

TENNESSEE

LAND *life* & Science

VOL. 10/NO. 2 2014 | UT INSTITUTE OF AGRICULTURE



DELIVERING ON THE
INSTITUTE'S COMMITMENT
TO HANDS-ON LEARNING

THE UNIVERSITY of
TENNESSEE 
INSTITUTE of
AGRICULTURE



Dear UT Institute of Agriculture friends,

One of our four core values as an institute — or pillars, as we call them — is to promote world-class hands-on learning and research experiences for all our students. This issue of our magazine shows how our 4-H'ers and our undergraduate and graduate students are benefiting from our commitment to provide them with experiential learning opportunities. The magazine also focuses on our land-grant approach to food science: how we're improving food safety and quality through discovery, engagement and learning.

It's been an exciting year for the institute. In recent months we have appointed five new departmental leaders in entomology and plant pathology, Extension family and consumer sciences, food science and technology, plant sciences, and marketing and communications. They are advancing our academic excellence and helping us grow in new directions. We are

also very grateful to the individuals who previously held these posts, ones who have retired, returned to their faculty role or passed away, for the many contributions they have made to advance our mission.

We at the institute thank you for your support and wish you and your family the best during the new year ahead.

Go Vols!

Larry R. Arrington
Chancellor, UT Institute of Agriculture

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The UT Institute of Agriculture provides instruction, research and public service through the UT College of Agricultural Sciences and Natural Resources, the UT College of Veterinary Medicine, UT AgResearch, including its system of 10 research and education centers, and UT Extension with its offices in every county in the state.

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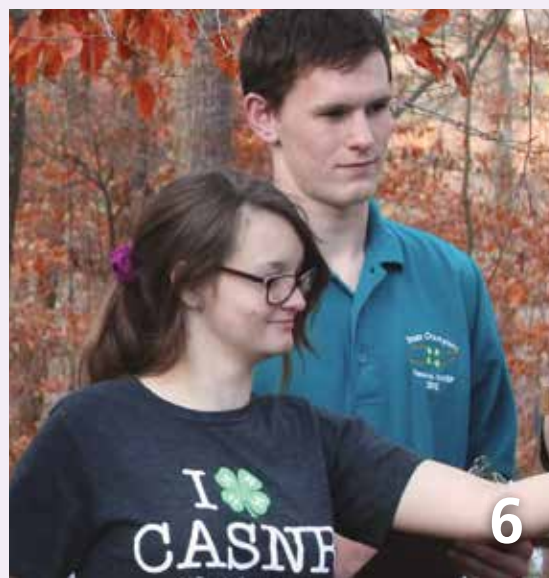
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On the cover: Putnam County 4-H Extension agent and 4-H'ers. From left to right is Emily Welte, Melissa Henry, Luke Welte, Ashley Williams, Raleigh Betterton, Ben Cody and Augusta Betterton.

News around the institute



Mary Rogers



Institute member Jamie Norris grew extra produce in her garden to share.

GROWING MORE, GIVING MORE

This spring the UT Institute of Agriculture partnered with the nonprofit Society of St. Andrew to launch a produce drive called “Grow More, Give More.” The initiative benefited Knoxville area hungry — “our hungry neighbors” as the organizers called them.

Members of the institute community were asked to plant more in their gardens or purchase produce and bring it to the UT Farmers Market. Volunteers collected the donations and delivered them to area agencies that feed the hungry.

Produce was also contributed from the community and production plots at the UT East Tennessee AgResearch and Education Center, with near-expiration food taken to feed animals at the Knoxville Zoo in this zero-waste campaign. From June through October, 6,882 pounds were grown and 20,646 servings of healthful fruits and vegetables given. Learn more at <http://ag.tennessee.edu/gmgm>.

PIONEERS IN ANIMAL-ASSISTED THERAPY

A UT College of Veterinary Medicine outreach program called Human-Animal Bond in Tennessee is one of the oldest animal-assisted therapy programs in the country. Enlisting dogs, cats, bunnies and other animals as therapy assistants, HABIT volunteers touch lives throughout Knox and 13 other counties in East Tennessee. The program assists people of all ages in a wide range of settings including schools, hospitals and nursing homes. HABIT expanded into the Tri-Cities in 2009 and spread even further in the region last summer through meetings with potential volunteers in Chattanooga and Greeneville. Visit <http://www.vet.utk.edu/habit/index.php> to learn more.



GLOBAL SCHOLARS

UT Agricultural and Resource Economics graduate Alicia English (M.S. '08) has been awarded a Fulbright Fellowship, and so has institute scientist Tim Young.



Alicia English



Tim Young

With a total of five faculty now on Fulbright exchanges, UT is on of the prestigious program's "top producers" for 2013-14. UT ranks in the top 10 of research universities for its number of current Fulbright recipients.

SCIENCE TO UNDO HARM TO WATER QUALITY

More than 12 million Chinese rely on Lake Taihu for drinking water, but about 20 years ago the once

English received the U.S. Department of Agriculture National Needs Fellowship for Alternative Energy from 2008 to 2011 and is former chair of the American Agricultural Economics Association graduate student section. Through the Fulbright she will research economic development in Kosovo.

Young is a professor in the Department of Forestry, Wildlife and Fisheries and is affiliated with the institute's Center for Renewable Carbon. He is a Fulbright Fellow at Salzburg University of Applied Sciences. He received a second honor when members of the international Forest Products Society inducted him as president for 2013-14.

An algal bloom on Lake Taihu, China.

pristine lake turned pea green. It had become overrun with toxic blue-green algae that can damage the liver, intestines and nervous system of humans and animals.

UT AgResearch scientist Jennifer DeBruyn and Steven Wilhelm, professor of microbiology, are working on an international team funded by two National Science Foundation awards totaling \$2.5 million to resolve the ecosystem balance in the lake. Their work has the potential to help safeguard America's water supply.

"China provides a unique opportunity to test ideas and management efforts in highly polluted and nutrient enriched lakes that we predict we will see in North America in coming decades," says DeBruyn, an assistant professor in the institute's Department of Biosystems Engineering and Soil Science.

The end result of the China study, she says, will be a science-based strategy that guides provincial and central government officials in bringing and maintaining Lake Taihu below the toxic algae threshold. That strategy will be transferrable to similar lakes worldwide.



OPERATION CHRISTMAS CHILD

MAKING HOLIDAYS BRIGHTER FOR WORLD YOUTH

Youth across the state in UT Extension's 4-H Program made Christmas a little brighter for children in developing countries. Through a program called Operation Christmas Child, 4-H'ers collected crayons, coloring books, stickers and toys, along with personal care items. They filled shoe boxes bound for youth around the world at packing parties in December. "This is about promoting global citizenship," says state 4-H Extension specialist Justin Crowe. "It's about giving our youth something to think about outside the daily context of their lives, to reach out to someone they'll never meet in a country they may never visit." The effort, which continues this year, is sustained with gifts in kind and contributions that provide a suggested donation of \$7 a box for shipping. Learn more by contacting Justin Crowe at 865-974-2128 or jcrowe3@tennessee.edu.



4-H alumna Samantha Horne shows her Christmas spirit.



Tennessee youth thrive

in 4-H natural resource projects and judging teams

The coach asks, "What can we do to increase populations of songbirds in our area?" To formulate their answers, the youth eagerly scatter into the woods, taking note of the grasses, trees and landscape, not caring that they are getting dirty. Is there something wrong with these youth? Why didn't they just Google it?

In today's society when we want information, most of us turn to a computer, open an Internet search engine and see what we can find. Not

these young people, they are UT 4-H Youth Development Program members learning about natural resources. They are learning about wildlife and forestry by actually being in the environment, not just reading about it on the Internet or in a book. This hands-on

approach to learning makes 4-H judging teams a popular activity in the state.

Youth in grades six through 12 are involved in a special opportunity each time they participate in a 4-H judging team, where they receive hands-on instruction in a subject area, allowing them to really understand the topic. This approach falls in line with the UT Institute of Agriculture's pillar, or core value, of preparing students to adapt and lead in society through

real-life opportunities to develop and apply practical learning. In 2013 more than 14,500 youth learned to be good stewards of Tennessee's abundant natural resources through UT Extension 4-H forestry, wildlife and fisheries projects, programs and judging teams.

These activities help make the state's youth more well-rounded in knowledge of

Tennessee's natural resources. The experience also prepares them to be better stewards of those resources as adults. Youth involved in forestry and wildlife judging also get to interact with UT Extension specialists, industry leaders and other professionals. These connections give 4-H members an opportunity to learn about college programs in their fields, to meet potential future employers, and to learn more about education and research conducted by the institute.

Tennessee teams in wildlife and forestry have found much success at the national level, winning the 2012 National Forestry Championship and back-to-back national titles in 2012 and 2013 in wildlife judging. And it's not just ribbons and trophies that measure their success, but the new knowledge they gain from the competitions. They demonstrate commitment and hard work through the weeks of practices and studying it takes to prepare for the contests. Many people are involved to ensure their success. One example is Weida Ringley from Shelby County. A 4-H volunteer leader for decades, she has coached numerous teams to victory

in forestry. Another is UT Extension Putnam County agent Scott Chadwell, who has been involved in wildlife judging since its beginning in 1978.

So if you think that all kids do is stay inside and play video games, think again. Many youth across Tennessee share an interest in natural resources, and each year they come together for meetings, practices and trainings through involvement in 4-H judging teams. They work hard, learn new skills and information, but most importantly they have fun. The 4-H motto is "To Make the Best Better," and it's a great feeling for 4-H agents and parents to know that with the knowledge the youth have gained from 4-H judging teams, they can go out into the world and make it a better place for generations to come.

— Melissa Henry

Melissa Henry, B.S. agriculture '98, is a 4-H Extension agent in Putnam County who has worked with many forestry and wildlife judging teams in her 15-year career with UT Extension.





Joanne Logan



Manisha Kureja

Undergraduate research and its impact



Gabriel Clemens



Bobby Simpson



Brad Collett

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Margot Emery

IT'S EASY TO SAY THAT THE UT INSTITUTE OF AGRICULTURE OFFERS UNDERGRADUATES WORLD-CLASS OPPORTUNITIES FOR HANDS-ON LEARNING — IT'S ONE OF OUR CORE PRIORITIES. BUT IT'S FAR MORE FUN TO HAVE OUR STUDENTS TELL ABOUT THEIR EXPERIENCES. HERE ARE A FEW OF THE STORIES THEY'VE SHARED.

1. In a waters and civilization course, **senior Zachary Shupe** cleaned Third Creek and collected data on water quality and stream health for a report to the city of Knoxville. “Cleaning Third Creek was an awesome break from normal classes and was great for meeting other classmates.”

2. **Junior Daniel Love** took part in a study tour of Jamaica. “Though I have been all over the United States and have experienced many different things, leaving the country was completely different. Learning about and observing the culture in Jamaica as well as the agriculture was not only fascinating, but enlightening as well. I know I’ll never be the same.”

3. **Senior Melany Moore** conducted research on a National Science Foundation hardwood genomics project. “I’ve loved my field and lab work with tree breeding and genetics. My internship included 100 hours of genomics work at Clemson coupled with experience in classical tree breeding at the institute. When I started my degree, I thought the only thing I could do with it was to be a forest ranger, and that’s not true at all. The field of forestry is very broad and there are lots of career opportunities, and they’re all needed to keep our world’s forests from diminishing.”

4. **Junior Alana Burnham** conducted research in the cloud forests of Costa Rica and peat bogs in Minnesota. “I’m studying environmental and soil sciences. I’m interested in how our changing climate is affecting ecosystems and their functioning. I got to see firsthand how climate change is affecting two disparate yet equally vital ecosystems. Doing my own field research and watching and learning from those with experience has opened my eyes to what goes on behind the sciences (in conducting

research). These aren’t the things you can learn in the classroom. I think it’s given me an invaluable toolbox, one that I hope I can use in graduate school and beyond.”

5. **Senior Ruxin Tao**. Horticulture and landscape design study abroad tour. “As a landscape design student, it was really a good opportunity for me to see how design concepts apply in the actual place and how designers can use the limited space in a more efficient way.”

6. **Freshman Dustie Strasser**. Living, learning internship at the UT East Tennessee AgResearch and Education Center, which offers housing and work experiences open to all majors within the UT College of Agricultural Sciences and Natural Resources. “I am excited about being able to take part in this internship. I feel that it is a wonderful opportunity for students interested in agriculture. I hope to expand my knowledge of animals, especially the ones that I am not a familiar with, to help me be better prepared for my future as a veterinarian.”

7. In his research experience as a dean’s scholar, **sophomore Drew Mallinak** developed a scientific study of his own to determine if ticks carrying a bacterial disease or ones that were genetically different traveled to hosts at faster speeds. “Whether I was out collecting ticks in the sweltering heat of Ames Plantation in West Tennessee, setting up mosquito traps around Knoxville, checking cattle for ticks at various UT AgResearch and Education Centers, extracting DNA from ticks in the lab and testing them for bacterial presence, ... my experience last summer was filled with a multitude of fun memories, fantastic learning experiences, and thought-provoking ideas for which I will always be grateful.”

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Olivia Collins

COWGIRL CREAMERY



LASSOS UP ARTISANAL INTERNSHIPS

As Kemia Amin approached the check-in desk at San Jose International Airport in late July, ticket in hand and bound for Knoxville after a two-month internship at the Cowgirl Creamery, she knew she was carrying home with her much more than she arrived with — knowledge of the dairy industry, exposure to new career options and respect for the back-breaking work of cheese making.

And then there was the 7 pounds of cheese in her luggage.



Food science and technology senior Kemia Amin.

"My luggage was 10 pounds over," says Amin, a senior food science and technology major in the UT College of Agricultural Sciences and Natural Resources, a unit of the UT Institute of Agriculture. "I didn't realize how much cheese I was taking home!"

Amin, along with Rebecca Hill, a senior in retail and consumer science in the College of Education, Health and Human Sciences, were the first to take part in a dynamic internship program established by Sue Conley and Peggy Smith, UT alumnae and owners of the Cowgirl Creamery.

Founded in 1994 by Conley and Smith — Washington, D.C., natives who met at UT in the 1970s — the Cowgirl Creamery is committed to supporting the craft of artisan cheese making and the health of small dairy

"This experience was beyond learning how to make cheese or learning the ins and outs of food safety. This internship taught me how to be diligent and problem solve on my own. I improved my critical thinking and learned how to multitask many different projects. I was held to a high standard and pushed myself to meet those expectations."

— Kemia Amin



operations. The creamery, based out of Point Reyes Station, Calif., had its beginnings in a renovated hay barn. Nearly 20 years later, Cowgirl Creamery boasts two creameries and four retail stores. Its award-winning cheeses are also sold to more than 500 stores, farmers markets and restaurants, and are distributed nationally through Whole Foods Markets.

“We are part of a food community that is working hard to promote organic agriculture, local growers and producers, and the connections between farmers and consumers,” says Conley, who oversees the creamery’s cheese making. Smith, meanwhile, manages the marketing side.

Their own division of duties inspired Conley and Smith to create and fund two internships for UT students — one housed in CASNR’s Department of Food Science and Technology to support cheese making and the second in CEHHS’s Department of Retail, Hospitality and Tourism Management to support the marketing side.

“In drawing one intern from agriculture and one from hospitality, we hoped to spur the students to think about how connections might improve between the people who grow our food and the end users (restaurant chefs, consumers and retail stores),” says Conley.

Both interns spent their first four weeks with the creamery learning about all aspects of the business — making deliveries, working at the

farmers market, staffing the cheese counter and making cheese in the creamery.

“In the second four weeks, each intern was assigned a project that served to advance their knowledge in a specific area,” Conley says.

Amin helped to complete a food safety audit at the creamery, while Hill worked on a new marketing plan for the creamery’s four farmers market stands.

“The experience at Cowgirl Creamery really combined my passion of agriculture and retail into one,” says Hill. “I remember telling Peggy and Sue one of my first days that I couldn’t do a marketing project because I hadn’t taken marketing yet. Little did I know, I have been doing marketing for a while now (in my job at Kroger’s Murray Cheese Shop).”

Amin says her eyes were opened to the dairy industry as well as food safety and quality control, a career she’d never before considered. And of her time spent scooping, washing and wrapping cheese in the Petaluma creamery, she says, “I’ve never worked so hard in my life.”

“I learned the hard truth about cheese making,” Amin says. “It’s really glamorous to eat it, but making it? It was tough. I gained a huge level of respect for this industry.”

Cowgirl Creamery founders Peggy Smith, left, and Sue Conley have created dynamic learning opportunities for students from their alma mater.

And as for the 7 pounds of Cowgirl Creamery cheese she ended up stowing in her carry-on luggage? She gave it away, mostly to a friend of the family for a dinner party.

“It was a great chance to talk about the cheese and my experience,” Amin says, though she didn’t eat much herself.

“I ate so much cheese while I was over there!” she says. “I needed to take some time off from the cheese!” — *Melanie Edwards*

Retail and consumer science senior Rebecca Hill.





TENNESSEE TRIUMVIRATE

UT FORESTRY, WILDLIFE AND FISHERIES ALUMNI SHARE POWER, HISTORY

When the directors of wildlife programs in Tennessee, Virginia and West Virginia get together they talk shop, but they also talk history. All three studied wildlife science at the University of Tennessee. Last November, the trio got together at the UT Institute of Agriculture to talk career preparation and job opportunities with students majoring in wildlife and fisheries science.

Ed Carter, B.S. forestry '71, is executive director of the Tennessee Wildlife Resources Agency. Bob Duncan, B.S. forestry '71, M.S. wildlife and fisheries science '74, is executive director of the Virginia Department of Game and Inland Fisheries. Curtis Taylor, M.S. wildlife and fisheries science '79, is chief of the Wildlife Resources Section for West Virginia's Division of Natural Resources.

For three alumni of the same program to lead statewide wildlife activities at this level is nearly unprecedented, Taylor says. "I can't think of any other university that has had three graduates at the same time as heads of state fish and wildlife agencies. I can't think of any that can make that brag."

All three grew up in the woods or on the water, they say, and choosing a wildlife and fisheries career just seemed natural.

The UT Department of Forestry, Wildlife and Fisheries, established in 1964, has turned out hundreds of successful graduates in the past 50 years.

"Ours wasn't the biggest program in the country, but we were really fortunate in receiving top-quality instruction," Duncan says. "It was a relatively new program then in 1968, when I first showed up. It was really gratifying to see the program grow. I learned a lot there."

Duncan and Carter both studied under the direction of professors Mike Pelton and Ralph Dimmick. Both did summer work at Ames Plantation in West Tennessee. Taylor came along a few years later, but got to know Bob Duncan who directed his master's degree fieldwork through TWRA.

"In school, you take jobs and make contacts, and you don't think about classmates being something you'd draw on as much as you do," Carter says. "The odds against all three of us being state directors are pretty enormous. There's a lot of water under that proverbial bridge to get us to where we are today that we didn't see back then."

"The department was small, very personal, and you got to know all professors," Duncan says. "The people were so warm and friendly, and that meant a lot to me."





“Billy Minser also — he was the student’s guy,” Taylor said. If Pelton was busy, you went to Billy Minser. He was a great help to all of us at UT.”

While all three cite classwork as essential, it was fieldwork, they say, that really got them ready for the world of work. Professors like Pelton did not micromanage students in the field, Taylor says. Students worked independently developing technical skills with wildlife as well as people skills as they interacted with hunters and sportsmen groups.

Those abilities have led to leadership roles. Among other honors, all three have served on the executive committee for the Southeastern Association of Fish and Wildlife Agencies, and Carter and Duncan have served as president. At the association’s national level, all three have served on the executive committee and Taylor has served as president. Interaction through this and other groups gives them opportunities to share their triumphs and frustrations.

Fees from hunting and fishing licenses completely fund their agencies, a challenge in a world where

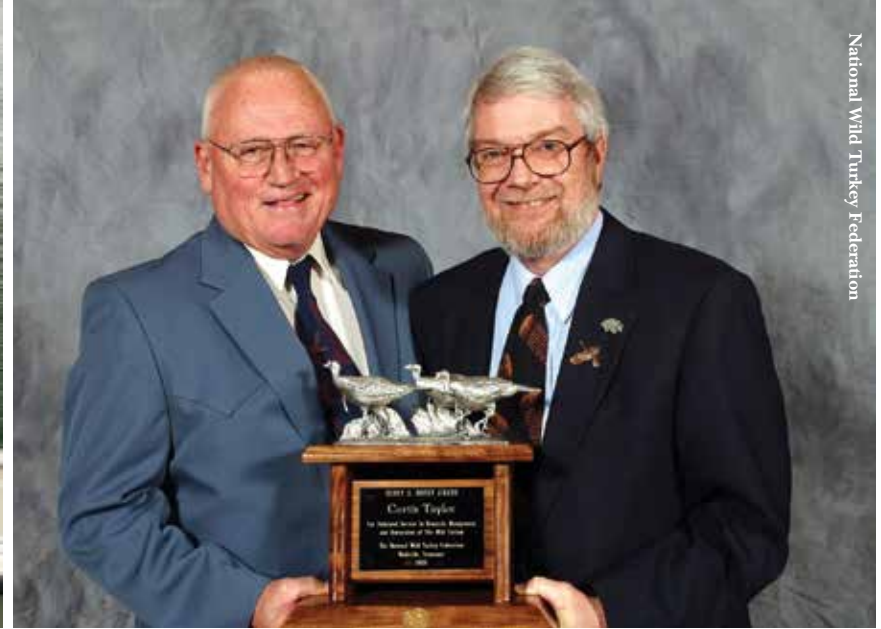
much of the public has moved away from rural roots. Recruitment and retention of sportsmen are issues for every manager, Duncan says. All agree that getting the general public to understand the need for certain rules and regulations can be challenging.

Theirs is a fraternity with issues few others can truly understand.

“These days, we’ll get a phone call from someone who says they have the world’s largest rat in their garage,” Carter says. “That rat turns out to be a possum. A lot of people don’t have a background with wild animals anymore. They view wildlife management in a totally different way than people with a rural background. There’s more of an expectation that the state will handle it for them.”

Sometimes, though, their jobs can be especially gratifying. Their shared history gives them unique opportunities to benefit constituents.

South Holston Lake lies on the Virginia-Tennessee line. A breakdown in communication between the



Above left: Tennessee Wildlife Resources Agency director Ed Carter, left, and Bob Duncan, executive director of the Virginia Department of Game and Inland Fisheries, shake hands on a long-awaited agreement that allows residents of both their states to fish South Holston Lake without requiring dual licenses.

Above right: Curtis Taylor, right, of West Virginia’s Division of Natural Resources, accepts the National Wild Turkey Federation’s prestigious Henry Mosby Award. The honor recognizes his leadership in turkey restoration and conservation. “He is a major reason why West Virginians enjoy wild turkey today,” said James Earl Kennamer, NWTF chief conservation officer, in presenting the award.

(continued)



The Department of Forestry, Wildlife and Fisheries celebrates its 50th anniversary in 2014. Members plan observances throughout the year and a big gathering in the fall. To keep up with developments, like the department's Facebook page — University of Tennessee Department of Forestry, Wildlife and Fisheries — or sign up for email updates at <http://fwf.ag.utk.edu>.



UT Institute of Agriculture alumni all, the leaders of three state wildlife programs visited campus in November to talk career paths and preparation with an audience of wildlife and fisheries science majors. Know your technical skills, Bob Duncan told the students, but "it's really about people. Your working relationships with other people are what's important." So, these days, is the use of social media. "I thought a tweet was a sound a turkey makes," said Curtis Taylor. "But I've found that tweeting and use of other social media is something we need to do to communicate with hunters and the general public." Support by each, he emphasized, is important for wildlife resource management programs.

states over the years meant fishermen needed two fishing licenses just to be sure they were covered in both jurisdictions.

"It may not sound like much," Carter explains, "but governor candidates actually ran on that issue, saying they would solve the problem."

Years dragged on and that never happened. Duncan often got calls in his Virginia office.

"When Ed Carter was named director in Tennessee, I called him and said, 'Congratulations. Let's fix this,'" Duncan says.

Wildlife staffers and legislators from both states evaluated the problem and kept working until they had a resolution. Then it was time to celebrate, Carter says.

"I got on a Tennessee boat and Bob got on a Virginia boat," Carter recalls. "We met in the middle of lake and shook hands to seal the deal."

"UT prepared us to be good ambassadors, good practitioners in the profession," Duncan says.

"Some people are in areas too far from Nashville and too far from Richmond to feel that their voices are heard. We realize their needs matter, too."

The three alumni agree they aren't the only UT Institute of Agriculture success stories.

"UT's Forestry, Wildlife and Fisheries program has had a profound impact on the field nationally," Taylor says. "UT grads have really done well in this profession. It's a testimony to the program and to the university." — Lisa Byerley Gary

Summer learning

CLINIC EXPERIENCE PREPARES VET STUDENTS FOR CAREERS AHEAD



When second-year veterinary student Taylor Lewis opted for an eight-week externship during summer break, she didn't feel she was missing out on her vacation time. "I didn't find it was giving up eight weeks. I wanted an externship, something with a lot of experience, and this was the best thing for me." Lewis says the experience "far exceeded my expectations."

Lewis was one of 15 veterinary students who participated for the UT College of Veterinary Medicine inaugural Sophomore Summer Externship Program created by Dean Jim Thompson. The College of Veterinary Medicine is a unit of the UT Institute of Agriculture. The externship program provides second-year veterinary students the opportunity to work directly with private veterinary practitioners, to learn from them and obtain hands-on experience in primary care veterinary medicine.

The students are expected to fully participate in the veterinary practice. Thompson says they learn from not only the veterinarians, but also from the entire practice staff including veterinary technicians, veterinary assistants, receptionists and practice managers. According to Thompson, the new educational experience and working knowledge in primary care will make classroom work more meaningful for rising third-year students. "The emphasis of the

clinical experience is on understanding common primary health care presentations in companion animals, gaining respect and appreciation for some of the underlying business decisions in private practice, and achieving competency in performing some technical skills considered basic to the practice of veterinary medicine."

Each student is provided a veterinary practice manual containing medical learning objectives considered essential for entry-level veterinarians. The manual is divided into chapters with each chapter containing medical questions that the student must seek answers to through reading veterinary medical textbooks. Participating practices are given manuals containing the answers.

Lewis spent eight weeks at Oak Ridge Veterinary Hospital under the tutelage of Dr. Stewart Novinger (CVM '97). Novinger says he likes everything about the program and wishes he could have taken advantage of something similar when he was in veterinary school. He says much of Lewis' success was determined by her drive and motivation to learn. The veterinarians at the practice wanted to teach her a few things they didn't learn until they were in private practice. "Not every case gets a full work-up: a chemistry panel, urinalysis. You can't biopsy every growth you remove or order a CT scan. Some of our learning issues for Taylor were along the lines of, 'This client has \$100. How can we resolve the pet's issue within that price range?'" Novinger believes learning how to work with limited funds and think outside the box are valuable lessons for veterinary students to learn before they graduate.

Lewis adds another valuable lesson, at least for her, was being treated as a colleague-in-training, which she says helps make her job-ready. "I didn't have confidence in my own skills before the externship. Now, even though I'm not fully ready to practice, I know that I can get there, and I can be successful."

Thompson plans to expand the program to include equine, food animal and mixed animal practices. "We are excited about this new educational experience for our rising third-year students, allowing them a focus on primary care medical issues in companion animals and building closer relationships with our referring community veterinarians. It's a 'win-win' outcome."

— Sandra Harbison

Veterinary student Taylor Lewis says she received invaluable career preparation last summer through the UT College of Veterinary Medicine's new veterinary clinic externship program.



Phil Snow

Globally connected



Above: UT delegation members David Bilderback and Ken Goddard examine silage on a UT delegation trip to Croatia to meet with new UT Institute of Agriculture partner Agrokor, an agriculture and food industry giant in southeastern Europe. **Below:** UTIA Chancellor Larry Arrington (second from right) and UT Extension Assistant Dean Robert Burns (right) sign agreements with Ljerka Puljić, Agrokor senior executive vice president for Agrokor strategic business groups, and the corporation's coordinator of the memorandum of understanding Robert Spajić, left, to promote innovative solutions in agricultural production and food processing between UTIA and the industry leader.



THE UT INSTITUTE OF AGRICULTURE'S INTERNATIONAL TIES OFFER OPPORTUNITIES TO LEARN AND SHARE EXPERTISE FOR STUDENTS, RESEARCHERS, SPECIALISTS AND AGENTS

The UT Institute of Agriculture is placing a priority on becoming more internationally involved in its academic programs. Citing a big push by industry and employers for graduates with international experience, Chancellor Larry Arrington says growth in the number and kind of partnerships is important and serves to advance the institute's pillar, or core value, of academic excellence.

"We operate more than ever in a global environment," Arrington says. "It's important that our faculty and students have the opportunity to learn about the global economy as it relates to Tennessee and around the world. Engaging with universities and businesses around the world helps the UT Institute of Agriculture better serve our clientele, and it raises awareness of the quality of our programs."

In the College of Agricultural Sciences and Natural Resources, a unit of UTIA, deans and faculty are actively

fostering partnerships from South America to Europe to Southeast Asia.

"The agreements we are cultivating with universities in other countries are for students to study, learn and conduct research that makes them more competitive for careers in a fast-changing global economy," says Assistant Dean John Stier. "We want students to become informed citizens of the world. This positions them to contribute to and lead multinational approaches to large-scale environmental and social issues such as food security and terrorism."

In the arenas of UT Extension and research, there is a lot of excitement about an expansive partnership that will promote innovative solutions in agricultural production between Tennessee and the Republic of Croatia.

UTIA is partnering with the region's food industry giant, Agrokor Group. Agrokor is a vertically integrated food



and beverage producer, processor and retailer that employs nearly 40,000 people. It is the largest privately held company in Croatia.

Through this partnership, experts from UTIA will provide proven expertise in Extension and research to the food and industry sectors within the Agrokor Group. Reciprocally, Agrokor will share its know-how in areas of production, value-added processing and marketing.

The institute sees its growing international connections as strategic — in preparing its graduates to excel in the job market and positioning UT to be a globally ranked top-tier university. Visibility at that level will enable UT to continue to attract the best students and research and outreach funding from industry and governments. As Chancellor Arrington says, these global partnerships are important for both today and tomorrow.

— Margot Emery

UT AgResearch Dean Bill Brown, with Agrokor's Robert Spajić, inspects total mix ration for dairy cows on a visit to Agrokor's facilities in Croatia.

CASNR'S GROWING INTERNATIONAL TIES

- Joining with UT Knoxville in developing the "100 Ph.D.s" program to attract international students to graduate study in agriculture, business, engineering and other areas.
- Opportunities with Chile to develop articulation programs in agriculture and food safety.
- A pending agreement with the National Agrarian University-LaMolina, Peru, for mutual academic and research opportunities for students and faculty.
- Future collaborations with the Federal University of Amazonas, Brazil, and with that country's equivalent to the USDA.
- Exchanges of researchers and students in areas of biofuels, wood processing and statistical process control with the University of Salzburg and BOKU University of Vienna, Austria.
- Ongoing research and training with Leibniz University and Hohenheim University of Germany.
- Work toward a certificate program in tropical turf management in Southeast Asia.

For gardeners, nongardeners alike, show is a delight



With a relaxed and friendly demeanor infused with a bit of humor, Chris Cooper, UT Extension agent in Shelby County and interim director of the Tennessee Master Gardener Program, an educational and volunteer service program offered by UT Extension, brings a wealth of horticultural knowledge to a wide audience, including savvy gardeners and those just starting out.

Cooper is the host of the television program, “The Family Plot: Gardening in the Mid-South,” which airs weekly on PBS stations throughout Tennessee and surrounding states. The show is recorded in the WKNO-TV studios in Cordova, Tenn. Each week, Cooper invites two guests, including local gardening experts and UT Extension agents and specialists, to share their gardening wisdom.

Guests discuss horticulture topics specific to the Mid-South, such as the

region’s ornamental grasses, turfgrass, insects and diseases, plus such gardening classics as scarecrow-making. Some episodes include cooking demonstrations using produce from the garden. Pickled peaches and peach ketchup are a couple of the unusual recipes that have been featured.

One of Cooper’s favorite episodes focused on backyard chickens. “This show was a fan favorite because once we started talking, the chickens chimed in and would not stop for the entire show!” he says. Other popular episodes featured snakes and one in which guests tasted herbs and flavorful weeds.

Cooper has hosted the show since its creation three years ago. “WKNO’s director of television had produced a similar show in Nebraska, and he wanted to see if it would be successful here,” he says. “I was asked to be the host, and the show has become very successful.”



Television host Chris Cooper, left, and Walter Battle, UT Extension director, Haywood County, watch Shelby County Master Gardener Genie Ashworth make hypertufa planters.

Keeping up with the latest gardening information specific to the Mid-South has been a learning process for Cooper. “I need to make sure that the information I give out is as accurate as possible,” he says. “I rely on fellow UT Extension employees for recommendations and resources, and all of the information provided is available in UT Extension offices.”

Cooper says he was surprised to find that nongardeners are among his viewers. “I am particularly amazed because you expect only gardeners

to watch the show, but nongardeners appreciate and learn from the show also.”

WKNO President and CEO Michael LaBonia sums up the value of The Family Plot by saying, “There appears to be a wave of people getting back to farmers markets, purchasing locally grown food and planting their own gardens. This show is a great way to help Mid-Southerners get started gardening or get help with their current lawns and gardens.”

– Kirche Rogers

Watch full episodes of The Family Plot at <http://video.wkno.org/program/family-plot>.



In profile:

Dr. Larry Steckel

INSPIRED BY CHILDHOOD EXPERIENCES ON THE FARM, UT Institute of Agriculture weed specialist Larry Steckel says he feels “blessed” to help Tennessee producers find solutions. Steckel is at the forefront of resistant weed outbreaks and travels the world educating producers about the changing face of weed management.

WHAT INSPIRED YOU TO WORK IN AGRICULTURAL RESEARCH AND EXTENSION?

I grew up on a small farm in south-western Illinois. The hard work of baling hay in the summer, chopping cocklebur out of soybean, tending to cattle in the snow and the big gamble each spring made me really appreciate how much farmers do to feed everyone. Years later, while working as an agronomist for Pioneer, I observed that specialists with research/Extension appointments at the land-grant universities were crucial “go to” sources for answers to difficult production questions. This led me to go back to school to get a Ph.D. and secure a research/Extension appointment.

WHAT HAS SURPRISED YOU MOST ABOUT YOUR FIELD?

The speed of change. When you read textbooks about evolution, you think it’s slow. As we have learned in weed science, evolution is very fast. In just a handful of years, very effective herbicides have become obsolete.

WHAT DO YOU THINK WILL CHANGE ABOUT WEED CONTROL OVER THE NEXT FIVE YEARS?

The biggest change will be more complexity. Just a few years ago weed management consisted of just spraying glyphosate a few times. It will not be that simple probably ever again. It will take a completely integrated approach that will incorporate cultural practices with the use of multiple herbicides, not just one.

WHAT DO YOU WISH MORE PEOPLE KNEW ABOUT AGRICULTURE?

People who work in agriculture love the environment and in my mind are the real environmentalists. We are in the field every day working to help feed and clothe the 7 billion souls on the planet. Yet we’re still mindful that we have to take great care with the environment so we can sustainably meet the needs of the estimated 8 billion folks who will be on the planet in just a few years.

IF YOU WEREN’T THE UT EXTENSION WEED SPECIALIST, WHAT WOULD YOU BE DOING INSTEAD?

I would be farming. I really love the whole lifestyle.

YOUR WIFE WORKS IN UTIA’S ENTOMOLOGY AND PLANT PATHOLOGY DEPARTMENT. WHAT’S IT LIKE SHARING A MUTUAL INTEREST OF AGRICULTURAL RESEARCH?

It’s been really great, particularly when Sandy helps me spray research plots on the weekend! She and I both grew up on small farms. We came of age during the very difficult farm economy of the 1980s, when so many farmers went out of business and lost their dream to farm for a living. I think we both feel we have an impact by helping generate answers as farmers try to navigate through difficult management decisions each year. We both are very proud to work for UT and the Tennessee farmers, and we hope and pray we can do a little something to help them. – *Ginger Rowsey*



FARM ANIMALS: THE UT VETERINARY MEDICAL CENTER HAS A VERY SPECIAL PLACE JUST FOR YOU!



“If it has more than one toe and less than five, we bring it in the door.” That is how Dr. David Anderson, Large Animal Clinical Sciences department head at the UT College of Veterinary Medicine describes the patients treated at the newly updated Farm Animal Hospital, operated by the UT Institute of Agriculture’s Veterinary Medical Center. “Beef, dairy cattle, sheep, goats, pigs, llamas, alpacas, camels and then what we call OLA or other large animals such as ostriches, buffalo. The list goes on.”

The expanded and renovated 35,000-square-foot Farm Animal Hospital opened its doors last fall. Complete with specialized patient management areas for various farm animal species, the facility will meet the needs of Tennessee’s animal industries for several generations to come, helping to protect the food supply from farm to fork.

The bovine ward, small ruminant and swine ward, and the camelid ward each have dedicated treatment and procedures rooms that allow focused care for individual species. In addition to a rehabilitation room with flotation tank and 2-ton hoist, the new facility includes an outpatient working facility and two dedicated surgery suites. “The standing surgery suite allows surgical procedures to be done on conscious patients,” explains Anderson, a board-certified large

animal surgeon. “In the recumbent surgical suite, we are able to perform more invasive surgical procedures that require general anesthesia and a higher level of sterility. We also have access to 24-hour intensive care monitoring, isolation facilities and the MRI and CT capabilities in the John and Ann Tickle Advanced Diagnostic Imaging Center.”

Dr. Sarel Van Amstel, professor of farm animal medicine and surgery, says the new facility enhances teaching and patient care. “When people see the facilities and the equipment such as the AquaCow flotation tank, I think they will be more inclined to bring in a down animal,” says Van Amstel. The treatment rooms, chutes and wards offer proper space to safely maneuver patients from one area to another within the hospital. “From an animal welfare point of view, with good facilities like this everything works better, and we can work properly and deliver medical care with less struggle and stress on the animal.” With a hint of a grin, Van Amstel adds the new hospital brings another advantage, “We don’t have to worry about competing with horses for facilities.”

NEW FACILITIES ENHANCE STRATEGIES THAT IMPROVE HEALTH OF FARM ANIMALS

What does the new hospital mean to the average Tennessean? Anderson

says the college and veterinary medical center are in the business of generating new knowledge and discovery. “The things we are learning here through the work we do and accumulation of knowledge is to try to develop strategies that improve animal health care. It may be through nutrition, farm management, vaccinations and parasite control. But at the end of the day, the expectation is that information filters down through the industry so people on the local level can use it to improve the health of their animals.”

One of the ways to increase animal health care across the state and region is by putting well-trained students onto producers’ farms. According to Anderson the quality of

education students graduate with is heavily dependent on the quality of medical care facilities. “The ability of clinicians who are highly specialized in a variety of disciplines to translate that quality into action requires excellent facilities.

“Our new facilities allow UT experts to provide the most advanced medical therapies available and maintain a strong teaching program for future veterinarians.”

From service to farm animals and their owners to preparing future generations of veterinarians, the enhanced facilities enable the college to continue to assist the institute in meeting agricultural needs across the state. – Sandra Harbison

The rehabilitation ward of the Farm Animal Hospital at the UT College of Veterinary Medicine allows clinicians to effectively manage farm animals through physical therapy, hydroflotation and alternate treatment strategies to rehabilitate muscles and nerves for recovery from debilitating injuries.



Phil Snow



The UT Gardens:

three locations, one state botanical garden

MORE THAN 100,000 PEOPLE VISITED THE UT GARDENS IN THE PAST YEAR, AND, IF YOU'LL PARDON THE PUN, THAT NUMBER AND THE GARDENS THEMSELVES CONTINUE TO GROW.

Integrating nature and green spaces into daily life would be essential to the well-being of an ever-growing urban culture — so thought faculty in the then Department of Ornamental Horticulture and Plant Sciences as early as the 1980s and so observed the Tennessee General Assembly in 2013. Last April the UT Gardens' statewide collection of plants became the official botanical garden for the state of Tennessee. The UT Gardens are a unit of the UT Institute of Agriculture.

The legislation that bestowed the designation on the Gardens declared that tranquil sites should be maintained for people to observe, study and explore nature's wonders and that a state botanical garden fulfills part of the research, teaching and outreach mission of a state land-grant institution. The legislation also noted the truly statewide nature of the UT Gardens system, which includes the original UT Gardens site in Knoxville, the second site at the UT West Tennessee AgResearch and Education Center in Jackson and the newest site at the

Plateau Discovery Gardens on the grounds of the UT Plateau AgResearch and Education Center in Crossville. Three sites. Three grand divisions of the state. One statewide botanical garden.

Thirty years in the making, the UT Gardens system began in 1983, when professor Don Williams overhauled a swampy plot on the southwest corner of the agricultural campus into a useable site for ornamental horticulture research and teaching. From that original plot the Gardens have grown into the statewide entity that they are today. Although their annual temperatures, topography and soil qualities vary, each of the UT Gardens sites shares the same mission to foster appreciation for and stewardship of cultivated plants through garden displays, educational programs and research trials. Sue Hamilton directs the statewide system, and she is assisted by many associates and volunteers. James Newburn, Jason Reeves, Carol Reese and Gregg Upchurch are among the familiar UT AgResearch and UT Extension faculty who contribute.

So why is each site called "Gardens" plural? Some 4,000 annuals, perennials, herbs, trees, shrubs, vegetables and ornamental grasses are evaluated in multiple research trials each year. Also, each site maintains demonstration gardens that allow students and staff to stretch their landscaping imaginations. The legislation recognizes that home gardeners; educational groups; architects, nursery, landscaping and retail businesses; and art communities all benefit from the UT Gardens system.

Truly a statewide resource, the UT Gardens are open to the public during daylight hours and free of charge to visit. They also offer free and fee-based educational opportunities. From UT Extension Master Gardeners to kindergarteners, there's room for everyone to learn and contribute. Visit the site nearest you or look it up online at <http://utgardens.tennessee.edu> to learn how you, too, can grow with the UT Gardens. — *Patricia McDaniels*

Visit <http://utgardens.tennessee.edu/tips.html> to sign up for the Gardens e-newsletter and receive monthly gardening tips and news of the Gardens.



The UT Gardens, Knoxville

✿ The original collection ✿

From the beginning, this site has delivered research discoveries to industry and the public, promoted hands-on learning for public horticulture students and served Knoxville-area communities. In 1992, the establishment of the support organization, the Friends of the UT Gardens, cemented the gardens' value to a community of garden enthusiasts statewide.

The UT Gardens, Jackson

✿ The first bud ✿

Located on the grounds of the UT West Tennessee AgResearch and Education Center, the UT Gardens in Jackson grew out of a casual conversation between Jim Brown, who was then the center's director, and UT Extension forester George Hopper in 1989. Today this site hosts one of UTIA's most popular public events, the annual Summer Celebration Lawn and Garden Show, occurring on the second Thursday of July.



The Plateau Discovery Gardens, Crossville

✿ The newest UT Gardens site ✿

At this site on the grounds of the UT Plateau AgResearch and Education Center, many of the plots were designed and built by Cumberland County Master Gardener trainees beginning in 2005. Master Gardener programs are managed by local UT Extension offices, and Master Gardeners receive extensive horticultural training in exchange for providing that information to the public through service opportunities. Statewide 2,100 Master Gardeners have provided more than 153,000 hours of service to their local communities. (More information is online at <http://mastergardener.tennessee.edu>.)





Saving Southeastern dairies



The number of dairies in the Southeast is falling. More than two-thirds of the region's dairies have closed since 1995, and milk quality is consistently the poorest of all the regions of the U.S. UT AgResearch Assistant Dean Steve Oliver and a team from UT's Department of Animal Science and five states know why. What's more, a new grant may help them reverse the decline.

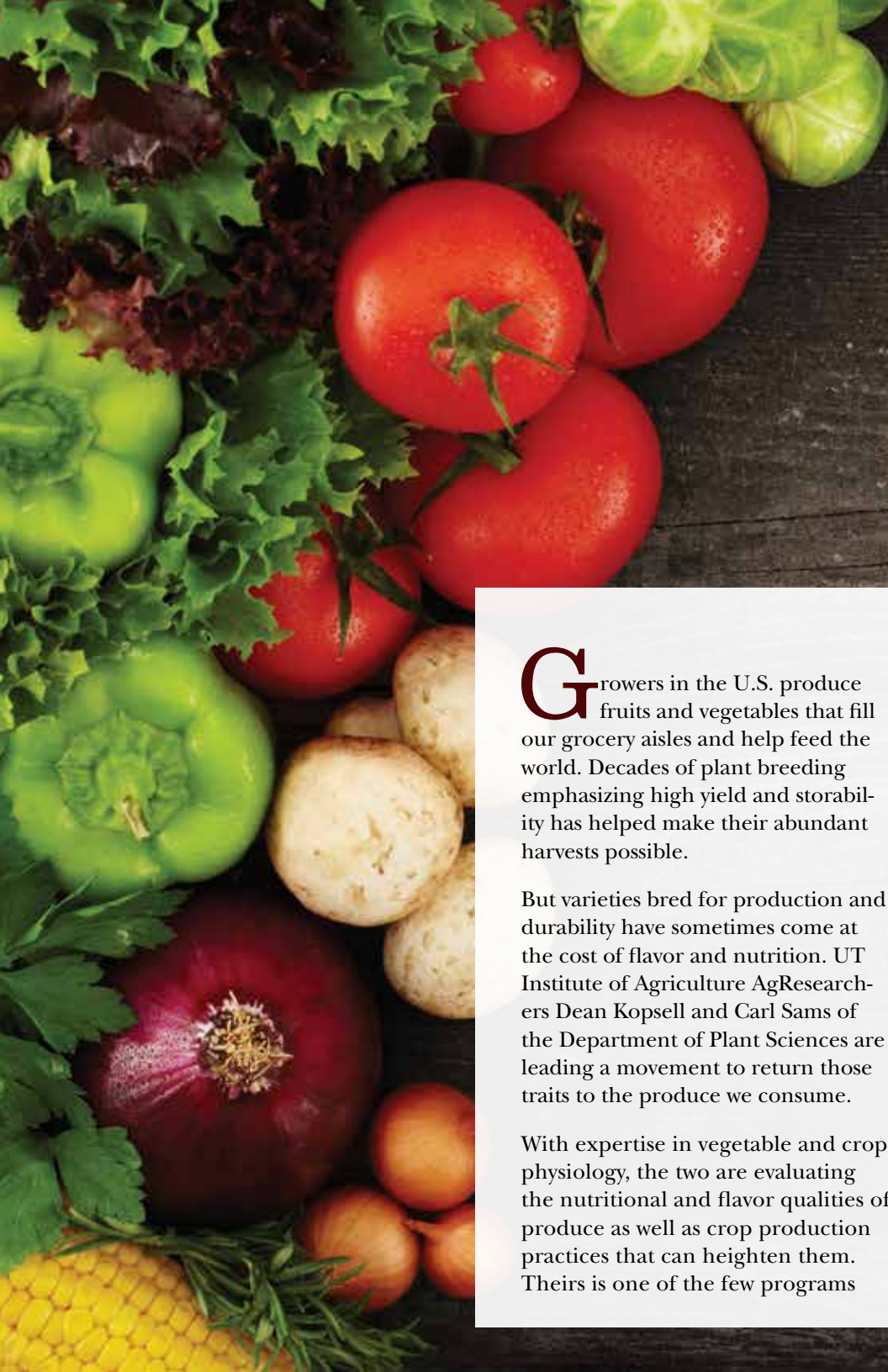
The \$3 million, six-state effort is being funded by the U.S. Department of Agriculture National Institute of Food and Agriculture. The UT Institute of Agriculture is the lead institution, and participants include the University of Florida, the University of Georgia, the University of Kentucky, Mississippi State University and Virginia Tech.

Oliver, who is coordinating the effort, says the study is focusing on improving herd health and milk quality and quantity by lowering the incidence of mastitis in Southeastern herds. Mastitis is an inflammation of the cows' udders.

To improve milk quality and enhance production quantities, scientists are reaching out to the Southeastern dairy community, particularly to challenged and underperforming operations. First they will identify why farmers are not fully adopting practices known to control mastitis and then they will work with producers to assess on-farm practices, focusing on strategies for controlling mastitis and enhancing

milk quality. The effort will include training producers and milkers to make on-farm decisions and developing continuing education programs for those serving the dairy industry. Methods will include printed publications, face-to-face meetings and electronic teaching tools in both English and Spanish. Undergraduate and graduate student education internships will provide hands-on learning and result in a more knowledgeable work force for the region's dairy industry.

UTIA scientists participating in the effort include Oliver, Raul Almeida, Peter Krawczel and Gina Pighetti, all of the Department of Animal Science; and Mark Fly and Susan Schexnayder of the UTIA Human Dimensions Research Lab. The entire effort is expected to be funded for five years. This award is supported by USDA National Institute of Food and Agriculture under the Agriculture and Food Research Initiative grant award # 2013-68004-20424. – *Patricia McDaniels*



Science for tastier, more nutritious produce

in the nation with the expertise and instrumentation necessary to integrate nutritional science, physiology, production and genetics.

“This idea of high nutrition, high flavor and high functionality of foods is starting to come back around due to advances in science that are making it possible,” Kopsell says.

“We’re seeing seed companies, processing companies and start-ups all wanting those values,” Sams says. “One force driving this are people who have a high passion in sustainability and nutritional values. These are the individuals who are working to return agriculture to urban and near urban areas, and they want to grow the best, most nutritious produce for their particular areas.”

Kopsell and Sams constitute the nutritional component of a wide-ranging effort to establish a thriving East Coast broccoli industry, one that focuses on crop production and nutritional quality.

They are also researching new horticultural technologies for crop production. One such project centers on the application of light-emitting diodes. “We’re finding that using red and blue LED lights can dramatically boost most of the nutrients in leafy microgreens and by large margins,” Kopsell says. Findings like these

have significance to greenhouse and vertical farming production, and he and Sams believe the lighting has the potential to one day augment inputs for produce grown in the field.

Consumers can already see the early stages of this push for higher nutrition. Home gardeners can find an increasing number of cultivars listed in seed catalogs that offer higher levels of lycopene, beta carotene and anthocyanins. And in some premium grocery stores shoppers can find lacinato kale (with higher nutritional levels) offered alongside conventional kale. Kopsell and Sams foresee more choices ahead.

“As consumers become more knowledgeable, they’re going to start researching what are the best food choices. They’re going to be more conscious of, ‘Well, if I eat this, I’m going to get this value for my overall health,’” Kopsell says.

And at the institute, these two AgResearchers are providing the science to make those choices possible.

– Margot Emery

For more information on these studies, contact Kopsell and Sams at 865-974-7324.

Growers in the U.S. produce fruits and vegetables that fill our grocery aisles and help feed the world. Decades of plant breeding emphasizing high yield and storability has helped make their abundant harvests possible.

But varieties bred for production and durability have sometimes come at the cost of flavor and nutrition. UT Institute of Agriculture AgResearchers Dean Kopsell and Carl Sams of the Department of Plant Sciences are leading a movement to return those traits to the produce we consume.

With expertise in vegetable and crop physiology, the two are evaluating the nutritional and flavor qualities of produce as well as crop production practices that can heighten them. Theirs is one of the few programs



Probing the mysteries of milk's molecular structure

Archeological records show that humans began milking goats 7,000 years ago during the Neolithic era. Yet even with our long-term relationship with fluid milk, dairy products and dairy-based ingredients, important questions still remain on the structure and function of several key milk components.

Harte is the first scientist in more than 100 years of research to produce a molecular model of a casein molecule.

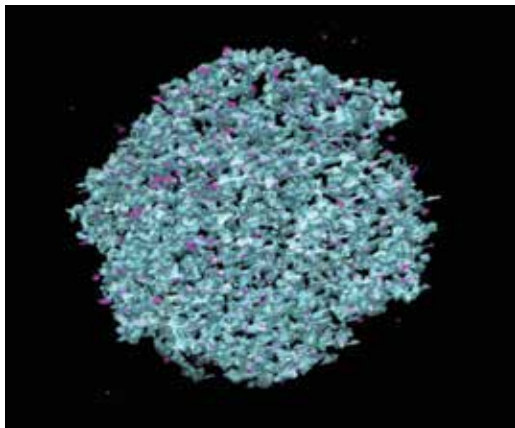
In the UT Institute of Agriculture's Department of Food Science and Technology, researcher Federico Harte is working to determine the structure and function of casein micelles in milk. A casein micelle is a spherical structure (think soccer ball) of four protein molecules that forms when suspended in a fluid, in this case milk. Casein micelles are responsible for giving skim milk its distinctive whitish-bluish color. Their main accepted function is to transport calcium from mothers to young

in all mammals. But there the agreement ends, with some scientists arguing there are other, so far not understood, biological purposes. Research in Harte's lab and in his department's Biopolymers Group aims to find answers and identify functional uses of casein micelles for novel food and nonfood applications.

Harte is the first scientist in more than 100 years of research to produce a molecular model of a casein molecule — you can see it in 3-D at his lab's website, <http://web.utk.edu/~fede>. With collaborator Terje Dokland of the University of Alabama at Birmingham, Harte used cryo-electron tomography to demonstrate that the casein micelle is an open structure whose void spaces explain why skim milk is such an excellent vehicle for transmitting vitamins such as vitamin A, which is commonly added to milk. With UT chemistry professor Shawn Campagna, Harte has demonstrated that casein micelles also deliver nutrients, such as sphingomyelins, that aid infant development.

Harte says research in his lab is not only focused on biological and health aspects of the casein micelles. "We're also conducting research on how processing affects the technological properties of the casein micelles. We're using homogenization at very high

The casein micelle pictured here is why skim milk is white. There are 1,000 trillion casein micelles per milliliter of milk. This model developed by Federico Harte represents the structure of the molecule, showing a protein-rich fraction (light blue), calcium phosphate-rich clusters (pink) and void areas that aid in the transmission of milk additives such as vitamin enrichment.



The knowledge that UT AgResearch scientist Federico Harte is generating on casein micelles has enormous implications for the dairy industry, and Harte recently won the American Dairy Science Association's Scholar Award in dairy foods — a tremendous honor for him and the UT Institute of Agriculture. Earlier this year he was recognized with the institute's 2013 T.J. Whatley Young Scientist Award for his achievements and professional promise. His work has resulted in five disclosures and a pending patent with Bush Brothers on a technology that enables the tracking of changes in weight, volume and density of beans, barley and other seeds during hydration.

pressure — five times the pressure in the bottom of the ocean's Mariana Trench — to modify the size and structure of casein micelles to promote better binding to other molecules." This, Harte says, can lead to improvements in the quality and yield of traditional dairy products such as yogurt and cheese. It also shows promise for creating new applications for dairy ingredients and that, Harte emphasizes, could benefit us all.

"Who knows?" Harte says. "Maybe in the next five years we will be able to consume zero-fat yogurt, zero-fat ice cream and zero-fat cheese that fully resemble their full-fat counterparts but without sacrificing flavor and texture and with no added stabilizers!"

After all, casein micelles are part of the structural backbone of all dairy products, and improvements will happen when scientists fully understand the architecture of this fascinating component in milk. Harte's work through UT AgResearch is paving the way for this breakthrough.

Federico Harte supplied the information for this article. Two dairy companies, the Dairy Research Institute, the U.S. Department of Agriculture and the National Institutes of Health provide funding for his research.

Food science and technology associate professor Federico Harte, center, and members of his lab team celebrate their success in dairy research.



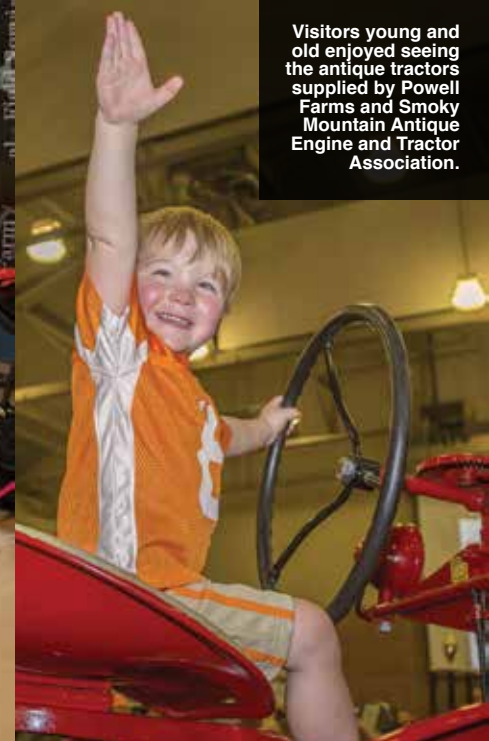
Rich Maxey



The UT Garden's James Newburn and CASNR's Angie Berry show off their UT spirit.



Sporting their orange, UT College of Veterinary Medicine HABIT service dogs greeted visitors to Ag Day.



Visitors young and old enjoyed seeing the antique tractors supplied by Powell Farms and Smoky Mountain Antique Engine and Tractor Association.



Animal science undergraduates Nicole Delfraio, left, and Karrol Courtney show off baby chicks.

AG DAY 2013 SUCCESS

JOIN IN THE FUN WHEN AG DAY RETURNS NEXT OCTOBER



Waymon Hickman, center, with wife Helen, receives the Meritorious Service Award from Chancellor Arrington.



Ag Day fun and balloon hats put a smile on everyone's face.



Jennifer Hatcher, holding the Horizon Award, with parents Sharon and Charlie, and brother Charles.



Up close and personal time with farm animals made for fun.

How much orange can be stuffed into the new Brehm Animal Science arena? Alumni, friends and family attending this year's Ag Day can tell you it's a lot of orange ... and a lot of fun.

Ag Day is held annually and is a fun and educational event that serves as a homecoming for many who have ties to the UT Institute of Agriculture. "It provides the opportunity to share with alumni, friends and community the programs we have and how those programs impact their lives," says Willie Hart, professor in biosystems engineering and soil science and chair of the 2013 Ag Day Planning Committee. "In today's global economy, the institute's impacts reach far beyond the state of Tennessee, and it is important that we educate the public on what we do."

In addition to Ag Day favorites, such as the insect petting zoo, cricket spitting, face painting and departmental displays, this year's attendees were met with some not-so-familiar activities. The new location inside the animal arena drew a huge crowd and included an animal holding area where sheep, baby calves, beef heifers, baby pigs and a horse were waiting to greet visitors. Milking demonstrations

held a captive audience, and baby chicks — some still working their way out of their shell — were too cute to pass by.

During a brief program, Larry Arrington, chancellor of the UT Institute of Agriculture, announced the creation of two new institute awards. The inaugural Meritorious Service Award, which was established to recognize a distinguished friend and supporter instrumental to the success of the institute, was presented to Waymon Hickman (agricultural education '56) for his long-term support of the institute. Jennifer Hatcher was presented with the inaugural Horizon Award. This honor recognizes a young professional for his or her early career accomplishments and potential as a leader in agricultural, natural resources and related professions. Since graduation, Hatcher (CVM '05) has been given many accolades, including the UT College of Veterinary Medicine Distinguished Alumni Award.

Next year's Ag Day is planned for Oct. 4 and will start four hours prior to kickoff as the Vols take on the Florida Gators. Plan on bringing your orange and your smile. You'll need them both!

— *Jean M. Hulsey*

THE HISTORY OF AG DAY, AS RESEARCHED AND DOCUMENTED BY THE AG DAY 2013 COMMITTEE MEMBERS:

During his tenure as vice president for agriculture, Bill Armistead sent out a memo to faculty and staff soliciting ideas on how to improve UTIA. Ben McManus, who was on the faculty of the Department of Agricultural and Resource Economics, and possibly several others, suggested a need for a Faculty Advisory Council. Around 1980 or 1981, the advisory council was formed with Larry Parks, professor of plant sciences, serving as chair and McManus as vice chair. The following year McManus served as chair.

During one of the advisory council meetings, McManus suggested that the institute should start an event for staff, faculty and alumni, and in his words, "Frank Bell, Ed Lidvall and Joe Burns jumped all over it." Professors Bell and Lidvall, and Burns, a UT Extension forage specialist, served as the initial planning committee and are credited with the orchestration and legwork that brought the idea into fruition.

In 1982, the first Agriculture Recognition Day was held. Lidvall and Bell served as co-chairs. The second year Extension poultry specialist Charlie Goan served as chair, and the name was shortened to Ag Day. Since then, this event has been held each fall. John Hodges, who at the time served as superintendent for the East Tennessee Experiment Station, did a tremendous amount of behind-the-scenes work over the years and was instrumental to the success of Ag Day.

ROW CROP PRODUCERS INVEST IN FUTURE

When he sold his winter wheat last June, Dyer County producer Matt Fennel designated 150 bushels of it to a cause that's important to him. Fennel donated it to the University of Tennessee Foundation through a program that directly benefits UT Extension services in his county.



Matt Fennel

"Anyone with a stake in agriculture should support Dyer County Extension, and Commodities for Communities provides an opportunity to give that is also beneficial for growers."

Through the program, Tennessee farm operators are able to make a direct transfer of an agricultural commodity such as corn or wheat to the UT Foundation. (Officials are working out details

of donating other commodities such as cattle.) Money raised from its sale goes into an endowment account decided on by the local producers. Dyer County producers, the first to take part, established a Dyer County Extension Endowment for Agriculture. Their fund will allow the UT Institute of Agriculture to enhance agricultural Extension programs in the county in perpetuity.

Fennel is the first participant in an endowment program called Commodities for Communities. His gift of wheat provided more than \$1,000 to the endowment.

"UT Extension has played a huge role in the success and sustainability of agriculture in Dyer County," Fennel says.

Row crop and livestock farmer Larry Joe Maupin of Newbern is chair of the Dyer County producers who funded the local Commodities for Communities program. "We feel that farmers and producers need to have input at the county level to ensure our Extension programs continue and not just for us, but for future generations of farmers," Maupin says.

"I think producers need to be more involved in supporting all our operations through this Commodities for Communities program, to be able to help in having UT agents here. And we're not only supporting Extension, we see ourselves helping to support UT AgResearch, as well," Maupin says. "We set up our endowment to do many things."

Tim Campbell, UT Extension Dyer County agent and former Extension director, helped pioneer Commodities for Communities and made a contribution of his own. Campbell says gifts to the program impact both local agricultural communities and the Extension programs that serve them.

"The Dyer County Extension office has been here for more than 100 years serving Dyer County agricultural producers. The research-based information we share helps farmers stay abreast of

OF LOCAL UT EXTENSION SERVICE

advancing agricultural practices to enhance their production systems, and that's helped them achieve a better way of life. It's important for us to be here."

UT Extension has been a very important part of my farming career over the past 40 years, starting with 4-H. I've worked with four agents over the years, and they've all been super.
– Larry Joe Maupin

To participate in a Commodities for Communities program, growers deliver their commodity to a local elevator and inform the business that they wish to transfer ownership to the UT Foundation. The elevator operator will complete the necessary forms, and the UT Foundation will order the sale of the commodity. By directly transferring commodities, as opposed to selling the commodity and making a gift from the proceeds, growers may realize significant tax savings.

Producers in four other counties launched their own Commodities for Communities initiatives last year. Foundation members say the program will soon expand to other counties. Farmers interested in contributing may contact the UTIA Office of Institutional Advancement at 865-974-5779 or by email to utiaadvancement@tennessee.edu.
– Michele Sides

Commodities for Communities supporter Larry Joe Maupin scouts for soybean disease with UT Extension Dyer County agent Tim Campbell.

U.S. Sen. Lamar Alexander of Maryville, third from left, holds a gift agreement for the new Commodities for Communities initiative presented by Gibson County farmer Jason Luckey. Also present is U.S. Rep. Stephen Fincher of Frog Jump, at Luckey's right, institute Chancellor Larry Arrington, center, and Gibson County producers who showed their support by signing the agreement.



TAREK HEWEZI, ASSISTANT PROFESSOR OF PLANT MOLECULAR BIOLOGY IN THE UT DEPARTMENT OF PLANT SCIENCES

“Soybeans are one of the most important crops in the U.S. and in Tennessee. Soybeans have one big problem: soybean cyst nematodes. These tiny worms cause more than \$1.5 billion in losses each year. There’s some resistance, but it’s very limited. When soybean breeders introduce a

nematode-resistant soybean variety, that resistance only lasts several years before the pathogen of cyst nematodes overcomes it. I want to use the new tools of molecular biology and biotechnology to develop resistance that will last for a long time.

“I was a postdoctoral researcher at Iowa State when it was discovered that it’s interactions of proteins from the nematodes and the plants that cause the infection.

“I decided to pursue this very new research on the nematode proteins, called nematode effectors. If I can understand how effectors act, how they help nematodes to be able to affect the plant, how they change plant cell physiology and morphology — all of which is very challenging — then we have a lot of potential for applications that can help reduce nematode damage. This basic research has a lot of potential to increase plant

performance, yield and defense simultaneously. The Tennessee Soybean Promotion Board is funding my research, as is the National Science Foundation. They’re both important supporters of my lab as we work toward finding solutions to this pathogenic threat of soybean production worldwide.”

ADITI RAMBANI, PH.D. STUDENT, PLANT MOLECULAR BIOLOGY

“As a kid, I always wanted to be a plant doctor. Growing up in India I could see how important it was for farmers to get a good yield of crop and how devastating it was to lose it all because of infestations. As a sophomore I participated in camps and seminars to educate farmers about practices to avoid pests and diseases, but these solutions were not foolproof. I wanted to be part of research that develops reliable technology to combat infestations, and that’s why I chose the field of plant molecular biology. I can now study and understand the impact of pathogens on plants at the molecular level and figure out ways to boost plants’ immunity against them.

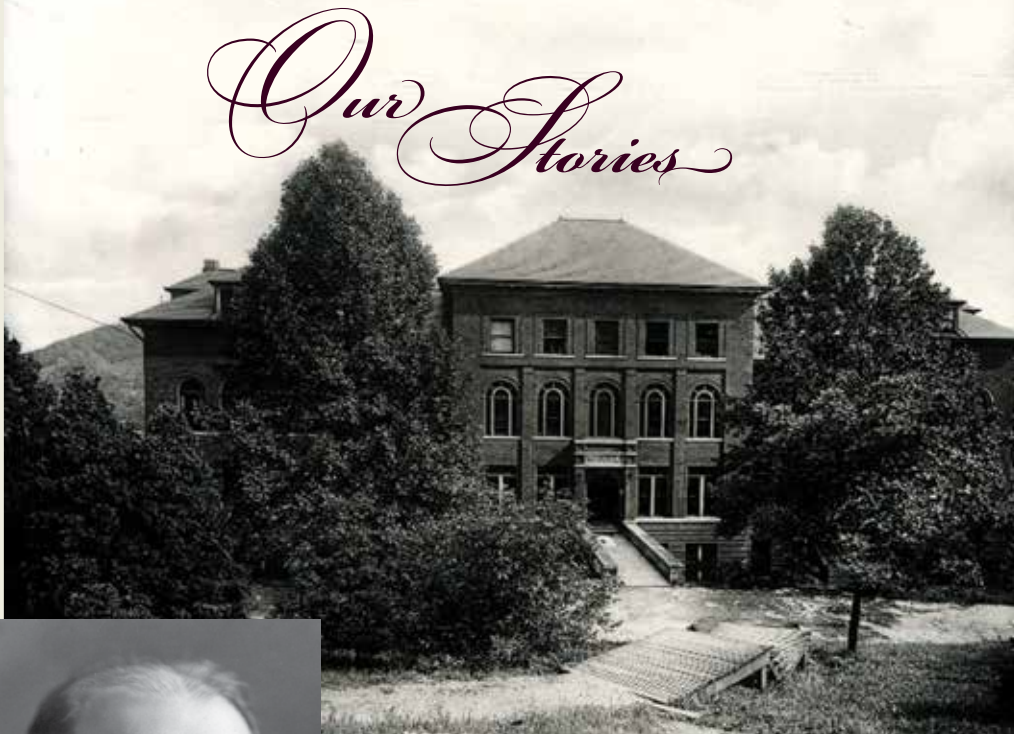
“My project at UT is about understanding resistance of soybean towards cyst nematodes. How is this tiny worm able to infect plants? What happens in plants that are able to resist this infection? The plant and worm interact at the molecular level and if we understand the dynamics of this interaction we may be able to give plants an upper hand and save crop losses incurred by farmers every year due to this pest.”



Margot Emery

Tarek Hewezi ('17), left, and Aditi Rambani examine soybeans, a crop they seek to protect using molecular biology and biotechnology.

Our Stories



Morrill Hall in an undated photo.

HARCOURT MORGAN

By the time Morgan Hall, the stately flagship administrative building on the UT Institute of Agriculture campus in Knoxville,

was completed in 1921, its namesake was already something of a legend in Tennessee agriculture.

Harcourt Morgan, a Canadian-born entomologist, arrived at UT in 1905 to teach entomology and zoology. By 1913 he was dean of agriculture at UT and had developed a good working

relationship with Tennessee farmers. His warm demeanor and simple dress helped persuade them to try science-based farm-improvement practices.

His reputation as a friend to farmers became a stumbling block when, in 1919, he was considered for the presidency of UT. Trustees grumbled that Morgan “didn’t dress like a college man.”

“He works with the farmers,” Acting President James Hoskins explained. “We’ll tell him to fix himself up.”

Students of that era recall a moose’s head, bagged by Morgan in his native Ontario, hanging on the wall of the old auditorium in the center of Morgan Hall’s second floor.

Morgan served as UT president until 1934 when he resigned to serve on the board of directors for the newly created Tennessee Valley Authority, a post he held until 1948. Morgan represented agricultural interests within TVA, too. Progressive Farmer honored Morgan as 1940 Man of the Year in Service to Agriculture. He died in 1950.

THE LIBRARY

Though the institute owns dozens of buildings, farms and laboratories, perhaps none has been as widely used by students as its library.

A dedicated agriculture library dates to at least 1880, when a room containing some 5,000 volumes became part of the first Morrill Hall on the Hill. When a second Morrill Hall was funded in 1907, a library was also an integral part.

The Ag Library got new space when Morgan Hall opened in 1921, and again in 1974 when the College of Veterinary Medicine opened.

Today, “the Webster C. Pendergrass Agriculture and Veterinary Medicine Library serves those seeking information and scholarship

in areas important to UT’s Institute of Agriculture and the citizens of Tennessee,” according to its mission statement.

And you don’t even have to be on campus to use those materials. Offering onsite and virtual use of its resources: Collections that span agriculture, natural and environmental science, food science and veterinary medicine.

Librarians Peter Fernandez and Ann Viera are available to answer questions not only from UT students, but also for any Tennessean who needs information.

The facility’s namesake began his career as an Extension agent in 1936 and retired as UT vice president for agriculture in 1979. – Lisa Byerley Gary

An undated photo shows the agricultural library as it was in the second Morrill Hall.



RYAN "RHINO" BOLCAR, OWNER, RHINO'S MUSHROOM HUT

Ryan Bolcar (B.S., environmental and soil science, '11) founded Rhino's Mushroom Hut as a newly minted UT graduate. Always interested in nature and the outdoors, he traces his interest in the kingdom of fungi to an out-of-classroom experience made possible by the Department of Plant Sciences. "The department sent me to the Southern Sustainable Agriculture Working Group Conference. The workshop that particularly interested me discussed that through mycoremediation, the environment could be cleansed of a variety of pollutants. I was intrigued." Today Rhino's Mushroom Hut provides Knoxville area chefs with a local source of gourmet mushrooms. Bolcar grows oyster mushroom species blue, phoenix, elm and pearl oyster for almost year-round production. "We're dedicated to social and environmental sustainability by growing seasonal varieties, donating to local charities and utilizing natural production methods as Mother Nature intended." Bolcar says he has the toughest boss anyone can have. "I'm the only limitation to my success and have had my share of failures along the way. I enjoy the process of building my business from the roots up (pun intended) and the connections with people I have made."



Alumni Dream Jobs



JIM "JIMBO" THOMAS, CERTIFIED GOLF COURSE SUPERINTENDENT, TPC SOUTHWIND

Love of the outdoors and a summer job in golf started Thomas in the direction of a career as a top-tier course superintendent. "One of my mentors suggested that I attend college and get a degree in turfgrass management. This sounded much better than working behind a desk, so off I went to conquer the world." He earned his B.S. from UT in ornamental horticulture and landscape design in 1979 and says, "You may not realize or appreciate college at the time you are studying for your exams, but the educational background I received and the relationships I built have been the backbone of my career." Only a handful of golf courses in America have the honor of testing the best players in the world, and Thomas' job is to have TPC Southwind ready when the Memphis club annually hosts the PGA's FedEx St. Jude Classic. The event often serves as a tune-up for professional golfers in the run up to the U.S. Open. Thomas says it's hard to explain what it takes to put on a PGA Tour event. "Let's say it takes endless hours for about six weeks preparing for the tournament. Then tournament week starts at 4:30 a.m. and ends about 10 p.m. I have a great staff of about 30 team members. Each day I have an additional 15 to 20 volunteers from other golf courses in the area that include superintendents, their assistants and crew members, and college interns, all of whom are greatly appreciated. It's a lot of work, but fun and very gratifying watching your course on national TV."



WALTER J. MIXON, DVM, INTEGRATED HEALING TECHNOLOGIES

Dr. Walter J. Mixon's (CVM '08) love of animals at an early age combined with an interest in science and biology to lead him down the path he is on today. Almost. "When I started vet school I had visions of being a large animal ambulatory vet, but it wasn't long before I started to focus on horses," explains Mixon. After practicing as an equine veterinarian in central Kentucky's thoroughbred industry, Mixon joined Integrated Healing Technologies, a Franklin, Tenn., provider of wound healing systems and services, as vice president of veterinary sales. He says he has the best of both worlds now. "My job is about as exciting as it gets for a veterinarian. I'm involved with cutting-edge innovations and technologies that have human and veterinary implications; I work closely with CVM professors and call on CVM colleagues and friends practicing in both small and large animal medicine." In any given day, Mixon may work on a clinical study, meet with customers, work on marketing or website development, meet about new product development, or play his usual role as the office veterinary consultant.

DERRICK WILKERSON, FAA ENVIRONMENTAL COMPLIANCE MANAGER

Working for the Federal Aviation Administration is not only a dream job for Derrick Wilkerson, but also a dream location. Wilkerson lives at the North Pole — North Pole, Alaska, that is — and commutes 20 miles to Fairbanks. There he works to ensure federal government facilities and functions comply with environmental laws. For a forestry major (B.S., '87), protecting Alaska's pristine environment is important. Wilkerson says the education he received from the UT Institute of Agriculture helps him do it. "UT gave me a good foundation in the sciences and problem solving. In Alaska, where most of the state is remote, just getting supplies and equipment to the job site can be quite a challenge." Wilkerson loves to travel to different parts of the state. He and his family enjoy winter retreats at a cabin on the Chatanika River. "We get there on snow machines, which is what snowmobiles are called in Alaska, and conditions are primitive. My favorite treat is biscuits prepared on a propane stove. When I can get it, I have relatives send me Tennessee sourwood honey. On a cold winter morning, it is great with hot biscuits." He celebrates his UT heritage by signing emails with the university's logo.

READ ABOUT THEIRS, TELL US ABOUT YOURS AT AGALUMNI@TENNESSEE.EDU



UTIA'S FOUR PILLARS



ADVANCING ACADEMIC EXCELLENCE

Achieving academic excellence throughout UTIA requires investments in students, faculty and programs. Resources to support efforts in new and emerging areas are critical to advancing the institute. Within UTIA, our programs, people and resources are committed to providing students in the College of Agricultural Sciences and Natural Resources and the College of Veterinary Medicine with opportunities to stretch their academic abilities while expanding and enhancing research and outreach.



PROMOTING HANDS-ON LEARNING

Our graduates and 4-H youth face a fast-changing society and must develop skills to adapt to and drive the change. Providing outside-the-classroom experiences affords them with relevant, real-life opportunities to put the knowledge gained via traditional methods to practical use. This prepares them for the real world, heightens their status for potential employers, and helps UTIA achieve its mission of advancing society.



SERVING OUR COMMUNITIES

Community access to the resources and programs of UTIA are vital to our state. We will continue to work with our partners in communities throughout Tennessee to provide quality programs that address the unique needs and issues of each community we serve, whether we're talking about geographic communities or communities of shared interests.



DELIVERING DISCOVERIES

UTIA scientists generate numerous technologies that address global problems, but UTIA needs to better support faculty to facilitate the development from startup to market place. Private industry partnerships will help to accomplish this and deliver our inventions and intellectual property to Tennessee producers.

RESPONSIBILITY MATTERS

This issue of Tennessee Land, Life and Science is printed on 80-pound Sappi Opus cover and text, which is 10 percent postconsumer waste. In using this paper, the Institute of Agriculture affected the environment in the following ways:



Wood/trees used: 68 trees

Trees planted: 144 (net gain of 76 trees)



Greenhouse gases generated: 20,681 lbs. CO₂ equivalent

Greenhouse gases prevented: 8,272 lbs. CO₂ equivalent



Solid waste generated: 8,021 lbs.

Solid waste not generated: 3,609 lbs.



Wastewater used: 63,765 gallons

Wastewater recycled: 57,388 gallons



Energy consumed: 115 million Btu

Energy saved through use of renewable resources: 115 million Btu

One hundred percent of the electricity used to manufacture Opus sheets is Green-e certified renewable energy. In 2012 Sappi reported a 12.7 percent overall reduction of water consumption and a 45 percent reduction of solid waste generated. Data provided by Mac Papers.

Energy saved is approximately enough to power one home for one year and four months.

Greenhouse gases prevented is equivalent to taking approximately one car off the road for nine months.

Wastewater recycled is approximately enough to supply 272 people with drinking water for an entire year.