focus on the best learning environment and experience for the students. A social scientist is probably the natural person to continue asking, what is the best? Technology is important, but I would be just as happy to use non-technological ways, if they provide that optimal learning experience.

Q: Can you tell us something about yourself that might surprise your students?

A: I juggle. And I learned how, at 10, by reading a book. The book simplified the learning process in a useful way. That's really what teaching is all about, simplifying things that otherwise seem complex.

Q: Do you see yourself teaching at UK until you retire, or is that too far in the future?

A: I am a very curious person. As long as I feel stimulated and find the challenge, as long as the college and university let me indulge in my passion, which is figuring out how to help students, and as long as that continues to challenge me, I would like to stay in this role.



MATT BARTON



Steve Higgins and Becky Thompson stand by a gravity-fed tire waterer at Eden Shale. The shade balls slow evaporation and keep water temperature regulated.

Eden Shale: The Ideal is Real

In an ideal beef cattle operation, the cattle are happy and healthy, the farmer's job is less strenuous and stressful, while profits are plentiful. This is reality at the College of Agriculture, Food and Environment's Eden Shale Farm, Owenton, thanks to a unique partnership between the college and the Kentucky Beef Network. Through a cooperative agreement with UK, the network has managed the farm as a learning and demonstration center since 2013.

Steve Higgins, the college's director of animal and environmental compliance, has taken practical steps with Becky Thompson, executive director of the Kentucky Beef Network, and Dan Miller, industry coordinator at the Kentucky Beef Network and Eden Shale Farm's superintendent, to help the network better manage their herd using existing resources.

"We want to run this farm as closely as possible to a regular Kentucky cattle farm," Thompson said. "We want to keep costs down, and we do that by

using what we have and repurposing it, so it's better for the cattle and the farm manager."

Higgins, Thompson, and Miller started by taking steps to better utilize nutrients and water on the farm. Higgins made horizontal passes on the farm's steep slopes with a subsoiler, which loosens the soil below the surface, to trap water and nutrients, thus reducing runoff and soil erosion.

He installed all-weather surfaces using geotextile fabric and gravel or concrete in heavily trafficked areas. This reduces soil compaction, mud, and ruts, which lower grass and cattle productivity and put the cattle at risk for injury or lameness.

The team also improved winter feeding areas, even when it meant moving feeding locations to make the hay accessible from several pastures to complement rotational grazing. By locating the feeding areas near hay storage facilities, they reduced both fuel costs and the amount of time the farm manager spends on a tractor in cold



Steve Higgins shows off an improvement to winter feeding areas at Eden Shale, making hay accessible from several pastures to complement rotational grazing.

weather. Farmers looking for options suited to their operation and budget can view several types of feeding areas on display at the farm.

Watering points were created to serve multiple pastures and facilitate rotational grazing. Gutters on barns capture and store rainwater in tanks, where it is gravity-fed to waterers placed throughout the farms. The system provides cattle with a continuous supply of clean water while reducing runoff and the farm's water bill.

"We can't control what a producer gets for their cattle at the market, but we can help control their production inputs," Higgins said. "These improvements are practical and low-cost techniques that producers can install fairly simply."

Higgins and Thompson have also partnered with several state and federal agencies to make some of these improvements part of cost-share programs.

Around 2,000 people from 110 Kentucky counties and 24 states have toured the farm to see the innovations and learn what it means to be successful public-private partners.

THE CAMPUS KITCHEN at the UNIVERSITY of KENTUCKY



SINCE
NOVEMBER 2014



2,895 total volunteers = 5,455 hours of service



Recovered 10,888 pounds of food



Prevented more than 1 million pounds of CO2 emissions



Prevented the waste of 188,362 gallons of water



**Delivered 8,502 healthful meals to those
facing food insecurity**



Provided 25 nutrition education programs



Collaborated with 10 community partners

SUPER STAR CHEFS

By Jeff Franklin
Photography by Stephen Patton

It was a typical summer morning, like you remember as a child. The July sun was climbing in the sky. The cicadas were making that sound, synonymous with summer, reminding us that another hot afternoon was coming. But in Shelby County, inside the University of Kentucky Cooperative Extension office, it was as cool as the other side of the pillow and new summer memories were being made.



Super Star Chef team members, Haleigh Rall and Ross Boggess introduce these Washington County youngsters to the joy of healthy eating.



Budding chefs in Hart County learn how to make mini omelets during a Super Star Chef class.

A Super Star Chef class was underway, made up mostly of children from migrant farm families and low-income housing. For some of these kids, this might be the only meal they would have all day. That was heartbreaking for UK junior dietetics major Lindsay Thoman, from Louisville, who helped teach the class.

"I never grew up around any situations like this, where people are struggling with hunger; I have never really been exposed to it," Thoman said. "That has really impacted me to think that people go home and don't have dinner on the table. I will never forget that."

The Shelby County class was reminiscent of growing up in Bowling Green for UK dietetics senior Ambrazia Sublett, team leader of the group teaching the class.

"When they come in the morning, they are hungry, and I understand what that means," Sublett said. "I had friends who came to my house, because they had nothing to eat. Things like that carry over to me now."

Hungry or not, the kids in the class came eager to learn each morning, and to try new foods they had never eaten before, which is one of the goals of Super Star Chef. The lesson plan that day called for making calzones, fresh fruit parfaits, and smoothies. The day before, the students made salsa, by chopping tomatoes, peppers, onions, and cilantro. 13-year-old Caleb Peavy made salsa at home that night for his parents and siblings, Makayla and Tony, who were also in the class.

"I first thought this class would be bad," said 9-year-old Makayla. "But when I came here, I actually had fun. I would love to do it again."

Kitchen Stars

Super Star Chef is a curriculum from the Kentucky Nutrition Education Program, funded through the U.S. Department of Agriculture's Supplemental Nutrition Assistance Program Education (SNAP-Ed) and administered through UK Cooperative Extension

"I have learned about fruits and vegetables... and I have learned how much of a portion you should eat a day."

-Joe Haggerty

SUPER STAR CHEFS

and the UK School of Human Environmental Sciences. The course focuses on food preparation skills, nutrition, and physical activity. The three-day class is taught by college students who are majoring in dietetics and human nutrition or a related field. This summer there were five teaching teams, each made up of four members.

"This year we had 26 applicants, which is the most we have ever had apply," said Sara Talbott, Central Kentucky area nutrition agent and the program's coordinator. She was blown away by the quality of the applicants. "They are just so sharp and so put together. It makes me think back and wonder if I was that together as a 20-year-old."

For nine weeks, the teams traveled to the 45 participating Kentucky counties. At each site, a maximum of 20 students, ranging from 9- to 18-years-old, enrolled in the class.

The students teaching the class were paid an hourly wage while gaining valuable experience delivering a nutrition curriculum to children. Kurt Brown, a UK senior nutrition major from Georgetown, taught for the second year.

"It's a great opportunity to impact children's lives around the state," Brown said. "I was born here, raised here, and you have to hop on an opportunity like that. I like being a positive male role model in the community; I enjoy that."

Before going out in the counties to teach the Super Star Chef curriculum, the students went through two weeks of training, where they discussed learning theories, safety, and other important details before role-playing the part of class participant. Sandra Bastin, chair of UK's Department of Dietetics and Human Nutrition, wrote the curriculum for Super Star Chef and helped train the teams. She believes it is important for the teachers to get a perspective from both sides.

"My goal (during the training sessions) was to make them think critically, so when they were side by side with the children, they did not have any issues," Bastin said. "Preparation leads to better learning outcomes, and training provides key information that



Knife skills are important. JR Miller and Emily Sedoris teach safe techniques to Bath County youngsters.

results in fewer issues and breakdowns on the part of the leaders. They felt a little more equipped and confident."

In Shelby County, there were six rules on the white board for the Super Star Chef students to follow: Knife safety, wash hands, try everything, listen, pay attention, and last but not least, HAVE FUN! The last rule, apparently, wasn't hard to follow.

"The kids are always happy, always laughing," said Avery Depaso, a senior human nutrition major from Louisville, who was part of the Fayette County team. "It's fun when they tell you they actually got something from the class. I love interacting with the kids."

Try It, You'll Like It

For the teachers, it was exciting when the kids tried a fruit or vegetable for the first time. Sublett was determined the kids in her group would do that.

"My goal was to get them to try new foods," she said. "And it is okay if they don't like it, but at least they can say they tried it."

It varied from week to week and class to class. Some kids were willing to try new foods, while others refused.

"We have kids who say they hate everything," Sublett said. "They say they only eat chicken nuggets."

Then there were kids like 9-year-old Joe Haggerty of Lexington. He was willing to try something new and learn in the process.

"I have learned about fruits and vegetables," Haggerty said. "And I have learned how much of a portion you should eat a day."



One boy in Fayette County wouldn't touch a fruit or vegetable in the Super Star Chef class. Then after some coaxing, he agreed to try a strawberry. Brown said that was a game changer. "It was his first time trying a fruit or vegetable. It was good being able to talk some truth into that kid," Brown said. "Being able to do that was definitely impactful."

"It's a really good program, teaching them little stuff about nutrition they may not learn at school," Sublett said.

Bastin said evaluations show that one-on-one and group nutrition education programs are effective. They can have a huge impact on young children and their food choices, especially in the food preparation arena, where children can make big knowledge changes, which can also lead to behavior changes at a young age. It is important to do these kinds of things for young people.



Super Star Chef teams shop for ingredients at the beginning of each week of the summer program. (l-r) Alyssa Blanchet, Ambrazia Sublett, Kevin Richie, Lindsay Thoman

Monday Morning Shopping Spree

If you were in a certain Lexington Kroger store on a Monday morning this past summer and saw a throng of college students buying food as if it were a race to the finish, it was just the Super Star Chef teaching teams. Every Monday morning, in what Bastin called, "organized chaos," the teams met at Kroger and purchased their supplies for the week ahead. After a couple of times, they had it down to a science. With shopping list in hand, they knew what they needed, and how many kids they were expecting. There was very little wasted food, if any. Then they would load up their vehicles and head out for their assigned location.

"They almost became like my kids, and I care about what goes on in their lives," said Talbott, who admitted fussing over her teams a bit like a mother hen. "I just love the connection I have made with the students, and I am so excited to see where they go in the future."

Super Star Chef was a rewarding experience for the students working as a team, providing them with leadership skills—and those irreplaceable summer memories.

"This is all you could ask for a summer," Lindsay Thoman said. "I am telling all my friends, next summer apply for this job, because it is so amazing. ■"

A large crowd of people, including children and adults, are gathered outdoors. Many are wearing special solar eclipse glasses with a red, white, and blue American flag pattern. They are all looking upwards towards the sky. Some people are holding their glasses to their eyes, while others have them on their heads. The crowd is diverse in age and appearance. In the foreground, a young boy on the left is looking down at his glasses, while a girl next to him looks up. To the right, a man and a woman are also looking up. The background shows more people, some wearing blue shirts with text on them. The overall atmosphere is one of anticipation and excitement.

It Was Amazing

Viewing a total solar eclipse was the pinnacle of an exciting weekend of science activities during a Solar Eclipse Camp held at West Kentucky 4-H Camp in August. Campers had the rare opportunity to learn about space and the solar system firsthand from NASA experts.

Full story on page 22



Pollinator **PROTECTOR**

By Katie Pratt

Bumblebees dart in and out of hives inside Brent Cornett's greenhouse in rural Laurel County. Without them, Cornett, '01, would not have such an abundance of bright, red tomatoes that play a role in his family's diversified farming operation. Shortly after installing the greenhouse this past winter, he got his first beehive with help and guidance from Ric Bessin, University of Kentucky extension entomologist, and Steve Berberich, UK horticulture extension associate. He chose bumblebees, because they more efficiently pollinate nursery plants.

STEPHEN PATTON

“In an enclosed environment without wind and rain to carry the pollen, tomatoes will not self-pollinate,” Cornett said. “If you don’t have hives, your other option is to hand pollinate by either shaking the blossoms or using a leaf blower, which is very labor intensive and expensive.”

Pollinators, which include bees, butterflies, hummingbirds, bats, beetles, and flies, are responsible for pollinating nearly 75 percent of crops. But many pollinators are facing dire futures, as their populations decline. In the past five to 10 years, researchers estimate that pollinator populations have dropped between 30 and 60 percent, depending on the pollinator. Much of the attention has focused on colony collapse disorder in honeybees, but they face decline for many other reasons including parasitic mites, pesticide issues, lack of nutrition, stress, and illness. Native bee populations—bumblebees, mason bees, and many other solitary bee species—are on the decline too. Monarch butterfly populations have also steadily declined over the past few decades. Habitat loss due to urban and suburban sprawl is one of the main reasons for the declines in all pollinator species.

Faculty, staff, and students in the College of Agriculture, Food and Environment take these statistics seriously and have developed many efforts to

protect pollinators and rebuild their numbers, so farmers like Cornett can continue to be successful and consumers can continue to have the nutritious foods that pollinators help produce.

Bee Brain

Some answers to honeybee health may be in their behavior. UK assistant professor Clare Rittschof is a honeybee neuroscientist. She studies the brain mechanisms that control bee behavior, particularly aggression.

“Honeybee aggression is a cool behavior to study for a few reasons—it is a highly socially coordinated, sophisticated behavior, and it is tied to their health,” Rittschof said.

When they feel threatened, honeybees release a special pheromone that alerts the hive to danger. The bees respond in numbers with a coordinated attack. Rittschof is studying how bees perceive those cues, and how that information is encoded in the brain to lead to a change in behavior. She is also interested in understanding why colonies show such remarkable differences in their tendency to respond to aggressive cues.



STEPHEN PATTON

Brent Cornett shows off some luscious tomatoes “made” by bumblebees in his Laurel County greenhouse. Three hives are in the background.

Rittschof has found that honeybee aggressive response is tied to their environment—workers from colonies that are more aggressive tend to transmit that information to young developing bees, making them more aggressive as well. She is studying the brain mechanism that controls that decision, as well as physiological changes in other tissues. In a surprise finding, more aggressive bees tend to be more tolerant of pesticides, perhaps because they may be better at detoxifying harmful compounds. Rittschof is testing that hypothesis across honeybees with different aggression levels by assessing physiological patterns in the insect-equivalent of the liver.

Understanding these mechanisms could actually improve bee health. Rittschof’s group has found aggressive bees are healthier in many ways. They tend to forage more, survive the winter better, and have fewer parasitic mites in their hives. Other labs have found that aggressive bees make more honey and more baby bees, or brood.

“The honeybee is a great example of the ways in which behavior can be used to infer individual health,” she said. “Clearly, behavior has a strong physiological basis, and it reflects processes going on throughout the organism in tissues other than the brain.”



STEPHEN PATTON

The honeybees are active, as Clare Rittschof checks one of her hives at UK’s Spindletop Farm.

Habitat Builders

Students in Professor Daniel Potter's Urban Landscape Entomology lab are studying ways to increase urban habitats for pollinators. This could help rebuild populations in areas that have seen the steepest decline due to development. They are also studying ways to manage lawn and landscape pests without harming bees and other beneficial insects.

One of the research priorities for graduate students Adam Baker and Bernadette Mach is to determine which plants are the most attractive to pollinators and develop recommendations for homeowners, landscape managers, and nursery professionals.

Monarch butterfly larvae are picky; they feed only on milkweeds. The adult butterflies also need flower nectar to fuel their annual long-distance migrations.

With research plots at The Arboretum and 18 different monarch waystation gardens he's installed at the college's Spindletop Research Farm, Baker is assessing which milkweed species and garden configurations are the most attractive to monarch butterflies. He is also spearheading a project to help golf courses establish monarch butterfly habitat in their out-of-play areas.

"Recent research has shown that 50 percent of all monarchs that migrate to overwinter in Mexico come through the Midwest, which includes Kentucky, so it's important that we do our part to provide habitat they can use as stepping stones," Baker said. "Our research demonstrates that monarchs do indeed find and use these waystations in urban areas."

He has found swamp, common, and showy milkweeds are the most attractive to monarchs, whereas butterfly milkweed, despite its name, is especially good for bees.

Mach assessed about 75 species of flowering trees and shrubs at 375 sites around Lexington and Cincinnati and documented the numbers and types of bees that visit them. From her findings, she developed a bee-friendly plant list for the Ohio Valley. Released this past spring, it is the first comprehensive study of its kind. The list is available on Potter's lab website, <http://entomology.ca.uky.edu/Dpotterlab>.

"This list allows the land care professionals and homeowners to participate in meaningful bee conservation efforts using science-based plant recommendations," Mach said. "It can also stimulate interest in pollinator-friendly plants and spur sales of such plants by Kentucky nursery producers and garden centers."

Roadside Service

It's not just Kentucky yards that are becoming more pollinator friendly. The Kentucky Transportation Cabinet is also making sure the state's highways provide pollinator habitats, and CAFE is helping in the effort.

Joe Omielan, a research scientist in the Department of Plant and Soil Sciences, collaborates with cabinet personnel Mike Smith, '83, and Steve Kempf, both roadside environment state administrators, and Cindy Marquel, district roadside environmental administrator, on managing invasive weeds along the roadways. When cabinet personnel began installing the gardens, Omielan began working with



At Spindletop Farm, a monarch butterfly glides in for a meal from a favored plant, *Tithonia rotundifolia* (Mexican sunflower).

MATT BARTON



MATT BARTON

Ric Bessin looks on, as Mark Williams examines cucurbit leaves under a low tunnel at the UK Horticulture Research Farm.

them to find an effective herbicide rate that would control weeds and allow the pollinator friendly plants to establish and thrive.

“It is very difficult to keep weeds out of pollinator beds. There’s not a lot of information on how to do it and not a lot of herbicide products we can use, and that’s what Joe is doing,” Smith said. “When I talk to states that don’t have the relationship that we do with their university, they are envious of us because we have someone who can look at these new products and figure out how to best use them.”

Since the 2014 presidential memorandum on pollinators, which called for public-private partnerships and greater citizen engagement, the Kentucky Transportation Cabinet has installed more than 80 pollinator gardens and monarch waystations along the state’s highways with plans to install more.

“It took a while for the plants to germinate, but now we have a fairly diverse mix out there. It’s only going to get better,” Kempf said.

Growing Awareness

Ric Bessin has been a proponent of bees since he was a child growing up in a family that raised bees. Not only does he offer advice to farmers like Cornett, but he has been very active in statewide policy to improve pollinator conditions. He and Ricky Yeargan, senior extension associate for UK Ag Programs, were UK’s representatives to a statewide group

that developed the Kentucky Pollinator Protection Plan. The plan outlines best management practices for beekeepers, pesticide applicators, and landowners, ways to increase pollinator food sources, and ways to educate the public on the importance of pollinators.

At the college’s Horticulture Research Farm in Lexington, Bessin works with horticulture professor Mark Williams on best management practices and applied research projects. Together, they develop ways to improve pollination for high-value fruit and vegetable crops like cantaloupe and acorn squash while keeping insect pests away.

They have developed a system where organic growers can plant cucurbit crops under low tunnels. The screens over these tunnels help keep insect pests like the cucumber beetle at bay. To pollinate the plants, however, they must place bees underneath the screens.

“This system works well for a high-value crop, and pollinators are critical for us to get the yields we want,” Williams said.

In 2016, Bessin and Williams found just how important bee timing was, as delayed pollination resulted in reduced yield. They are trying to determine the optimal time to release pollinators in this system, which could have important yield and economic consequences for growers.

Outreach and innovative research efforts like this at the College of Agriculture, Food and Environment are key to ensuring a brighter future for both pollinators and humans.

A BUMPER CROP

By Carol Lea Spence
Photography by Matt Barton

The new UK Grain and Forage Center of Excellence not only produces front-line research, it's growing an exceptional crop of next-generation researchers.

California cows have nothing over Kelly Mercier's cows. To see them happily swarm into a lush pasture of 5-foot-high forages like amoebae into an algae-filled petri dish is to witness cow Nirvana.

Well-fed calves that will propel profits at sales; a system for predicting wheat growth; maximizing the fertilizer benefits of poultry litter—these are just some of the research projects being conducted in Princeton by a bumper crop of graduate students through the UK Grain and Forage Center of Excellence. The center, in the College of Agriculture, Food and Environment, doesn't just produce cutting-edge research that benefits farmers. It also provides a special educational opportunity for students, growing a new generation of specialists and scientists to support the next generation of farmers.



"I think we see even more opportunities for hands-on learning, for practical education, for addressing real-world questions, and for seeing some of their research make a positive impact on the lives of people in Kentucky and the region," said Chad Lee, center director and extension professor in Plant and Soil Sciences.

Both graduate and undergraduate students are flexing their research wings under the expert guidance of CAFE professors, learning what makes a useful study, how to structure it to get constructive answers, and how much dedication it takes to manage projects that often know no weekends or holidays.

Identify the Problem

The winter of 2014, the first winter Carrie Knott experienced at Princeton, was a particularly cold one. The wheat crop in Western Kentucky wasn't as advanced as it should have been, which made the associate extension professor wonder if there were any regional rules of thumb relating heat units and growth stages of wheat. There were none.

When you ask the question, sometimes you have to answer it yourself, so Knott joined with wheat breeder Professor David Van Sanford and enlisted graduate student Ethan Snyder, a Meade County native working on his master's degree, to conduct a project with several goals in mind. They want to understand the interaction of vernalization and photoperiod—cold and light—on wheat growth and development. They also want to look at how wheat varieties act during a period of climate variability, when winters might be warmer. And they will develop a scale for critical growth stages for sound management by Kentucky growers.

Mercier's happy cows are part of her forage study, in which she is documenting the results of incorporating summer annuals into a pasture system. The doctoral candidate brings to her study an interest in conservation and a passion for cattle—a passion that comes naturally to Mercier, who grew up on a Wisconsin dairy farm and interned on a South Dakota cattle ranch.



Lydia Fitzgerald will begin her research by conducting lab incubation studies on wood chips and rice hulls, the two types of litter material used by the poultry industry.

Her research problem? If fall-calving cow-calf operations could put enough weight on calves by grazing high quality summer annuals, would it be economically feasible to hold on to them and sell them in the fall instead of immediately after weaning in the spring? And would the annual forage system pay for itself by producing larger calves, resulting in higher calf prices?

A first-year master's degree candidate, Lydia Fitzgerald will be turning her attention to nitrogen mineralization rates in poultry litter. Because most of the poultry barns in the state are located in Western Kentucky, poultry litter is a convenient form of fertilizer for many grain farmers in the area. It can be an economical source of nutrients if used correctly, but the way it is applied can make a big difference in its effectiveness.

"If you have it on the surface, you can lose the nitrogen value to volatilization. If you get a hard rainfall, it can wash off," said Edwin Ritchey, associate extension professor in Plant and Soil Sciences. "That's what we're looking for with Lydia's project: how do we maximize the effectiveness?"

Details Matter

For the past two growing seasons, Snyder hand-planted 50 varieties of winter wheat monthly from October to March. From sowing through harvest, he walked the fields, growth-staging and taking notes on critical growth states.

Winter wheat requires vernalization, which happens when it goes into dormancy during cold weather. Daylight length is also important for its growth, what's known as the photoperiod response. Different varieties require different lengths of cold and daylight to be able to initiate head development.

"But once its growing point comes above the ground, wheat is vulnerable to freeze damage," Snyder said. "If the temperature falls to 24 degrees Fahrenheit for two or more hours, that freeze is likely to affect yield."

The higher the developing head rises above the soil's insulation, the higher the temperature can be and still hurt it.

Snyder's early data indicates that planting date does make a difference. He has not noted any significant difference between sowing in October

A BUMPER CROP

or November; plants mature within a week of each other and yields are similar. The two crops planted in December and January showed a similar development rate. All varieties planted in those four months produced a yield, though October and November's plantings produced more.

February and March get complicated.

"I still had February-planted wheat that was heading in mid-July, and many of the heads were small without grain in them. When planted that late, most varieties don't produce an acceptable yield, so it must be the interaction to photoperiod and vernalization causing these changes in development," Snyder said.

The work can help in understanding the potential impact of climate change on wheat production in Kentucky and will help growers more efficiently manage their winter wheat under different environmental conditions.

A Profitable Mix?

Mercier's three-year forage study compares two different summer annual mixtures against a typical sorghum-sudangrass pasture. Both the mixes contain legumes to improve the forage quality, but Mercier admits, "Some of the species in our mixtures are kind of out there."

The simple mixture has sorghum-sudangrass, pearl millet, and soybeans, all of which are easy to find and reasonably priced.

The complex mixture includes 12 species—the three already mentioned, plus sudangrass, crabgrass, corn, cowpeas, sunn hemp, Korean lespedeza, sunflower, and two types of brassica.

"The seed is a little bit more expensive, but we're really interested to see how it's going to affect soil quality, forage growth characteristics, and animal gain," Mercier said.

On a blazing hot day at July's end, associate extension professor Chris Teutsch, Mercier's advisor, helped her move a fence to give the calves access to another strip of new pasture.

"We're not only looking at the benefit to the animals, we'll also be looking at total microbial biomass," he said. "We're going to look at insect diversity in these pastures and if the



Jordan Shockley and Edwin Ritchey examine a load of poultry litter. As a fertilizer, poultry litter has a high nutrient concentration and is readily available to grain farmers in Western Kentucky.



Kelly Mercier strings new fencing through a test pasture at UK Research and Education Center's farm.

different mixtures have an impact. It's more of a broad, ecological approach to a production question, because when you change things within a grassland ecosystem, lots of different things change along with it."

"Farm-Raised" Fertilizer

Having just arrived at UK on Aug. 1, Fitzgerald is only starting her research under the joint guidance of Ritchey, associate extension professor Josh McGrath, whose research specialty is in agronomic soil fertility and nutrient management, and Jordan

Shockley, agricultural economics assistant extension professor.

Poultry litter, a combination of fecal matter and bedding material, has a high nutrient concentration, containing nitrogen, phosphorus, and potassium.

"Nitrogen dynamics are kind of tricky to deal with," Ritchey said. "One of the forms it will convert to is ammonia, which will volatilize into the air. But if it's in contact with the soil, it will not volatilize. Instead, it becomes leachable."

Shockley will be helping Fitzgerald put numbers to her results.

“I hope the Grain and Forage Center of Excellence’s greatest contribution is that farmers improve their profitability and sustainability with us”

—Chad Lee

“Farming is a balancing act between agronomics, the environment, and economics,” Shockley said. “You can’t have a sustainable operation without all three.”

Fitzgerald will begin by looking at the standards that are presently used for Kentucky and will update older extension publications. From there, she will conduct lab incubation studies on wood chips and rice hulls, the two types of litter material that the poultry industry uses, because the physical properties and differences between them haven’t been studied before. And finally, she’ll be looking at nitrogen and different methods to reduce ammonia from escaping.

A Beneficial Education

The Grain and Forage Center and the extension mission of the college drew both Mercier and Teutsch to the college from Virginia Tech. Teutsch wanted to be part of a “great group of people working together” on the forage extension research team. And Mercier, who is considering extension as one of her career options, appreciates that she has many opportunities to give presentations at field days and speak with farmers directly. She’s also excited that this study gives her a bit of an animal science focus.

“I think this will make me more well-rounded when I go to look for a job after this,” she said.

When Fitzgerald, who also graduated from Virginia Tech, wrote Ritchey inquiring about a graduate position, he brought her in for an interview and a tour of the experiment station.

She was immediately impressed by the wide range of specialties at the research station in Princeton, where much of the grain and forage center



Carrie Knott and Ethan Snyder review the numbers in the lab. Snyder's early data indicates that planting date does make a difference.



In July, Ethan Snyder and Murray State undergraduate student, Bradley James, examined grain heads from wheat planted in February at Spindletop Farm. Yield was low and many of the heads were small without grain in them.

work is done.

“It’s a unique aspect about being out here,” she said. “If someone has a question about soil, they come and ask Edwin, and if they have a question about something else, they can go right down the hall.”

Snyder agrees, describing it as a “small community, family feeling” at the research station.

“You feel like you’re part of everything that’s going on,” he said.

In the long run, whether it’s research or extension or training the next generation of scientists, the UK

Grain and Forage Center of Excellence is about the center’s partners: Kentucky’s farmers and those who come after them.

“I hope the Grain and Forage Center of Excellence’s greatest contribution is that farmers improve their profitability and sustainability with us,” Lee said. “We hope we can help make them more productive in their cropping systems and that their water and soils are in better shape for the generation coming after them.” ■

The Incredible COSMIC Experience

Bounding across the lawn at the West Kentucky 4-H Camp on Aug. 21, Kiersten Foit, of Butler County, could not contain her excitement. The sky was darkening. The temperature was dropping. Crickets were chirping. The solar eclipse was beginning.

"It's so exciting," said Foit, a junior home-school student. "I'm incredibly grateful for this opportunity. I've been waiting forever for this to happen."

For five months prior to attending Kentucky 4-H's Solar Eclipse Camp, she spent hours researching and preparing for the event. In fact, she and fellow 4-H member Gabe McFadyen, also of Butler County, made the solar eclipse the topic of their 4-H team demonstration project. They won the junior team demonstration category at Kentucky 4-H's State Communications Day in July. She is also a member of the 4-H Science, Engineering, and Technology Advisory Board.

The weekend camp allowed Foit and more than 150 other campers prime viewing of the rare, historic event. Located in Dawson Springs, the camp was in the 70-mile-wide total solar eclipse path that stretched across the contiguous United States. Campers came from 17 Kentucky counties, four states, and South Africa.

"When we realized that our camp was in the direct path of totality, we began to explore different options," said Shane Browning, West Kentucky 4-H Camp director. "Our choice was to open a youth camp and provide an opportunity for them to come and hear from some very educated, wise, and experienced people in this field."

Browning set his goals high for the camp, so all campers would have an unforgettable experience. While at the American Camp Association's annual



Kiersten Foit gets a telescopic view of the total solar eclipse.

STEPHEN PATTON

conference this summer, he made a connection with NASA and began exploring avenues for NASA personnel to come to the camp.

NASA solar system ambassadors Cory Stone and Bo and Kathy Lowrey came and spent the weekend teaching 4-H'ers the science behind the eclipse and the solar system.

"We did a number of classes all about the moon and its phases and the way things move, so the kids could get an idea of the geometry that goes on in space," Stone said. "In addition, we did earth studies, learned about the moon, and of course, the safety issues regarding viewing the eclipse."

The NASA ambassadors brought several different scientific instruments and telescopes so the campers could view the eclipse and participate in other activities, including stargazing, under their guidance.

The young people also built rockets, eclipse viewing tools, and a solar car. Weather spotters gave a presentation the day of the eclipse and monitored the weather conditions during the event.

“Through this retreat-type process, they're able to have an incredible learning experience while having fun at the same time.”

—Shane Browning

"We are hoping that the kids got a true sense of how science can connect us to the world," Stone said.

"In the camp environment, we're able to pull away from the distractions of life, the telephone, the television, and social media," Browning said. "Through this retreat-type process, they're able to have an incredible learning experience while having fun at the same time."

The 4-H Solar Eclipse Camp is just one of many specialty camps Kentucky 4-H now runs: there will be a cave adventure camp at Lake Cumberland 4-H Camp in April 2018 and a family



MATT BARTON

Campers learned about the science of propulsion, one of many lessons they were taught at the Solar Eclipse Camp.

camp at North Central 4-H Camp in August 2018.

“The Kentucky 4-H Camping Program is working toward expanding its youth development programming focus to more than just summer camp,” said Darrell Stillwell, principal extension specialist for 4-H Camps. “With this, we are actively developing educational camp programs to reach more youth in the non-summer months. It’s an exciting time for Kentucky 4-H Camp.”

“I really enjoyed all the classes and the NASA talks,” said Foit, who already knows she wants to go into a science-related career field. “It’s been really fun to talk with NASA specialists one-on-one during my free time. It’s been an incredible experience.”

— Katie Pratt

A Most Generous Gift

What Ezra “Demp” Alford wanted most was to give budding food scientists a chance to pursue their dreams, just as he was years ago. A renowned food flavorist, Demp Alford passed away in 2015, but his dream lives on through a generous gift his wife Donna made in his name to the College of Agriculture, Food and Environment.

Donna Alford specifically designated the \$3.1 million gift for students in food science.

“Demp talked about this for years,” she said. “Because he worked so hard, he left me in a situation where I could do it. I hope these students end up making a difference in the world. He’s up in heaven looking down saying, ‘You go, girl!’”

Demp Alford had an amazing ability to unravel the most difficult flavors. A senior chemist for Brown & Williamson, the Richardsville native held several patents. He took an early retirement at 54, but he never stopped doing what he loved. He worked for a few smaller companies and eventually created Alford Consulting, spending the rest of his life working from a lab he built in their Louisville home’s basement.

“Demp traveled the world to analyze flavors and fragrances,” Donna said. “But he was also an avid gardener. He fed family and friends and many others in need every year, right out of his garden.”

The Alford’s gift will enable the Department of Animal and Food Sciences to offer full-tuition scholarships for the first time.

“This is a transformative gift for our food science program,” said Richard Coffey, department chair. “It makes our program much more attractive to prospective students and allows us to recruit top students.”



Ezra “Demp” Alford

The first three recipients were named for the fall 2017 semester: Nakoma Ehrhart of Louisville, McKenzie Miller and Brittany Adkins, both of Lexington.

Dean Nancy Cox said they are just the first of many students who will realize their dreams as a result of the Alford’s gift.

“This generous gift will support many future food scientists and elevate UK’s already prominent place in the field,” she said. “We know how important food science is to the health, welfare, and economic status of individuals and nations. We are looking forward to seeing the results here in Kentucky and around the world for many years to come.”

—Aimee Nielson

Some of Alford’s most notable work resulted from his ability to extract and unravel the most challenging flavors and fragrances from plants and flowers.



PHOTOGRAPHY PROVIDED BY DONNA ALFORD

Two Roads *Converge*

In a land of lakes, two Kentuckians reunited at a company of a similar name. Their roads began in different Western Kentucky towns, converged at the University of Kentucky, split as careers took them around the country, and then converged again at Land O'Lakes headquarters in Minnesota.

Farm kids from Metcalfe County and Henderson County, respectively, John Romines, '86, and Kyle Maple, '87, met at UK. Maple was an agricultural economics major, and Romines chose a career in animal science. Not only did they occasionally share a class, they were fraternity brothers in AGR. The memories stay with them today.

A name from his college years stands out in Romines's mind: Animal and Food Sciences Professor Don Ely.

"I remember going to Dr. Ely's office at night. His light would be on, and I'd go up to his office in the animal science tower (now Garrigus Building), and we'd just sit there and talk about life," he said. "I felt like he was a father away from home."

Romines has another connection to Ely. He met his wife of 30 years, Susan, '87, in Ely's class.

Maple warmly remembers the late Joe T. Davis, his advisor and agricultural economics professor.

"You're a farm kid, and you go away to the big city for college; you really need someone else there who is beyond your teacher," he said. "Dr. Davis was that guy who influenced me a lot. He took the time to listen. That's important to a student."

After graduating from UK, their occupations moved them around the country.

"I spent the biggest part of my career at Monsanto," Maple said. "I got to really understand both the agronomy side plus the business side of ag inputs."

Romines spent the majority of his career in sales with cooperatives Southern States, CountryMark, Growmark and finally Land O'Lakes. The two men reconnected at a meeting in Indianapolis.

"You don't see someone for 10 years, and it's like we talked yesterday. Part of that is the College of Ag and part of it is the fraternity, but there's a connection there that keeps friendship embers burning for years," Romines said.

When Maple decided to make a career move, Romines brought him to Land O'Lakes.

Today, Maple describes the two of them as "a package deal." He is vice president of marketing, and Romines is



(l-r) Kyle Maple and John Romines took a tour of Spindletop Farm on a recent visit to Lexington.

vice president of sales in the Winfield United division of Land O'Lakes. Winfield is the largest distributor of seeds in the United States, as well as doing research and testing.

"I'm just a small-town farm kid. We didn't even have a red light in the town I grew up in," Romines said. "I can't believe I'm sitting here, with the scope and scale of our organization."

Maple said his degree in agricultural economics has opened the door to many opportunities.

"I've gotten to meet new people and see and do things I otherwise wouldn't have," he said. "I wake up every day and think, 'This is awesome.' Because there's never, never a boring moment in our industry or within our organization."

The College of Agriculture, Food and Environment tradition runs deep in both families. Maple's son Conner recently graduated from the college with a degree in agricultural economics. Romines's daughter, Maddie, is a student in the Department of Dietetics and Human Nutrition and wants to become an orthopedic surgeon. Romines also has two nieces who have graduated from the college with degrees in nutrition and a nephew with a degree in plant and soil sciences.

Some roots grow deep.

— Carol Lea Spence

WINTER EVENT

January 9, 2018

KENTUCKY TEXAS A&M

It starts with us

Join the University of Kentucky College of Agriculture, Food and Environment for Winter Event. Enjoy dinner, fellowship with alums, and an update on all that is new in the college. Followed by Kentucky vs. Texas A&M at Rupp Arena.
Visit alumni.ca.uky.edu/winterevent for more information.

Change Service Requested



The Milky Way illuminates an August sky over West Kentucky 4-H camp in Dawson Springs.

It starts with us

The College of Agriculture, Food and Environment is an Equal Opportunity Organization.