

FALL 2012

THE

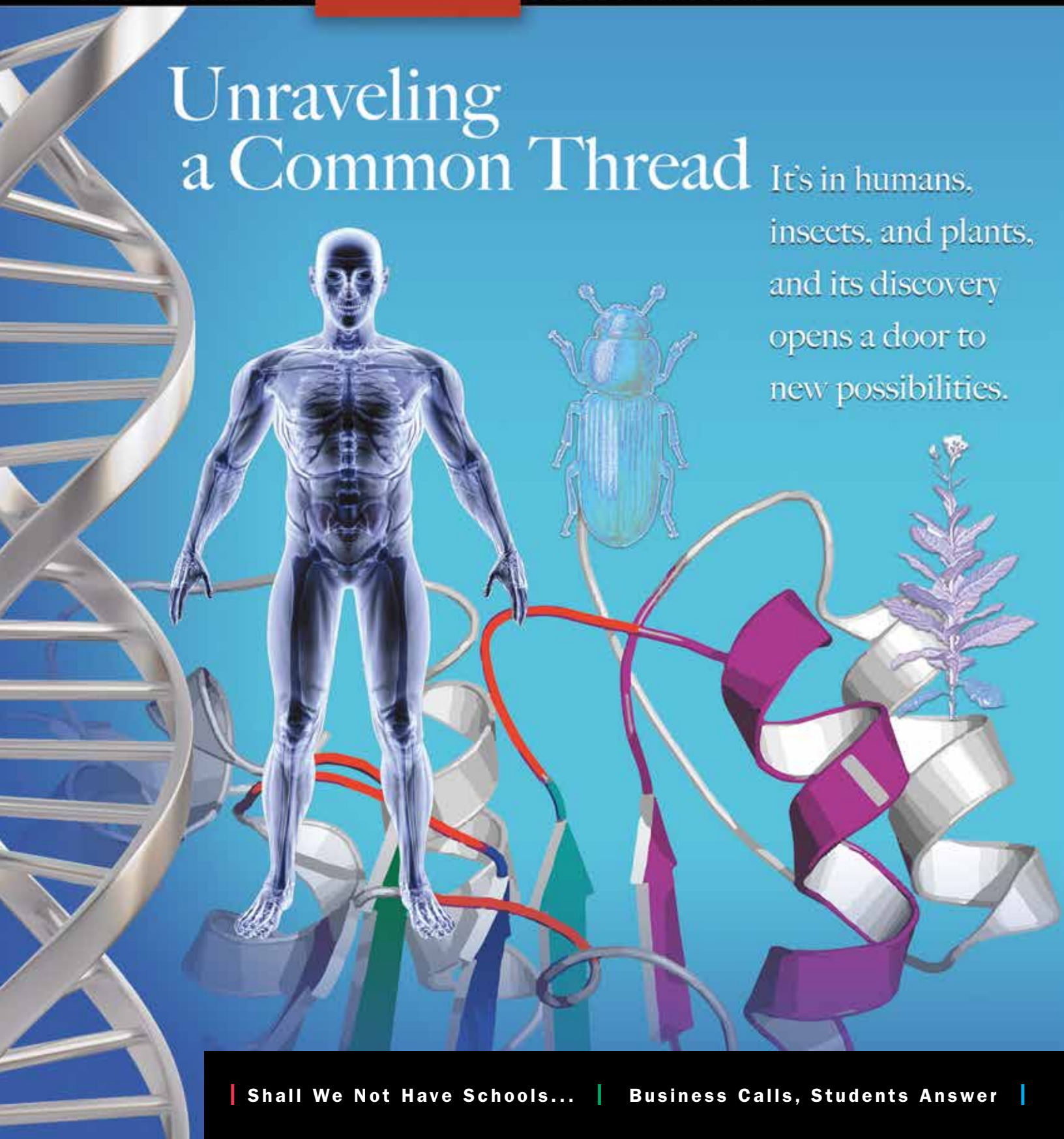
# magazine

UNIVERSITY OF KENTUCKY

COLLEGE OF AGRICULTURE

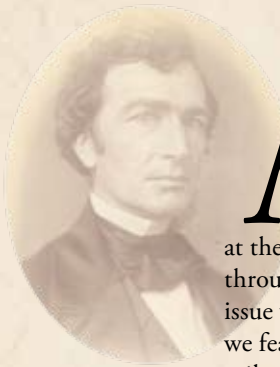
## Unraveling a Common Thread

It's in humans,  
insects, and plants,  
and its discovery  
opens a door to  
new possibilities.



# from the dean

## Questions for the Class of 2033



**A**s you probably know by now, 2012 is the 150th anniversary of the Morrill Act, which created the American Land-Grant University System. Many of us at the College have spoken about it across Kentucky throughout the year, my column in the spring issue was about that anniversary, and in this issue we feature an impressive timeline of the College's milestones and achievements in our history. Now I want to turn to the future.

Looking forward a couple of decades, I wonder what my grandchildren might find at this College. How will their opportunities for personal and professional development compare to the college experiences that shaped many of us? Will they still find professors who not only care about their students, but whose teaching is guided by immersion in discovery research and public service? Will their alma mater still be both a flagship and a land-grant institution moving our state and nation forward? Perhaps the most compelling question our grandchildren will ask is: will the degrees we seek be as valuable as the degrees granted to our parents and grandparents?

I often hear the comment that public higher education has changed more in the last five years than in the 50 years prior. Some of the forces at work are well known and widely discussed: declining public funding, affordability of tuition, aging infrastructure, and increasing competition from non-traditional sources for both students and resources. But perhaps the most worrisome trend, if it were to continue, is an emerging perception that a college degree is worth less in a very tough job market.

What changes will be forced by the increasing reliance on tuition revenue to cover the costs of higher education? Is it possible that higher education's long-held priorities for impact and excellence in research and development, extension, and public service will be altered by these challenges?

We can all have a part in deciding the answers to these questions, whether that influence is through a donation envelope, a voting booth, or our participation and volunteer efforts.

The remarkable 150-year land-grant university history of good work and service can provide us with a framework, a skeleton, for a future of achievement. That framework was built on the vision of Justin Morrill, Abraham Lincoln, and all the other founders of the land-grant system. Yet the flesh on this skeleton will be sustained only by the continuing support of our alumni, our public leaders, our scientists, and teachers—most of all by the commitment of “the people” for whom, as Lincoln told us, the land-grant system was built. Can we earn that commitment for our grandchildren?

**M. Scott Smith**

*Dean, College of Agriculture*



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## SHORT ROWS

### Sweet Apple Time

Apples are the most prevalent tree fruit in the state despite our less-than-ideal hot, humid summers. The one-two punch of two spring freezes and a summer drought didn't make 2012 an easy growing year. The freezes substantially reduced the crop size and affected fruit appearance, particularly in Central and Eastern Kentucky, says John Strang, horticulture extension professor. Freezes affected Western Kentucky orchards less, but the drought hit the area hard. Lack of water reduces fruit size and the high temperatures delay color development. There's a bright side; drought enhances fruit sugar content and reduces the need for pesticides.

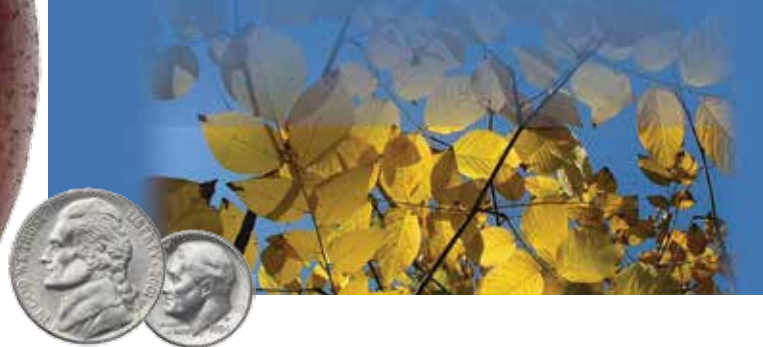
### KENTUCKY'S LEAST WANTED



Love the intense fragrance of sweet autumn clematis, *Clematis terniflora*? Well, put your hands in the air and step back from planting this exotic invasive vine. It spreads faster than an oil spill and is almost as much of a headache. That's the reason the Kentucky Exotic Pest Plant Council named sweet autumn clematis as Kentucky's Least Wanted Plant for 2012. Still considering it, despite being warned? Horticulture Professor Robert Geneve suggests *Clematis Virginiana*, a native late-blooming clematis, instead.

### A Tree for All Seasons

Choosing a native tree for the landscape can be a positive step toward reducing pest and disease problems for the homeowner. One to consider for a smaller yard is the medium-sized Kentucky yellowwood, whose dangling panicles of fragrant white flowers in the spring and golden orange leaves in the fall make it one of our showiest native trees.

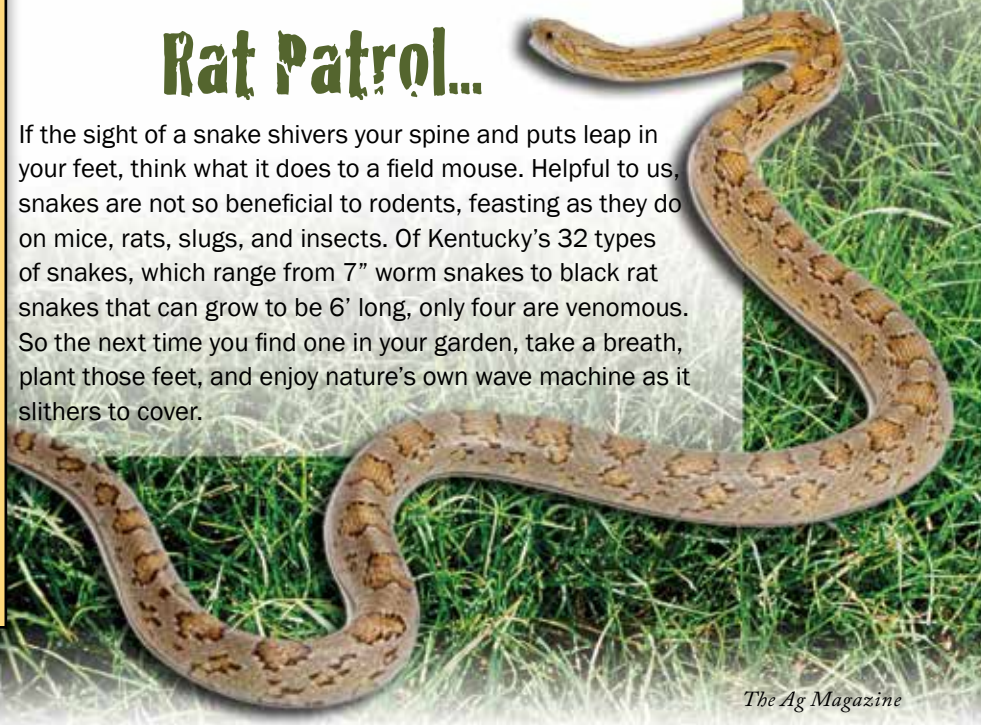


### NICKEL AND DIME IT

Are you trying to establish an emergency fund or start a savings account, but are finding it difficult to save? Jennifer Hunter, extension specialist in family financial management, recommends thinking twice about any purchase that costs less than \$5. Eliminating small purchases or incidental expenses can add up to big savings over time. Bringing your lunch to work can save you \$25 per week and more than \$100 a month. Skipping the morning coffee or afternoon soda can save nearly \$10 a week or \$40 a month.

### Rat Patrol...

If the sight of a snake shivers your spine and puts a leap in your feet, think what it does to a field mouse. Helpful to us, snakes are not so beneficial to rodents, feasting as they do on mice, rats, slugs, and insects. Of Kentucky's 32 types of snakes, which range from 7" worm snakes to black rat snakes that can grow to be 6' long, only four are venomous. So the next time you find one in your garden, take a breath, plant those feet, and enjoy nature's own wave machine as it slithers to cover.





## SPOTLIGHT:

### LLOYD MURDOCK

This past summer, Lloyd Murdock retired from his position as extension soils specialist and director of the UK Research and Education Center in Princeton. In a 43-year career, his accomplishments in no-till production, soil compaction, and remote-sensing fertilizer applicators resulted in environmentally sensitive ways to increase yields.



Matt Barton

#### **Q: What sparked your interest in soil science?**

**A:** I wanted to be in agriculture, and at that particular time, I loved math and chemistry. Soils seemed to be a good fit and were more challenging to me than studying plants.

#### **Q: What did you think when you started working at UK?**

**A:** I wasn't sure I'd like the job. I wanted to be in research and teaching, and this was an extension position. It was the best decision I ever made. When I got here, they boarded up an old hallway in the original Research and Education Center building and put me in there. I was the first faculty agronomist stationed in Princeton. It was pretty lonely for a while.

#### **Q: How did the farmers receive you when you first arrived?**

**A:** It would be like if you were a medical doctor who moved into a town that didn't have one. They were really excited to have me here.

#### **Q: What's your greatest accomplishment?**

**A:** Probably my greatest accomplishment is teaching Western Kentucky farmers how to make good decisions about fertilizers using a scientific base for recommendations.

#### **Q: What kept you in Princeton?**

**A:** The fact that the people here didn't have any help at all. They appreciated us so much and believed in us. They built the new Research and Education Center for us. It's just been very gratifying. And as communications with Lexington got better, I learned that I didn't have to be on a university's main campus to achieve the success I wanted.

#### **Q: How do you plan to spend your retirement?**

**A:** Well, I still have a 50 percent post-retirement appointment with the College. I plan to do some research on the fragipan, a soil layer that naturally occurs 2 feet below ground level and limits Kentucky crop yields and growth potential. I started this research years ago but never completed it.

#### **Q: As you step down as director, in what condition do you feel you're leaving the center?**

**A:** The administrative system and management style completely changed; we've managed the budget and set priorities, with research being the top one. If you treat people good and fair, they will become a very productive team.

## Alliance Keeps Cracking

**Although horses and cattle are big business in the Bluegrass, the poultry industry is actually the biggest moneymaker in the state, generating more than \$800 million from operations in more than 40 counties.**

"Through the Alltech-UK Nutrition Research Alliance, we are committed to using our modern poultry facility to research ways to improve poultry production," said Bob Harmon, chair of the UK Department of Animal and Food Sciences. "The facility continually provides hands-on learning opportunities for students, scientists, and faculty to work together to serve animal agriculture, using sound science and the combined resources of UK and Alltech."

The Poultry Research Facility at the College's Coldstream Farm is one of very few institutions that conduct research with both brown- and white-egg laying hens. The facilities have a combined capacity of 2,600 laying hens, nearly 1,200 growing broilers, and 500 breeders. This allows the alliance team to study how nutrition affects breeder performance as well as growth and development of the offspring. Modern methods of research, including nutrigenomics (how nutrients affect gene function), enable researchers to develop feeding programs that allow poultry to reach their genetic potential.

In the eight years since the alliance began, graduate students and visiting scientists from all over the world have had unique opportunities to collaborate with UK and Alltech animal scientists on everything from molecular biology to applied poultry science.

In addition to working at the college level, alliance team members reach out to primary and secondary schools to further interest in science education. Each year they conduct chick-hatching demonstrations at elementary schools and support numerous 4-H programs related to poultry science.

The publication of more than 125 scientific abstracts, 15 journal articles, and four book chapters since its inception demonstrates the alliance's success.

—Aimee Nielson



Steve Patton

# Cultivating

## New Lives

Jessica Ballard says she's all about the story of the food. It's powerful. It's healing. It's deep. She's seen that firsthand at the Bluegrass Domestic Violence Program's farm in Fayette County.

"Women come here in pain from their struggles and trauma," she said. "I feel like we've been able to give them an opportunity to connect with something outside themselves, something outside their own personal situation. They come out to the farm, and they see life; it may be declining even, but they are able to nurture it and witness life outside their own human struggle."

Ballard, an alumna of the College's sustainable agriculture program, has spent the past couple of years empowering women at the shelter through food and a small farm they've developed on BDVP property. With some timely grants and lots of help from volunteers, Ballard has come a long way in making the property something the residents and the leadership are proud of—an expansive garden full of vegetables, fruit trees, herbs, flowers, and most importantly, healing potential.

"It's good to get outside for a while and ground yourself," she smiled. "They don't call it ground for nothing."

"A few years ago, the garden area was old pastureland," said Nancy Cox, associate dean for research in the College and current vice president of the BDVP board of directors. "Diane Fleet (BDVP associate director) had the vision to create a farm, and she tested her ideas broadly within the local food garden community. One of the best things for the farm was securing the talents and energy of Jessica Ballard. The UK College of Agriculture is proud that one of our first sustainable ag graduates has helped create this wonderful garden setting."

Fleet said they started the garden to help with the program's growing food budget and as a solution to maintaining the farm's acreage. Not only are they growing



## New at the Helm

Richard Coffey became director of the UK Research and Education Center in Princeton July 1. He hopes to encourage cooperation among faculty and staff to further multidisciplinary research and outreach programming; improve technology capabilities to create new possibilities for information sharing and teaching; and enhance educational opportunities for graduate students.

A long-time leader of Kentucky youth livestock programs and UK swine extension specialist, he will continue to serve in those roles in addition to his new responsibilities.

As the new assistant dean for diversity and director of the Office of Diversity, Quentin Tyler wants to position UK nationally for its efforts in strengthening workplace diversity, recruiting and retaining a diverse student body, and building cultural competency. Most importantly, he wants to serve as a resource for faculty, staff, and students of the College.

"The Office of Diversity will remain committed to providing the necessary support to improve the lives of all Kentuckians," Tyler said. "Diversity is critical, and it's a fundamental element of higher education."

and cultivating items, they are also selling flowers. Vital help came from UK's Krista Jacobsen and Ben Abell in the sustainable agriculture program.

"It has really married the two purposes—providing food and taking care of the mowing, but then we started meeting really great people in the community who wanted to help us, and it's become part of the philosophy of all our work here," Fleet said. "We are giving women a project they have ownership of, a place where they can see the value of their labor. It's very empowering and therapeutic for them."

She said the garden has also given program staff and volunteers a way to teach women about business.

"The garden also spurs some business sense in them," she said. "I think, so often we look at some big corporation and think, 'Wow, I can't do that,' but this shows you that you can do a business on a smaller scale."

Future plans for the farm include food preservation classes for residents and more research opportunities for UK scientists.

—Aimee Nielson

Diane Fleet (l) and Jessica Ballard believe in the healing nature of soil and plants. At the Bluegrass Domestic Violence Program's young farm, women who come from bad situations learn to value themselves and their work.

Steve Patton

*The Ag Magazine*





# Energizing Ag

When Daviess County farmer Brian Wink and Christian County farmer Bruce Cline were looking to become greener, they turned to UK to realize their energy saving dreams.

Wink was interested in replacing a 30-year-old grain dryer with newer technology.

Cline wanted to install a half-acre of solar panels on his farm. He had an agreement with Pennyrite Electric and its service provider, the Tennessee Valley Authority, to sell them the energy he generated.

Both were hoping to receive grants from the U.S. Department of Agriculture Rural Energy for America Program and the Kentucky Agricultural Development Fund to offset some of the cost of these improvements.

Grant recipients can receive up to 25 percent of the project's cost. The USDA grant has limits of \$500,000 for a renewable system and \$250,000 for an energy efficient system. The Kentucky Agriculture Development Fund grant has a \$10,000 limit. Both programs require an energy audit.

That's where UK's Department of Biosystems and Agricultural Engineering came in.

"We found there weren't a lot of auditors evaluating agricultural structures and projects," said Michael Hagan, UK engineer associate.

The UK Cooperative Extension Service received a USDA grant that paid for 75 percent of the cost to conduct on-farm energy audits. Hagan conducted the audits for Cline, Wink, and many others. Other audits included poultry house upgrades, greenhouse improvements, dairy facilities, and farm shops.

"Not just anyone can do an energy audit for a project like this," said Kendal Clark, Cline's cousin, who assisted him with the grant applications. "People don't understand the value of the Extension Service. It reaches far beyond Lexington."

Cline's 832 solar panels are estimated to produce more than 245,000 kilowatt-hours of electricity per year. He received state funding. With the grant and a federal tax credit, the solar panels will pay for themselves in 11 years.

Wink received funding from both programs. His new dryer uses 20 to 30 percent less energy than the old one. Based on energy savings alone, the dryer will pay for itself in 27 years. Hagan said the payoff on dryers is longer compared to other projects, because the initial cost is high and farmers use the dryers for only a few months each year. For most farms, dryers are a long-term investment and provide operational and economic benefits in addition to improved energy efficiency.

Between 2008 and this July, UK energy auditors conducted 149 audits. These audits helped Kentucky farmers make energy efficiency improvements that will save or generate nearly 69 billion Btu per year with annual cost savings or generated income of more than \$1.41 million.

—Katie Pratt

UK Ag's Michael Hagan (r) conducts an energy audit at Fairland Farms in Daviess County for owner Brian Wink.

Steve Patton

## NEWS in brief



Steve Patton

UK Agricultural Engineering student Cody Lee Rakes builds a bicycle rack from scrap metal.

ART IN AG

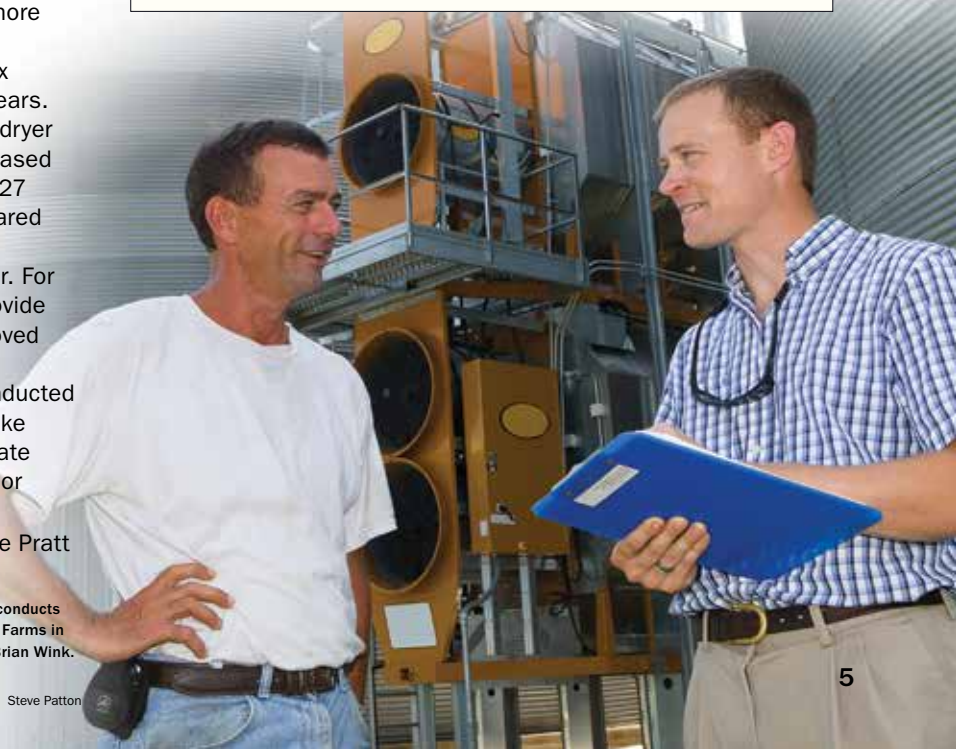
UK Ag students' artistic expression through agriculture will be on display in December with a unique art exhibit. In its third year, "Art Through the Eyes of Future Educators: By Choice, Not By Chance," sponsored by Community and Leadership Development, will showcase agriculture literacy through art. Students and faculty in Agricultural Education, Animal Sciences, and Biosystems and Agricultural Engineering collaborate in displaying their artwork.

"By infusing art into our method of instruction, our students discovered new

methods of showcasing their work and expressing their passion toward a specific topic," said Stacy Vincent, assistant professor of agricultural education. He is joined in the project by Animal Sciences Professor Bill Silvia and BAE Associate Extension Professor John Wilhoit.

BAE and Ag Ed students in Wilhoit's class created bicycle rack sculptures that they will auction off to raise money for the Isaac Murphy Bicycle Club in Lexington, which encourages bike riding by inner city kids.

—Jeff Franklin



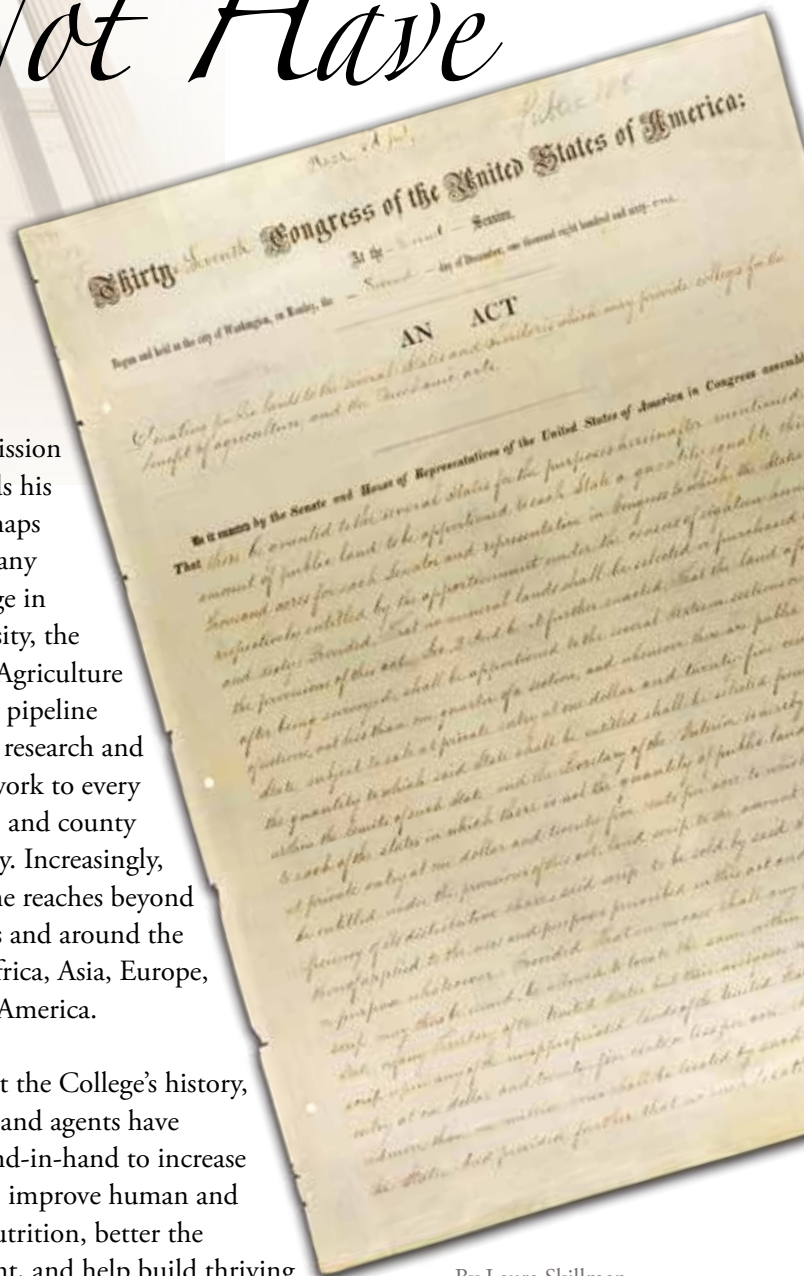
# Shall We Not Have Schools...

The idea started with a Vermont farmer, who went to Congress. U.S. Sen. Justin Morrill believed that universities and colleges had the potential to change lives for the better. Despite the national upheaval of the Civil War—or perhaps because of it, since Southern congressmen opposed to the 1858 version of the legislation were busy elsewhere—Congress passed his Morrill Land-Grant College Act of 1862. The legislation allotted to the states profits from the sales of western lands. These profits were to be used to establish higher education programs, particularly in the practical and applied sciences, including agriculture. This first instance of federal funding for higher education would change the country, ultimately opening doors for lower-income students, minorities, and women. Just as important, the knowledge and skills acquired within these new “ivory towers” were to be dispensed throughout the general population. Education, research, and outreach became the hallmark of the land-grant institution.

150 years after President Abraham Lincoln signed the act into law, the College of Agriculture forges

ahead with Morrill’s mission and expands his vision. Perhaps more than any other college in the University, the College of Agriculture has a direct pipeline through its research and extension work to every field, town, and county of Kentucky. Increasingly, that pipeline reaches beyond our borders and around the world to Africa, Asia, Europe, and South America.

Throughout the College’s history, researchers and agents have worked hand-in-hand to increase crop yields, improve human and livestock nutrition, better the environment, and help build thriving communities. This timeline is a mere glimpse at the hundreds of accomplishments, inventions, and benefits that have come from the College of Agriculture, the Kentucky Experiment Station, and the Kentucky Cooperative Extension Service. And it’s only the beginning, as the College prepares for another 150 years of service to the commonwealth and the world.



By Laura Skillman  
and Carol L. Spence



The nation which tills the soil so as to leave it worse than they found it, is doomed to decay and degradation....

Shall we not have schools to teach men the way to feed, clothe, and enlighten the great brotherhood of man?

— U.S. Sen. Justin Morrill



1865

The Agricultural and Mechanical College of Kentucky finds its permanent home in Lexington after Kentucky University Regent John Bryan Bowman purchases Henry Clay's Ashland and J.B. Tilford's Woodlands estates.



1885

UK President James K. Patterson hires M.A. Scovell as the first director of the Kentucky Agricultural Experiment Station. This is two years before Congress' Hatch Act provides the federal funds for state agricultural experiment stations.



1919

College dean Thomas Poe Cooper investigates ways for Extension to work with farm bureaus by sending M.O. Hughes to Ohio and New York. Hughes comes back convinced that Extension must "assist farmers in forming county farm bureaus." Kentucky Farm Bureau Federation is organized this same year and chartered in 1921.



William Ashbrook Kellerman, is hired as the first professor of agriculture after the Kentucky General Assembly authorized a half-cent property tax to support the establishment of an Agricultural Department.

1881



The Experiment Station becomes responsible for analyzing and labeling fertilizers, when the Kentucky General Assembly begins regulating them. By 1918 the station has expanded to regulate seeds, nursery products, livestock feed, food, and drugs.

Domestic Science instruction begins; 40 women take two courses in the basement of the women's dormitory. Today, the School of Human Environmental Sciences has nationally accredited programs and an enrollment of approximately 1,000 undergraduate and graduate students of both genders.



New hog serum laboratory is completed and immediately goes into production producing a hog cholera vaccine after a serious outbreak in the state. By the end of the year the Experiment Station is able to meet the needs of Kentucky's hog producers.

1913

1886



1906

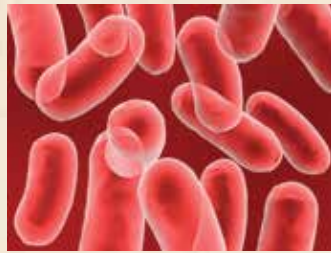
1931

Agronomist E.N. Fergus discovers and gathers seed from a stand of tall fescue grass growing on a steep slope on the W. M. Suiter Farm in Menifee County. After extensive field tests, UK releases it as "Kentucky 31" in 1943. It is now used on more than 35 million acres in the Southeast.



1939

The Department of Veterinary Science, internationally known for its distinguished work with *Salmonella*, is named the National Salmonella Center.



1948



Professor Emery Myers Emmert, the "father of agricultural plastics," employs polyethylene for the first time as a greenhouse cover in place of more costly glass.

1950s

Research at the West Kentucky Sub-experiment Station results in a widely adopted plan to crossbreed dairy cows with a beef bull. The offspring is a substantial, milk-fed, and choice-graded calf for slaughter.



Cooper establishes the Robinson Substation on nearly 15,000 acres in Breathitt, Perry, and Knott counties that were transferred from the E.O. Robinson Mountain Fund. Two years later, the West Kentucky Sub-experiment Station is started in Princeton with appropriations from the Kentucky General Assembly. Each experiment station focuses on agricultural situations unique to its part of the state.



School of Home Economics Director Abby Marlatt joins students in protesting segregation in Lexington restaurants and the Strand Theatre. Though her actions cause her to be demoted from director to faculty, they ultimately result in Gov. Bert Combs signing an order for the desegregation of all state facilities. In 2006, UK presents her with an honorary doctorate.

Extension agronomist Shirley Phillips establishes UK as a leader in the no-till movement, after Herndon farmer Harry Young, Jr. plants the first commercial plot of no-till corn. In 1983, researchers push into no-till wheat production, considered a risky venture. Today, approximately 90 million U.S. acres are in no-till production.



1962

1922





# 1966

Kentucky becomes the first state to send a black delegate to the National 4-H Congress.



# 1971

The College begins research and education in soybean double-cropping, becoming the technology leader in the Southeast.



# 2001

Investigators from several College of Agriculture departments track down the eastern tent caterpillar as the source of Mare Reproductive Loss Syndrome (MRLS) that resulted in early fetal losses, late-term abortions, and other problems for the equine industry.



# 2011



Extension soil scientist Lloyd Murdock discovers wheat blast near Princeton. The first find outside South America, it could have resulted in quarantine and lost exports. Plant pathologist Mark Farman uses DNA-analysis to determine the blast—a relatively harmless form—“jumped” from ryegrass. Their quick work protects a vital part of Kentucky’s economy.

The Maxwell H. Gluck Equine Research Center is designated as a World Reference Center for three significant equine viral diseases: equine rhinopneumonitis, equine influenza, and equine viral arteritis.



UK, along with USDA-Natural Resources Conservation Service and USDA Agricultural Research Service, releases the Quicksand variety of bermudagrass, destined to become the predominant bermudagrass grown in the country’s transitional zones. The variety was a result of a collection of surviving plants from Robinson Forest in Breathitt County.



College of Agriculture works collaboratively with the Agricultural Development Board, Governor’s Office of Ag Policy and farm organizations across the state to aid farmers in the transition from a predominantly tobacco-based farm economy to a more diverse one. In 2011, farm cash receipts hit a record high at \$4.92 billion. Diversification and new market opportunities are perhaps the biggest and best outcome of the Agricultural Development Fund.

# 2004 - present

# 1993



# Student Entrepreneurs

## BUSINESS CALLS, Students Answer

By Jeff Franklin

Summer 2012 promised to be a busy one for UK agricultural economics major Troy Hillerich. To start with, the senior from Louisville married his high school sweetheart, Jeanette Olson, in June. As if that weren't enough, he launched headlong into the entrepreneurial world by growing fresh vegetables for local restaurants. Harvest, voted one of the best restaurants in Louisville, and Saffron Persian Restaurant were two of his first customers.

Hillerich's plans were to grow San Marzano heirloom tomatoes, a plum tomato considered by many chefs to be the best sauce tomato in the world, along with squash, cucumbers, watermelon, cantaloupe, and tarragon. He hoped to supply 16 cantaloupes and four watermelons a week and a thousand pounds of tomatoes a month—no small undertaking. The only thing was, Hillerich had never before grown vegetables for commercial purposes.

He was nervous about the labor and management involved while also working a full-time summer job in downtown Louisville. He hoped to draw upon the expertise of his grandfather whose land in the southeastern corner of Jefferson County he was using at no cost. Prior to this year, Hillerich and his grandfather had done a little “backyard gardening,” selling a few vegetables at a neighborhood roadside stand.

What was his approach to the project from the beginning?

“I will see how it goes. If it goes well, maybe I will make a future of it. If it doesn't, I will get an office job or something here,” he said. “But I don't like office jobs, I don't like being inside, I don't want a boss, and I want to be able to give people something that they like.”

He did all of his planting after the close of spring semester, before he started his summer job. From his parents' home adjacent to his grandfather's farm, he





could easily keep an eye on his crops. But after getting married, moving out of his parents' house, and working a summer job, he wasn't able to be as watchful. That's when Hillerich turned to his mom, Teresa, who was willing to lend a hand knowing what her son had at stake.

"Troy's life-long dream is to do something like this as a business. He loves to work in the ground with his hands," Teresa Hillerich said.

Troy's initial cost to get his project started was about \$600, which included the seeds to start the plants in a portable greenhouse he bought at Sam's Club for \$74. He used his grandfather's tractor, free of charge, to clear the land where he planted the vegetables. Raising everything organically, his inputs were minimal, which he hoped would maximize his profits, plus he was getting three hours college credit for the project.

Maybe more important to Hillerich—he was living out a dream.

"From a junior in high school I knew I wanted to be a farmer. I set my goal, and I am going to reach it."



Steve Patton

## Growth has to start somewhere

Sometimes the owner of a small business can be overlooked when considering a community's wellbeing.

"Even in our schools the focus is on getting a job, not creating your own job," said Ronald Hustedde, professor in Community and Leadership Development and director of the Kentucky Entrepreneurial Coaches Institute. "I think that's where a lot of work needs to be done to build that entrepreneurial-friendly culture."

Since 2004, Hustedde and KECI have been training volunteer coaches who, in turn, train entrepreneurs in areas of the state that were once tobacco-dependent. In 2011 alone, KECI coaches helped create 65 new jobs and 32 part-time jobs.

"Entrepreneurs will typically start out small and don't make a big splash in their community, whereas opening a plant with 50 employees or 100 employees, is splashier, bigger," he said.

But the results of those small businesses might surprise people. Entrepreneurs working with KECI coaches in northeastern Kentucky have contributed more than \$9 million to the state's economy since the program began.

## Cooking up her own energy

"I have always known exactly what I wanted to do; it is just a matter of how I am going to get there," said Cleveland, Ohio native Kate Horning. A 2012 graduate from the School of Human Environmental Sciences with a degree in dietetics, Kate started a business two years ago by making and selling nutrition/energy bars.

"I never wanted to work for anyone, because I like doing things my way. I am definitely very stubborn," she said.

Under the name "Simply Nutritious by Kate," she concocted her "nourish" bars, as she calls them, in a local restaurant's kitchen and sold them in local chiropractor offices and at a fitness club in Lexington.

Eventually, though, she had to give up making them because they were time-consuming and taking her away from her studies.

Larry Grabau, College of Agriculture associate dean for academics, warns students about becoming consumed with their businesses and neglecting their schoolwork.

"We don't want someone to let their studies go as a result of their business. We want students to strike





“Entrepreneurs tend to stay in their communities, where they employ local people. And in terms of philanthropy, they tend to give more to the local community.”

a balance between their business and school,” said Grabau. “In balance, entrepreneurial activity is really a big plus. Especially if students can find ways to do it. Even if it is a seasonal thing or a part-time thing, it is really good for student learning.”

Horning says at some point she would like to move farther south, perhaps to Charleston, S.C., and start another business.

“I want to have a small specialty food store with a little restaurant where people can get breakfast and lunch and have cooking classes in the back,” she said. “That is my long-term goal.”

Horning credits her UK education in helping her realize where her passion really is. Besides being an entrepreneur and starting her own business, she also

teaches cooking classes at the Wholesome Chef in Lexington, writes her own food blog, [ahealthypassion.com](http://ahealthypassion.com), and has done cooking videos for a website. Horning’s energy and enthusiasm are infectious.

“I love being out and helping people; meeting people, sharing food with people probably makes me most happy,” she said. “The gratification comes from working with clients who are getting healthy and getting better and getting confident. It is really rewarding.”

## Collaring an education

It’s been hard for 28-year-old UK graduate student Steffanie Burk to continue the business she started as a sophomore at Slippery Rock University in Pennsylvania, but she might not be where she is today if it weren’t for her business, [CreateaPetCollar.com](http://CreateaPetCollar.com).

“It has definitely been helpful as far as the money being an extra source of income,” Burk said.

Burk personalizes collars for people’s pets by embroidering the pet’s name and owner’s phone number, or anything else the owner may want. She has even filled special requests on collars such as, “Will you marry me?” (She doesn’t know what the answer was.)

The Harmony, Pennsylvania native has completed her coursework for a doctorate in animal science and is now focusing on her research in equine parasitology. She is







also a research assistant in animal science in Professor Mary Rossano's lab.

Burk got into the pet collar business by going to craft shows with her mom back in Pennsylvania. She bought an embroidery machine to personalize the collars and put her business on the Internet, which generated a lot of traffic.

She doesn't have much time to do craft shows anymore, but in the spring she had a booth at the High Hopes Steeple Chase at the Kentucky Horse Park. She says she still gets two or three orders a week for collars and even more around Christmas.

Starting a business also taught Burk how to do Web design, as she created her own website. That led to other jobs designing websites while at Slippery Rock.

## Small Business: Large Importance

Small business creates 50 percent of the jobs in Kentucky and in the U.S., and 75 percent of new wealth creation comes from entrepreneurs and innovators. For that reason, they have considerable impact on the economy.

"I think we can't ignore that, and we need to provide people with the skills they need," Hustedde said. "Entrepreneurs tend to stay in their communities, where they employ local people. And in terms of philanthropy, they tend to give more to the local community."

Grabau agrees. "It would be great if our students, after they graduate, became entrepreneurs. Some are going to need to create businesses, companies, become small and large business owners."

Those entrepreneurs who change their communities just might include Hillerich, Horning, and Burk.





# Unraveling A Common Thread

By Carol L. Spence

The lab in the Plant Sciences Building was unusually empty, as Bob Houtz and Roberta Magnani awaited results from a radioactive assay she was running on the protein calmodulin.

The easy rapport between professor and post-doc highlights their respect for each other, built over a seven-year professional relationship. Houtz, chair of the College of Agriculture's Horticulture Department, had been so impressed with Magnani when she was a visiting graduate student, he held a research position open for her while she finished her doctorate at the University of Bologna in her home country of Italy.

So they chat about everyday things, as they wait for the test results.

Swing east 119 longitudinal degrees to Beersheba, Israel. Ruth Parvari is studying a gene in humans known as C2orf34, meaning it's the 34th gene on the second chromosome. Orf means open reading frame, scientific terminology indicating that no one knows what it is or what it does. Parvari knows the deletion of the gene contributes to mental disabilities and muscle weakness in people, but why remains a mystery.

Back at UK, neuro-geneticist Dr. Franca Cambi studies human brain development. Her research does not focus specifically on C2orf34. That's about to change.

Some of Reddy Palli's studies in UK's Department of Entomology have focused on the red flour beetle—a pantry pest that feeds off processed grains. It, too, carries C2orf34, though it's not called that in insects, because the gene resides in a different spot on a different chromosome. But it's the same gene, and it seems to be as important as it is in humans.



Roberta Magnani and Robert Houtz made the discovery others had been seeking for decades.



Across Cooper Drive in the Kentucky Tobacco Research and Development Center Indu Maiti conducts research using tobacco and Arabidopsis plants. Plants, too, carry that ubiquitous gene, and Maiti will soon discover that without it, plants respond in distinctive ways.

It is believed that every major life form on this planet carries this gene. In laboratories across the country and around the world, scientists in wide-ranging research fields sought its function.

On Jan. 14, 2009 at 2:07 p.m., in Houtz' laboratory, Magnani's test results emerged. She'd found the answer.

### Green Light to Explore

Magnani's search started two months earlier. She went to Houtz and said she wanted to identify the enzyme that enables the methylation of the protein calmodulin. In order to perform certain tasks, calmodulin needs to bond with three methyl groups, each composed of one carbon and three hydrogen atoms.

Picture yourself as a cell. You have all this genetic material in your nucleus, and you are

bounded by a membrane so your inner workings don't spill out. But you have to detect events that happen outside your walls, and you have to be able to react when you get a signal from outside. That signal could be from a hormone, a protein, even a pathogen or organism. How do you react? How do you protect yourself? By activating certain genes in the nucleus and deactivating others. And calmodulin is part of that communication system.

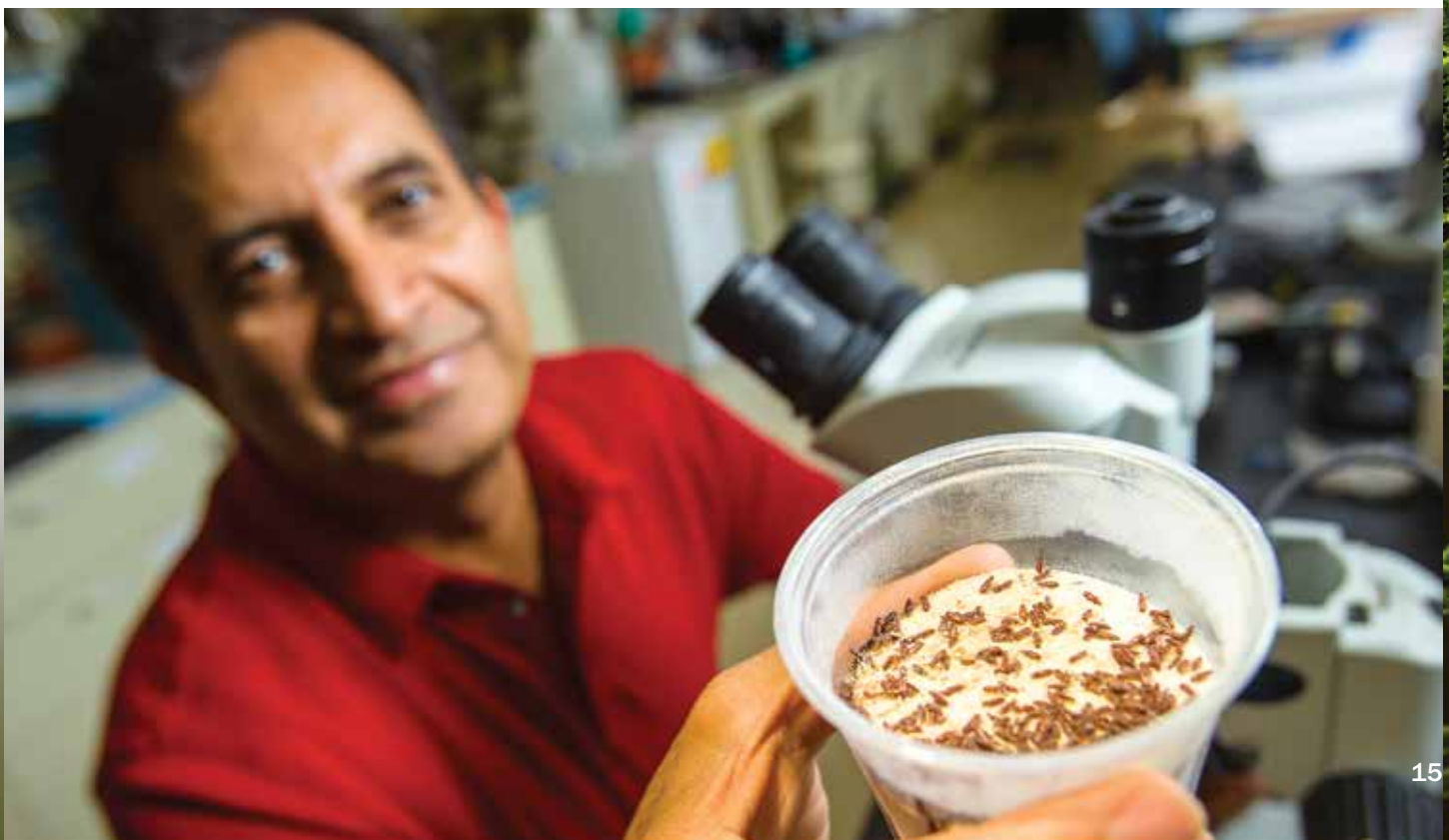
When a flux of calcium comes into the cell, it binds to calmodulin, which dramatically changes its entire shape, enabling it to bind to and activate any of 300 other proteins. Some of these proteins recognize whether or not calmodulin is methylated. If a gene doesn't produce that enzymatic catalyst to methylate

(Top) Jingjing Xu (l) and Ashlee Anciro track down methylation in Reddy Palli's entomology lab.

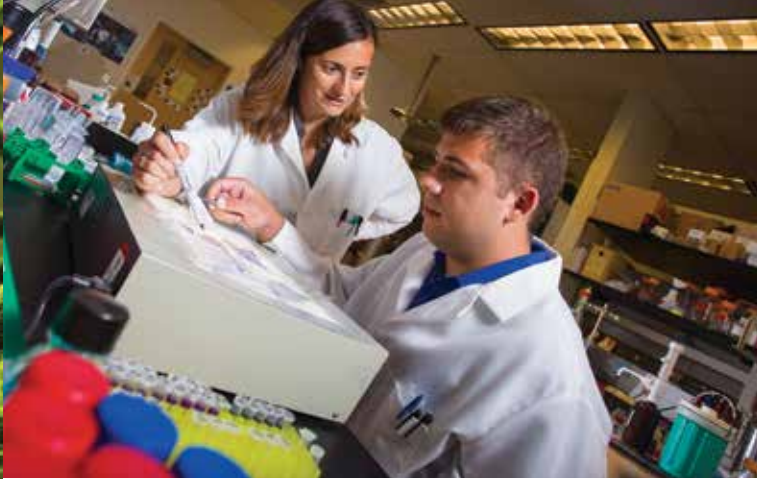
(Below) In his research pursuing the purpose of methylation in insects, Reddy Palli concentrates on fruit flies, the lab rat of insects.



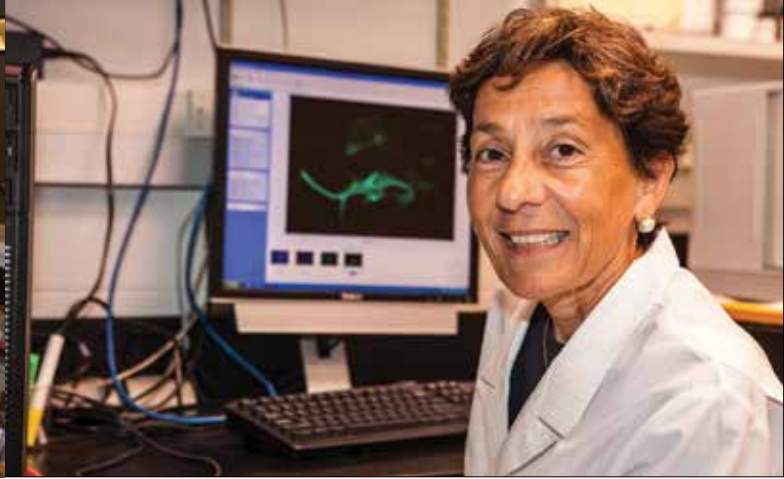
Matt Barton







(l) Roberta Magnani and Ag Biotechnology senior James Jasis.



(r) Franca Cambi is exploring the effects of methylation on autism spectrum disorders.

calmodulin, calmodulin can't bond to those proteins, and the entire chain of action is shut down before it starts. But no one knew what gene was responsible for this.

"Everybody who knows anything about this area of research, protein methyltransferases, knew that this particular enzyme was out there," said Houtz, whose laboratory has been recognized nationally and internationally for its work in this field. "I think a lot of people thought with the sequencing of genomes and comparing different genes in a number of organisms, that this one would show itself, but it never did."

So Houtz gave Magnani the green light.

Magnani began by isolating an enzyme she felt was a good candidate from some calmodulin-rich tissue. She sequenced the chain of amino acids in the chosen protein and compared that sequence to the human genome database. There she found C2orf34, the gene responsible for producing that protein.

Back in the lab, she cloned the gene, injected it into *E. coli* bacteria and forced it to produce its enzyme—an enzyme that, indeed, showed the methylation of calmodulin. It took Magnani a mere two months to solve the mystery other scientists had been trying to crack for years. Her lab journal #5 records her reaction on that January day. Scrawled in the left-hand margin is, "We have it, we have it, we have it!"

### Mystery Solved, Work Progresses

Ruti Parvari has identified certain human disorders with symptoms of mental retardation and severe muscle weakness as being the result of the deletion or mutation of C2orf34. A researcher and educator on the health faculty of Ben Gurion University in Israel, she has spent years studying genetic diseases. When Houtz became aware of Parvari's research, he contacted her, offering to collaborate.

Parvari offered to send cell cultures from affected patients, so they could biochemically demonstrate that calmodulin was not methylated in patients without the gene. Houtz, however,

does not have the necessary licenses to handle human cells. So Magnani contacted her friend, medical doctor and fellow Italian, Franca Cambi, who did have permission.

"Sure enough, the evidence was pretty dramatic," Houtz said. "The calmodulin was not methylated in those patients."

The repercussions of Magnani's discovery began to spread. In Israel, Parvari has developed a mouse model to study the deleted gene's effects. So far, mice show the same symptoms as humans.

In UK HealthCare's Neurology Department, Cambi is beginning a study on whether methylation affects patients with autism spectrum disorders.

Autistic features—which are not autism, she is quick to point out—are often seen in patients with mental retardation. Houtz and Magnani are collaborating with Cambi on the study.

### A Twist

"But now there's an additional little twist to the story," Houtz said. "Anybody who has studied calmodulin—and loads of people have—also knows that calmodulin is never methylated in insects. Never."

But the gene is there—active and completely capable of the task.

"We also know that if we mess that gene up in insects, we see specific and serious consequences," Houtz said.

So one day Reddy Palli took a call from Houtz, who asked him to investigate. Palli knocked out the gene in the red flour beetle and watched for a change.

"It didn't do much. The larvae became pupae, and then the pupae became adults. Then the adults mated, and they laid eggs," he said. "They laid eggs, but the larvae did not hatch. We found that the missing gene affected embryogenesis, the formation of the embryo within the egg."

But if calmodulin were never methylated in insects, why would knocking out that gene make any difference at all?



“We are thinking that at certain stages in the life cycle, insect calmodulin does get methylated, but not all the time,” Palli said.

“So when people looked at it, they may have looked at the times when it was not methylated. They did not look in the embryos where it may get methylated.”

Palli is now studying the gene’s effects in fruit flies, where he can isolate the exact place where the methylation happens. His study could not only lead to applied research in pest control, it also could eventually help in understanding human diseases.

“There is a lot of work on human diseases that is done with an insect model,” he said. “In my lab, I work on both angles (human health and controlling insects in agricultural environs). I get funding from the National Institutes of Health to improve our knowledge of diseases, and I get funding from the U.S. Department of Agriculture to control insect pests.”

## New Growth, New Ideas

Using tobacco and *Arabidopsis*, Indu Maiti is investigating the gene’s expression in plants, where a different scenario plays out.

“We’re finding that in plants, the protein seems to be expressed in young tissue that is regenerating: at the top of the plant, which has lots of

small cells or young leaves or sometimes in the tips of the roots. We also see it in flower buds,” said Maiti, a researcher in plant genetics. “Something about the regeneration process requires the methylation of calmodulin.”

He also suspects the process has something to do with controlling disease. When he infects a plant with a pathogen, the gene seems to activate at the site of the infection. It also seems to activate when the plant is under environmental stress, but whether either has to do with regeneration or signaling has yet to be ascertained.

Research in this field, too, can have ramifications in human health. Maiti sees a time when plants will regularly be used to make proteins that would be useful for medicine.



Matt Barton

## Just the Beginning

“As far as we know, this gene is in every single species we’ve looked at so far,” Magnani said. And while she’s now collaborating with many people in many areas of research, “ultimately, it’s not going to be my work, because I’m not a medical person. I’m not in pharmaceutical development. But my hope is that maybe I’ll give work to somebody else who will find more answers.”

(Top) Post-doctoral scholar Joydeep Banerjee works with Indu Maiti to study the gene’s expression in plants.

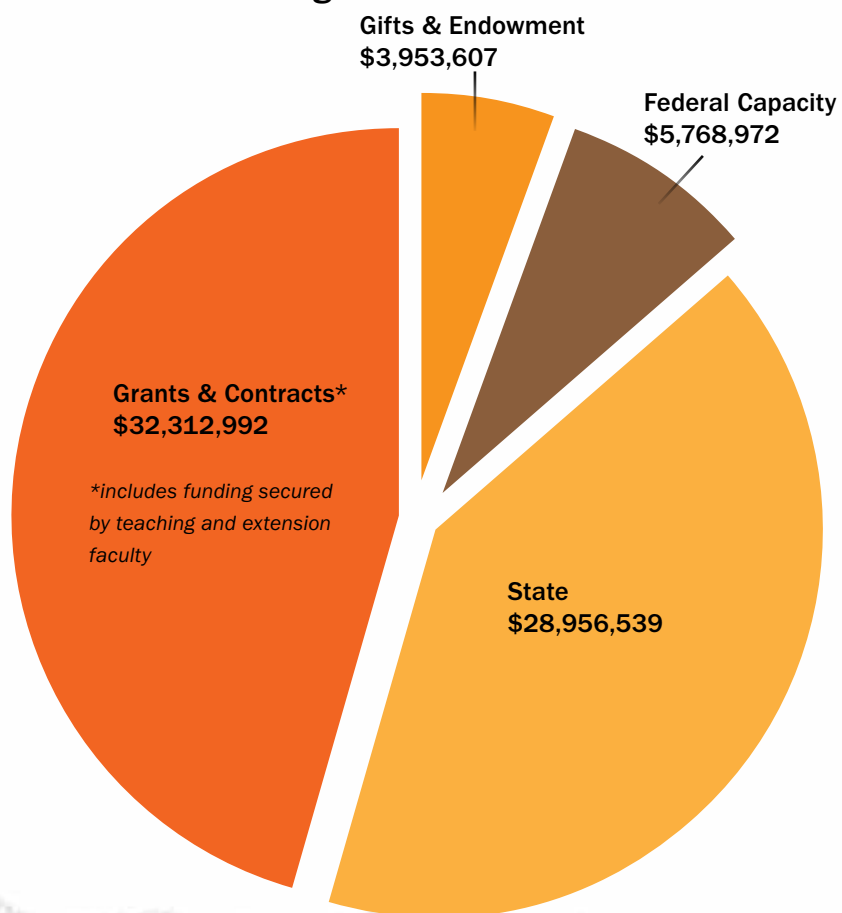
(Bottom) Indu Maiti suspects the methylation process has something to do with controlling disease in plants.



# Research 2011

## ANNUAL REPORT

### Research Funding



### Grants & Contracts

Awarded to the UK College of Agriculture through the UK Research Foundation


2011	\$32,312,992
2010	\$34,221,048
2009	\$23,829,306
2008	\$30,972,002
2007	\$31,488,174
2006	\$31,527,814

BEFORE THERE WAS A UK COLLEGE OF AGRICULTURE, THERE WAS AN EXPERIMENT STATION. Much has been written on the transformative creation of the land-grant university, catalyzed by the 1862 Morrill Act. It was, however, the additional commitment to research from the federal government with its passage of the Hatch Act of 1887 that established and funded agricultural experiment stations and brought respected, unbiased science to the practitioners of agriculture. So perhaps this is a good time to think about the long history and enduring and interdependent partnership between the Kentucky Agricultural Experiment Station and the University of Kentucky.

While the Experiment Station still belongs to UK, it now is the research arm for the College of Agriculture. Station oversight is the job of the Experiment Station director, who also functions as the College's associate dean for research. Today, the Station produces research on lands we manage in Kentucky, in real-world settings around the globe, and in state-of-the-art laboratories on campus. The equivalent of 100 full-time researchers aid Kentucky's forests, farms, food, and families with their phenomenal work.

At the Kentucky Ag Experiment Station, we were multidisciplinary before it was cool! Working across scientific disciplines is the foundation of all our work and one of the most enduring contributions of Experiment Station research.





Early ag research at UK was dedicated to solving problems for producers and concentrating on new productive plant varieties and new cultivation processes. Experiment Station research created incredible improvements in animal breeding, nutrition, and management. The green revolution of the second half of the 20th century had its roots in land-grant university scientists and their partners in the U.S. Department of Agriculture. We also made progress in the human sciences, solving problems about clothing, the home environment, nutrition, and marketing. Much of our success was due to our team approach, which many other disciplines, including biomedical research, have envied and emulated.

So how are we doing today? Team-based research is still second nature to us. We have refined the partnership with the U.S. Department of Agriculture and many more funding partners from other federal agencies, state agencies, and industry. Today, the modern Experiment Station in Kentucky works on problems of state-specific and national priority and leverages the federal government's investment more than five times over. We are completely integrated with the College's teaching and extension programs, educating students on research and imparting the results of our research to the practitioner.

Are we still relevant? Our role in the university is less prominent, and today's clientele are different from those 19th century farmers, but they are just as hungry for the latest information. We are up for the challenge. As you can see in this magazine, we work on more complex projects than the old days of improving crops and animals through breeding and management. In fact, we are working on non-food uses of crops through a bioprocessing project to use crops for fuel and bioproducts. We take a broad look at the effects of geography and poverty on nutritional health. We are still improving crops and animals, but we use advanced scientific techniques to focus our successes. We work beyond the U.S. borders too, and we involve our students. From its home in the modern College of Agriculture, the Kentucky Agricultural Experiment Station is true to its principles of partnership, relevancy, and dedication to stakeholders.

And still cool.

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# Slim Pickin's

Could where we live influence our waistlines? Based on her research, Alison Gustafson thinks so.

Gustafson, an assistant professor in the Department of Dietetics and Human Nutrition (formerly Nutrition and Food Science), is trying to understand the connection between people's neighborhoods and what they eat. Her research focuses on the availability of healthier foods in communities with Supplemental Nutrition Assistance Program participants.

According to the U.S. Department of Agriculture's Economics Research Service, about 60 percent of SNAP recipients are overweight and half of those are obese. Although several factors are thought to cause high rates of obesity, one influence may be an individual's environment. Specifically, the neighborhood where SNAP participants live and the food venues where they shop may influence what food choices they make.

Gustafson's interest in this research area was sparked while staging heart disease and weight loss interventions among low-income women throughout the Midwest.

"There is a lot of time and money needed for a person to lose 10 pounds," she said. "It's a lot more than calories in and calories out. It made me think of other possible outside influences that could affect people's weight."

Using a geographic information system, GIS, Gustafson mapped where SNAP participants in 57 Kentucky counties lived as well as the number and type of food venues they could access. This gave her a better understanding of how an individual's proximity to certain store types is associated with their diet.

Results show that SNAP participants living in counties with a supercenter consume seven more grams of fat per day than SNAP recipients living in counties without one. SNAP participants living in counties with three or more gas stations consumed 400 more calories per day than those living in areas with fewer. These additional calories roughly equal a pound per week.

In another study, Gustafson used the Nutrition Environment Measures Survey in Stores to determine whether the availability, price, and quality of healthy food within a grocery store influenced the diet of Fayette County SNAP participants.

She found participants who live near a store with a high availability of healthy options consumed two more servings of vegetables and more milk per day than those who did not live close to such a store. In addition, SNAP participants who live within a half mile of a farmers market consumed two more servings of vegetables per day than those who weren't near one. Those who lived within a half mile of a convenience store consumed fewer fruits and vegetables than other participants.

Based on these results, Gustafson believes it's not only the type of stores that are available within a neighborhood, but also the foods inside.

"We need to make the healthy option the easy option, but at the same time, we need to make choosing and buying the unhealthy option a bit harder, in order to see change at the community level," she said.

—Katie Pratt



Matt Barton



# Big Blue Trebuchet

When plant pathologist Michael Goodin talks about his recent visit to Brazil, he lights up with the idea that he's helping to build what he calls the Big Blue Trebuchet. In other words, he's helping to launch College of Agriculture students and researchers around the world for study, research, and outreach.

For instance, look at the coffee ringspot virus that Goodin experienced first-hand on his latest trip. He and his Brazilian collaborator, Professor Antonia Dos Reis Figueira, toured coffee plantations, where he was able to view the symptoms and understand the virus's economic impact. As it turned out, the virus is genetically related to one Goodin has been working with, a plant rhabdovirus that is basically, as he puts it, a plant rabies. Currently, scientists know of more than 200 rhabdovirus-like viruses, which collectively cause diseases in plants, animals, fish, and humans.

The coffee ringspot virus is an emerging virus in a country that produces 40 percent of the world's coffee. It's always been around, but for some, as yet, unknown reason, it's becoming more prevalent.

"Emerging viruses are a serious concern for agriculture and human health," Goodin said. "In this case, this is a mite-transmitted rhabdovirus. You see changes in the vector (an organism that transmits diseases or parasites) dynamics when you get a certain combination of cropping systems and/or climate change, and viruses are happy to go along for the ride."

The coffee ringspot virus causes a premature defoliation of the coffee plant, and under some weather conditions, can cause fruit to fall. This can negatively affect flavor, quality, and yield. The infected plants also are predisposed to secondary fungal infections.

Goodin is researching the relationship between the plant and the virus, with the goal of engineering a virus-resistant plant. He's starting from ground zero, however, since very little is known about this particular virus. Anderson de Jesus Sotero, a Brazilian doctoral student who is spending a year working in Goodin's UK lab, will sequence the viral genome before returning home to finish his degree.

"The cropping systems in agriculture are so intense in Brazil and the U.S.—good for virologists and plant pathologists perhaps, but difficult in terms of sustainable agriculture," Goodin said. "The world being what it is, virus problems in Brazil may ultimately mean virus problems in the United States or other parts of the world. It's not necessarily just helping Brazil; if you take a lesson from the tospoviruses and the geminiviruses, these are very globally conscious viruses, and they're on the move."

To Goodin, the ability to expand his role as researcher and teacher beyond our borders means a great deal, and he speaks enthusiastically about University and College offices and people initiating that.

"We've got U.S. Department of Agriculture-funded projects to globalize ag curricula," he said, "so all these travels and all these studies will get integrated into teaching modules and into the classroom to stimulate a global consciousness among students."

—Carol L. Spence



# Fuel on the Farm

Sue Nokes and her colleagues in the colleges of Agriculture, Engineering, and Arts and Sciences can picture a day when farmers not only grow the crops needed for biofuels, but also do much of the processing on their own land.

The Biosystems and Agricultural Engineering department chair leads a multidisciplinary team of UK researchers and scientists from the U.S. Department of Agriculture Research Service's Forage Animal Production Research Unit on UK's campus, Oak Ridge National Laboratory, University of Wisconsin, and North Carolina State University. The scientists are in the thick of a four-year project, funded by nearly \$7 million from the USDA and more than \$2 million in cost-sharing from CNH America, H&R Agripower, and Miles Farms, to study each stage of the biofuels system. Starting with the agronomics of growing a crop for energy and ending with a tanker truck filled with liquid alcohols as it pulls away from the farm, Nokes' team is refining each step in the process.

"With energy crops, the thinking is they can be planted on marginal ground," Nokes said, "so we're looking at best management practices and environmental impacts of growing plants, such as the perennials switchgrass and miscanthus, to see if that's true. It may be that farmers can grow crops in places they never have before."

One of the aspects the researchers need to overcome is harvesting and baling the grasses and ag residues like corn stover. Michael Montross, associate professor in Biosystems and Agricultural Engineering, is collaborating with a Pennsylvania company, CNH, to test a single pass combine that will separate the grain and bale the corn stover at the same time.

With this experimental method, the bales stay on the farm in a bunker silo, something most dairy farms already have.

Once in the bunker, the bales go through three major steps. Pretreatment comes in the form of white rot, a fungus commonly found on dead logs in the forest, which breaks down some of the lignin in the plants' cell walls, allowing for step number two, hydrolysis, where bacterial enzymes extract the sugar from the plant material.

"It's not like sugar cane, where you can crush the plant and the sugar comes out," Nokes said. "This is bonded into the walls of the plant, so we have to break those bonds; that's the tough part."

Horticulture Associate Professor Seth DeBolt is researching genetic modifications that would make it easier to convert a crop into sugar.

Step number three entails using another bacterium to ferment the extracted sugar into butanol, acetone, and ethanol. From there, the combined alcohols and solvent will be shipped by tanker truck to an off-farm refinery.

A year into the grant, the study is ready to move off the lab bench into a smaller scale of the life-sized version.

"We've presented this idea to a lot of farmers," Nokes said, "and they've all said, 'I would do that, if it works.' We still have work to do to get it to work, but I think the idea is a good one."

—Carol L. Spence



Steve Patton



# Fescue Detox

Tall fescue is an important grass for feeding livestock, and it grows very easily in Kentucky pastures. However, the super grass does come with its own problems—namely, a common endophyte, a fungus that can be toxic to the animals grazing it.

Some of the earliest research about fescue came out of the University of Kentucky. For decades, now, research in the College of Agriculture and many other institutions has focused on fescue toxicity. Most recently, scientists in the departments of Animal and Food Sciences and Plant and Soil Sciences have teamed up with the U.S. Department of Agriculture's Agricultural Research Service to find ways to minimize fescue toxicity.

"The loss of productivity in animals grazing endophyte-infected tall fescue results in more than \$600 million lost in the beef industry alone," said Professor David Harmon, an animal scientist who studies ruminant nutrition. "Animals consuming the infected grass show reductions in feed intake and weight gain, which can be exacerbated in times of heat stress like we saw this past summer. We are grateful to work with the ARS lab because they bring expertise we don't have. We benefit from one another; it's a win-win to have them here."

Harmon recently worked with Kyle McLeod, associate professor in Animal and Food Sciences, and Jimmy Klotz, a scientist with the USDA Agricultural Research Service, housed on the UK campus. They used steers at UK's C. Oran Little Research Center in Woodford County and administered either infected or endophyte-free fescue seed directly into their rumen to examine the effects. "The study data simply told us that the steers given the endophyte showed a reduction in their basal metabolic rate (the energy animals expend daily while at rest)," McLeod said.

Despite that, the researchers were surprised to find that some animals that consumed endophyte-infected fescue performed poorly, while others showed no difference from the control group that were given the endophyte-free fescue.

All three scientists agreed the results indicated more research is needed to determine the origin of the response—why the steers' metabolic rates decreased. Harmon said the team is following up their research with a second study to evaluate how efficiently the steers use the feed. He said it's just one facet of a complex syndrome.

"The benefit (of the research) is that we are making progress towards understanding the effects of the endophyte on the animal," McLeod said, "so perhaps we may one day eliminate the negative impact."

—Aimee Nielson



# GLEANNINGS

With an engine, four tires, and a lot of brains, these UK Ag students made a name for themselves—not to mention, one fine tractor—by taking home top honors at the ASABE 15th Annual International 1/4-Scale Tractor Student Design Competition. Though UK's team has always ranked high in the competition, this year they dominated it with 1st place trophies in 13 out of 16 categories. Go Cats!



Standing off the rope are Christina Lyvers and Mike Sama. In the seat is Cody Rakes. (rope on left) Angela Lyvers, Eric Varner, Catie Lester, Chance Corum (design chair). (rope on right) Nick Rhea, Micheal Blum, John Evans (captain), And Jordon Cook.



# imAGine

## **U.S. Sen. Justin Smith Morrill did.**

The Vermont senator and farmer authored the federal legislation that formed the nation's great system of land-grant colleges and universities and opened higher education's doors to those who would not have had that opportunity.

Sen. Morrill imagined the explorations, the discoveries, and the contributions that could arise from a healthy land-grant institution. We in the College of Agriculture have made his dream our mission—like Associate Professor Czarena Crofcheck, whose work in biofuels carries us a step closer to a clean environment. Through research, outreach, and academic programs, we've helped improve crop yields, protected women from ovarian cancer, and seen young people off to successful careers around the world. The UK College of Agriculture, building the future Morrill imagined 150 years ago.

ImAGine yourself part of that history and shaping a better future.



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*Change Service Requested*

An alternative crop is starting to  
emerge in parts of the state—  
solar energy. (Story on page 5)

