TENNESSEE

LAND life & Science

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Healing a Legend

THE UT VETERINARY MEDICAL CENTER CARES FOR SMOKEY

THE UNIVERSITY of TENNESSEE
INSTITUTE of AGRICULTURE

Tennessee LAND Life & Science

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Dear UTIA Friends,

Welcome to the spring issue of *Tennessee Land, Life and Science*. This issue is filled with articles about exciting programs and accomplishments in the Institute of Agriculture. We are particularly proud to report on the impacts of the recently completed Campaign for Tennessee.

Thanks to the support of our many friends, the Campaign for Tennessee was very successful for UT and for the Institute of Agriculture. The article on page 25 highlights several of the transformational gifts in support of UTIA programs.

We are particularly proud of the many gifts that support our students and 4-H'ers. Numerous endowments in support of scholarships have been established, and a generous gift established a new 4-H Center in Greeneville. Program support included the establishment of a new construction science program in the Department of Biosystems Engineering and Soil Science and a new organic research program in the Department of Plant Sciences. In the College of Veterinary Medicine, facility updates have been made possible that enhance our ability to provide cutting-edge animal care and educational experiences.

Though the campaign is over, many needs remain. Because we must continue our efforts to achieve excellence in research, teaching and extension, we will continue to seek partners to help us with the following goals:

1. Establish experiential learning programs and facilities for our CASNR students.
2. Provide graduate research assistantships.
3. Establish county Extension program endowments.
4. Construct the UT Gardens Education and Discovery Center.
5. Complete the Large Animal Hospital.
6. Establish AgResearch and Education Center program endowments.

Go Vols!



Dr. Larry R. Arrington, Chancellor,
UT Institute of Agriculture

President, UT
Joe DiPietro

Chancellor, UT Institute of Agriculture
Larry R. Arrington

Dean, UT College of Agricultural Sciences and Natural Resources
Caula A. Beyl

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agriculture.tennessee.edu



J. Miles Cary, Knoxville News Sentinel

UT Institute of Agriculture Chancellor Larry Arrington has been a regular presence at AgResearch field days, meeting with producers, citizens, gardening enthusiasts and the array of other stakeholders the institute serves.

On the cover ***The UT Veterinary Medical Center keeps Smokey in the game.*** *Photos by Jean Hulsey.*



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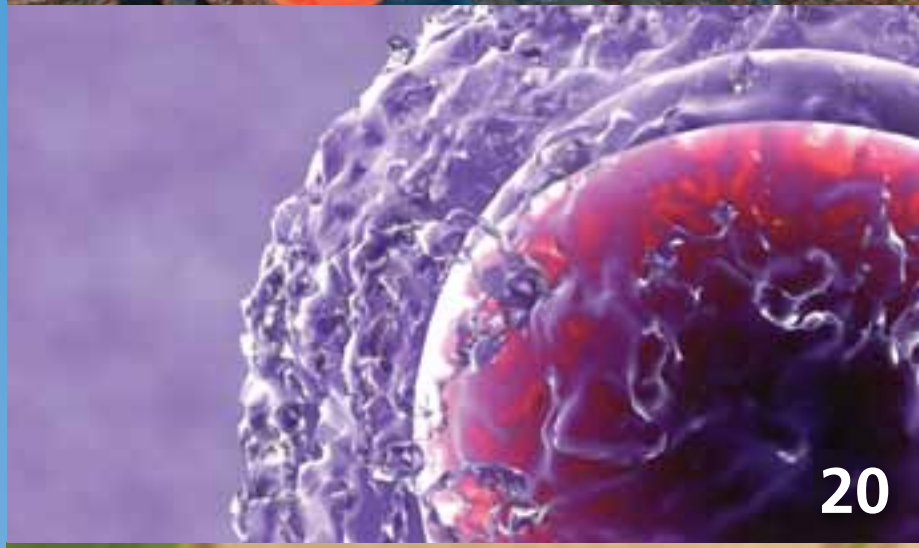
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News *around the* Institute


Bobby Simpson

LITTLE RIVER DAIRY COMPLEX OPENS

University of Tennessee Institute of Agriculture officials hosted an enthusiastic group of some 125 dairy farmers, Blount County leaders, and representatives from state government and the agricultural industry when UT AgResearch opened its new research dairy, the Little River Animal and Environmental Unit, in Walland, Tenn.

A number of dignitaries, including UT Institute of Agriculture Chancellor Larry Arrington, Tennessee Dairy Producers President Tony White and Blount County Mayor Ed Mitchell enthusiastically cut the ribbon to open the $12.5 million, 529-acre facility, but the bigger story was the huge turnout for the community open house. A crowd estimated to exceed well over 1,000 visited the grounds.

The new outdoor lab features state-of-the-art milking operations designed for best management practices and maximum animal comfort. The facility is designed to assist scientists in investigating the interactions between animal agriculture and the environment.

CASNR'S ENROLLMENT SURGES

For the 2011-12 academic year, undergraduate enrollment in the College of Agricultural Sciences and Natural Resources rose to 1,117 students, an increase of 9.62 percent over last year and an increase of 32.8 percent over the past five years.

Undergraduate enrollment has not been this high for CASNR since 1995, and the avid interest in agriculture and natural environment careers is an indication of the strong job market and demand for our graduates. Diversity and scholarship support are also reaching benchmark highs. Scan the QR code to hear CASNR Dean Caula Beyl talk about the promising career opportunities for agriculture graduates or visit http://tiny.utk.edu/CASNRdegrees.


Rich Maxey

Dean Caula Beyl gives CASNR students personal attention. She and her staff emphasize student success.

HIGH HONORS FOR TWO

For his dedication and career achievements in 4-H, the National Association of Extension 4-H Agents honored Lincoln County Extension Agent Darrell Hale with the U.S. Air Force Recruiting Salute Award. During his career, Hale has worked with 65,000 youth, achieving many honors, including national wins for 4-H teams. This is the second time in two years Tennessee Extension personnel have received this top honor.

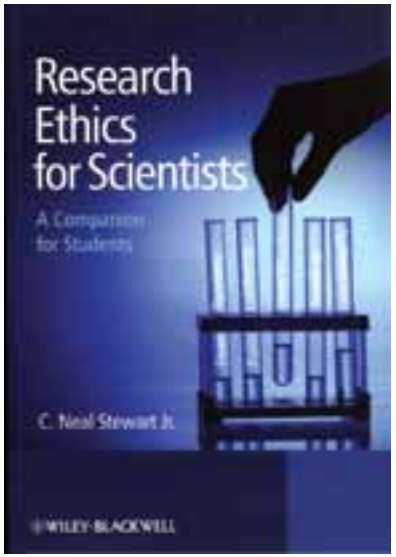


Darrell Hale

In the College of Veterinary Medicine, Dr. Jerry Roberson received a national honor this winter from the American Indian Science and Engineering Society. Roberson, who is Cherokee and holds the rank of associate professor, received the society's Professional of the Year Award. He has spearheaded more than 20 funded research projects in veterinary medicine and bovine health, demonstrating important findings related to the overuse of antibiotics on dairy farms and bacteria resistance, among other topics. He was also praised for his hands-on teaching style and professional service.



Dr. Jerry Roberson



RESEARCH ETHICS COURSE TRAINS BUDDING SCIENTISTS

Research-oriented undergraduates, graduate students and postdocs now have the opportunity for advanced training in research ethics in the life sciences through a 500-level course being taught in CASNR. Two sections of the course are led by Racheff Chair of Excellence Neal Stewart, Animal Science Associate Professor Lannett Edwards, Biosystems Engineering Professor Mark Radosevich and Food Science and Technology Professor Svetlana Zivanovic, all Ph.Ds. The course is required for graduate students in Animal Science, and faculty in FST have voted that it be mandatory for graduate students in their discipline, as well.

"So much of a career in science consists of mastering unwritten rules," Stewart says. "And the rules are constantly changing. While some students are able to figure them out, the majority needs guidance in how to develop and manage their careers in the sciences."

To assist them, Stewart wrote Research Ethics for Scientists (Wiley-Blackwell: 2011) used as a study companion for the courses. Proceeds from the book are invested back in the college.

CHANGES IN DEPARTMENT OF ENTOMOLOGY AND PLANT PATHOLOGY

Dr. Carl Jones, professor and head of the Department of Entomology and Plant Pathology for nearly 12 years, passed away suddenly in February.

"Dr. Jones brought to us renowned expertise and leadership that was highly valued," said Chancellor Larry Arrington. "We mourn his passing and express gratitude for the talent, spirit and skill he brought to the department and institute."

Dr. Bob Trigiano, a professor in the department, is serving as interim head while a national search is conducted.



Dr. Carl Jones



Dr. Bob Trigiano



New Option Leads UT Students to Careers in Urban Forestry

The demand for foresters who work within the urban environment has created a new career opportunity in urban forestry for UT students. Students can pursue a concentration in urban forestry in the College of Agricultural Sciences and Natural Resources Department of Forestry, Wildlife and Fisheries. The new concentration is an interdisciplinary program emphasizing forestry, arboriculture, horticulture, urban forest management and urban wildlife.

"The proposal to create an urban forestry concentration by UT FWF is exciting information indeed," says Tom Simpson, East Tennessee regional urban forester. "Urban forestry is becoming more important and demanding with Tennessee now recognizing 40 national Tree City USA communities and 15 Tree Line USA utilities (that recognize and practice good urban forestry). Communities across the state are now recognizing the value of a trained municipal forester to lead their urban forestry program, and utilities have found urban forestry training to be invaluable with their right-of-way supervisors."

The concentration is slated to start this fall. Its curriculum is designed to prepare graduates to evaluate, plan and resolve problems in urban and traditional forest environments.

Job opportunities for graduates with an urban forestry background include urban forest program coordinator, community forester, urban forestry supervisor and urban forestry instructor with average annual salaries ranging from $33,000 to $69,000.

"It is very exciting to formally offer an urban forestry concentration at the University of Tennessee," says David Vandergriff, UT Extension agent in Knox County.

"The skill set needed for success in this position is multidisciplinary and is not found in a traditional program of forestry, horticulture, biology, or ecology, yet it incorporates each of these study areas," Vandergriff says. "Graduates with the urban forestry concentration will have many professional opportunities and will be in high demand, and our communities will be better places because of them.

"For Tennessee to move into the next level of public education and success in the urban forestry arena, it will be absolutely necessary for the University of Tennessee to lead the effort."
–Dr. Sharon Jean-Philippe

The need, and importance, of trees in urban environments is translating into a new career option for students in the College of Agricultural Sciences and Natural Resources.

Dr. Jean-Philippe is an assistant professor in Forestry, Wildlife and Fisheries and adviser of the urban forestry concentration.



Rich Maxey











Make plans now to join us for our annual alumni street bash. This year Ag Day is set for **November 3**. The action starts four hours before game time on the Institute of Agriculture campus in Knoxville, as the Vols take on the Troy Trojans. We hope to see you there!

Social? Check.
Entertaining? Check.
Informative? Check.
Fun? Definitely!

As the nation's land-grant universities celebrate the 150th anniversary of the Morrill Act, UTIA will commemorate this special milestone as a part of Ag Day 2012.







Photos by Lorna Norwood and Bob Longmire.



Greg Hirshoren

"So many times owners attribute their dog's 'slowing down' to old age," says Millis. "It's important to explore the causes of changes in activity level, no matter how minute, so it can be determined if there is a medical or orthopedic underlying issue." Many times those changes can be addressed with medicine, physical therapy, surgery or a combination of the three.



Greg Hirshoren

HEALING A LEGEND

UT VETERINARY MEDICAL CENTER TREATS SMOKEY



Jean Hulsey

That distinctive bluetick coonhound howl fills the halls of the University of Tennessee Veterinary Medical Center, letting you know Smokey's in the house! "He certainly has an air about him—almost like royalty," says fourth-year veterinary student Richie Burdeaux as he describes Smokey IX, the beloved mascot for the UT Volunteers. "He's probably worth more than I am," Burdeaux jokes, "but he is such a warm, sweet dog, and that melts away anything that would stand in your way of falling in love with him. He is just a sweetheart."

And Smokey is the four-legged sweetheart of the Vol nation. During the second half of the UT-Cincinnati football game last September, Dr. Darryl Millis, orthopedic surgeon and surgery section chief at UTVMC, noticed Smokey showing early signs of lameness while celebrating another Volunteer touchdown. "My season seats are on the first row at Neyland Stadium," explains Millis. "I tapped an officer on the shoulder, explained what I do for a living and asked to speak to Smokey's handlers." Immediately following the game, Smokey's handlers, members of Alpha Gamma Rho fraternity, brought the mascot to the John and Ann Tickle Small Animal Hospital at UTVMC. The diagnosis? An early partial tear of his anterior cruciate ligament in his right knee. According to Millis, "Unlike humans, where a torn ACL is usually the result of an acute traumatic event or sporting injury, an ACL injury is a condition that manifests itself gradually in dogs. It is the most common injury seen by our orthopedic service at the Veterinary Medical Center here in Knoxville."

The game plan for Smokey mirrored treatments found at a human hospital: a combination of platelet-rich plasma, therapeutic laser, electrical stimulation (e-stim), nonsteroidal anti-inflammatories and joint supplements. Smokey's physical therapy included balancing exercises and walks in one of three underwater treadmills to help maintain muscle and cardio fitness and. The therapy, all under the supervision of both Millis and Dr. Marti Drum, clinical instructor in charge of the medical center's physical therapy and rehabilitation service, helped Smokey make it through the remaining eight games of the season without joining fellow Vols on the ranks of the injured reserved.

In January, following preoperative radiographs, Smokey underwent arthroscopy and tibial plateau leveling osteotomy surgery to repair the partial ACL tear. "The surgery went well with no surprises, and postoperative radiographs showed the implants are in good position," says Millis. "Smokey is a very fit dog with good muscle tone and was able to begin postsurgical rehabilitation almost immediately." That regimen includes passive range of motion exercises, icing, slow leash walks, pain medication and joint supplements. The challenge is keeping an active dog from doing too much during the recovery process.

Once Smokey is far enough along with rehabilitation on his right knee, doctors will determine how best to proceed with his other knee, which also has a partial tear. Millis is hopeful the mascot's postoperative rehabilitation will be successful, and his howls will fill Neyland Stadium next season when the Volunteers run through the T.



Three CASNR students are Haslam Scholars: from left, Margaret Conley, Ashley Smith and Ariel Buehler.

Haslam Scholars Pursuing Their Dreams

In 2008, the Haslam Scholars program began at UT. It brings together some of the university's most talented undergraduate students. They learn from, and with, each other in a series of interdisciplinary seminars and shared experiences.

The program began with a generous gift from Jimmy and Dee Haslam and Jim and Natalie Haslam, all outstanding supporters of UT. As honors enrichment programs go, it's unique and selective. Fifteen first-year students are admitted each year, after a rigorous process of intensive interviews.

Three CASNR students are Haslam Scholars—Ariel Buehler, Margaret Conley and Ashley Smith. Buehler is a food science major, concentrating on microbiology, Conley, who was unavailable for this article, is an animal science/pre-vet major; and Smith is majoring in biosystems engineering. All bring distinctive perspectives to the program.

Buehler began her research at UT with Dr. David Golden, professor of Food Science and Technology, in her final year of high school. "I was always interested in the aspects of food. I was always reading the ingredient labels and really curious about them," she says.

Buehler also has an artistic side. "I started playing violin when I was four and went on to viola in middle school," she says. So, how does she bring two very different worlds together? "I can take the creativity of music and apply that creativity to food science."

After graduation, Buehler plans to go to graduate school and earn her Ph.D. She hopes to do further research in food-borne pathogens entering the food supply. "I'm using the multiple hurdle approach to control *E. coli* O157:H7 in foods. It's targeted toward industry and multiple food pathogen outbreaks," says Buehler.

For Ashley Smith, the recent Deepwater Horizon disaster in the Gulf of Mexico played a major role in her life. Although the native of Gulfport, Mississippi, worked in a program that rehabilitated wildlife affected by the massive oil spill, she says, "I was in high school and wanted to fix it, but I couldn't do anything."

Now Smith is at UT conducting research on aquatic ecosystems with Drs. Paul Ayers, Daniel Yoder and John Tyner in Biosystems Engineering and Soil Science. "I want to look at the health of the oceans, lakes, rivers and creeks and relate it back to the health of the mainland," says Smith. "If you have 75 percent water on the planet, then it's going to affect something else."

Both Buehler and Smith say that the Haslam Scholars program has changed their views in significant ways. "One of the other scholars comes from Ethiopia, so he has a completely different perspective than I have coming from Farragut," says Buehler.

For Smith, just getting to know her class and what they may achieve in the future has been the most rewarding. "I'll be able to say that I spent four years of my life with them, and they will continue to be my friends. I love that," she says. *–Doug Edlund*

Ariel Buehler, the daughter of Forestry, Wildife and Fisheries Professor David Buehler (page 16), has been honored as a Barry M. Goldwater Scholar, one of the nation's most prestigious awards for undergraduates. She also received the Institute of Food Technologists–Kraft Foods Evan Turek Scholarship, awarded to one student in the nation each year.

Farm Credit Services of Mid-America Establishes CASNR Scholars Program

The Institute of Agriculture and Farm Credit Services of Mid-America have created a scholars program within the College of Agricultural Sciences and Natural Resources. Each academic year, five Farm Credit Scholars will be selected to enter customized curricula that include specially designed coursework, an international experience, mentoring opportunities and an internship.

"Farm Credit Services of Mid-America saw a need for attracting the best and brightest agricultural students from across the state and the country to provide a well-educated, well-trained workforce for the future. We are grateful for their leadership in this area and for choosing to invest in University of Tennessee students," said Chancellor Larry Arrington of the Institute of Agriculture.

"We're looking for the brightest and most exceptional students across all segments of agriculture," explained David Lynn, Farm Credit senior vice president of financial services. "We are structuring this program to be very open. The majority of scholars may come from the agricultural economics and agricultural business curricula, but we want the program to be available to other exceptional students in the UT College of Agricultural Sciences and Natural Resources. We want these scholars to become valuable contributors to their communities and to agriculture."
–Lorna Norwood


Rich Maxey

Officials from Farm Credit Services of Mid-America and the University of Tennessee Institute of Agriculture join some current students for an announcement of the creation of a prestigious scholars program for students within the College of Agricultural Sciences and Natural Resources. Pictured (left to right, ascending from bottom) are CASNR students Jonathan Harrison and Ashley Allen; Farm Credit Services of Mid-America staff Art Whaley, Heather Sutherland, Mark Wilson; CASNR student Jamie Morgan; Farm Credit staff Ricky West, Dan Ashby, David Lynn, Mike Estes; and Institute of Agriculture representatives Larry Arrington, Delton Gerloff, Caula Beyl, John Riley, John Stier and Tom Looney.

AGR COMPLETES SCHOLARSHIP CAMPAIGN

The Alpha Gamma Rho Fraternity recently concluded the Campaign for AGR: Make a Difference, raising more than $800,000 for scholarships and fraternity house renovations. Four new scholarships were created as a result, including one that honors former Animal Science Professor and Extension section leader (and former interim Extension dean) Dr. Charles Goan, poultry science. Two memorialize former Animal Science faculty members Prof. Ed Lidvall, animal management, and Dr. J. Karl Bletner, poultry nutrition. Both served as adviser to the fraternity.

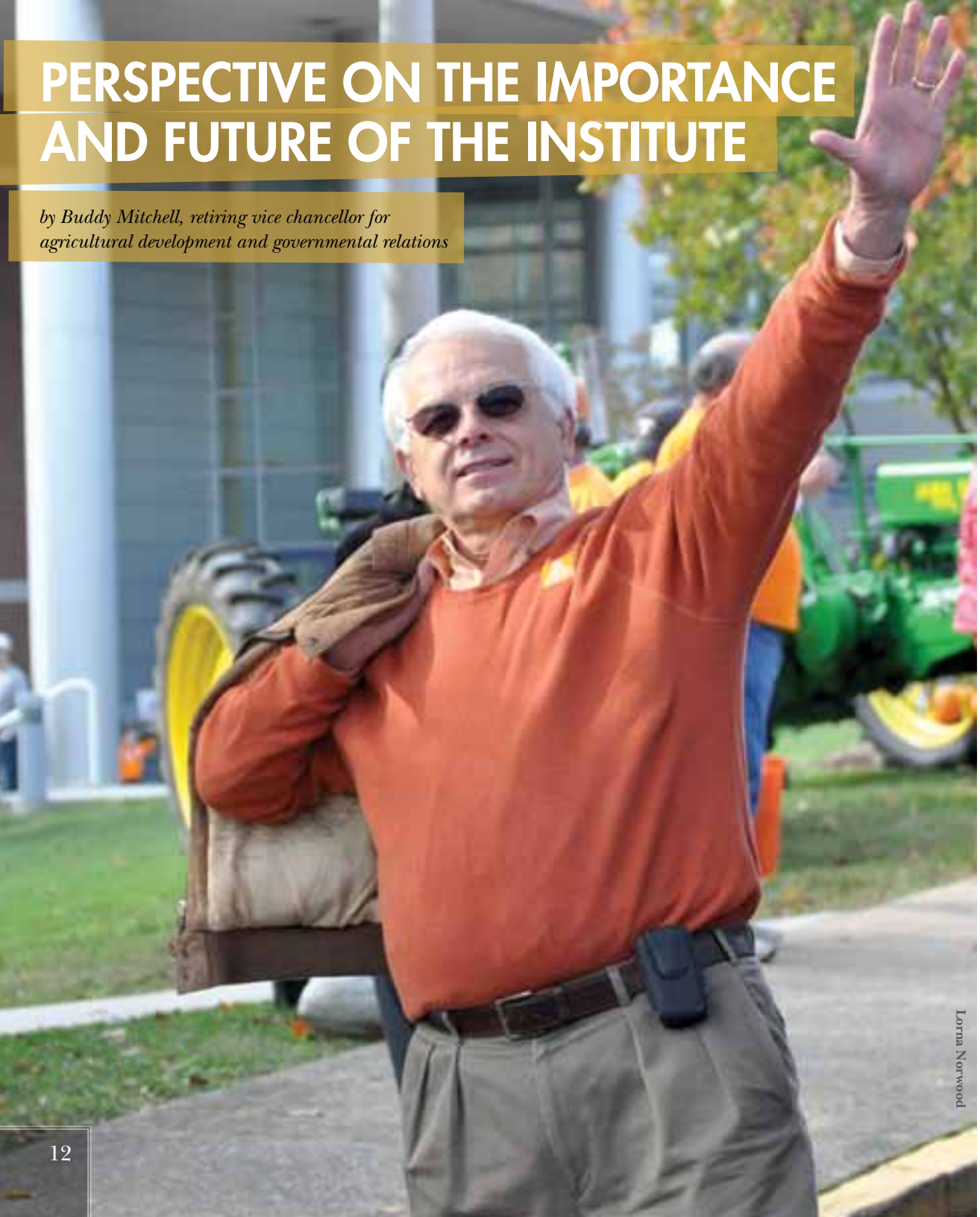
The campaign began in 2009 with a goal to increase the number and amount of scholarships awarded to deserving students. Each year, since the start of the campaign, the number of scholarships has increased. This year, more than 10 scholarships are expected to be awarded.

ALPHA GAMMA RHO
NURTURE. GROW. GIVE. REPEAT.

The campaign concluded at the end of 2011 with nearly 150 alumni and friends contributing. Mark Wilson ('76 Ag) chaired the campaign and the committee members included Tom Looney, Jim Nunn ('77 Ag), and Joe Gaines ('69 Ag). The scholarships are awarded at the fraternity's annual Parents and Founders Day in the spring. *–Tom Looney*

PERSPECTIVE ON THE IMPORTANCE AND FUTURE OF THE INSTITUTE

by Buddy Mitchell, retiring vice chancellor for agricultural development and governmental relations



Lorna Norwood

It has been my privilege to serve a small role in advancing this marvelous and incredibly productive entity that we call the University of Tennessee. Land-grant universities such as UT were created to transmit research discovery and proven information to the people of our state and nation. The core of our mission is to conduct cutting-edge research that serves society and solves major problems that our citizens face. Approximately one third of the research discoveries that flow from UT's Research Foundation to the private sector come from the institute. Our research does not remain within our laboratories. Extension specialists assemble this information and deliver it to our Extension offices in every county of the state where that information greatly benefits farmers, families, communities and local citizens, helping them make wise decisions based on the best information. Wise decisions lead to productive lives and an enhanced Tennessee economy.

The College of Agricultural Sciences and Natural Resources prepares work-ready employees who both transmit and receive this information. The result has been a remarkably productive agricultural system that has increased yields of food dramatically. Corn yields hovered around 20 bushels an acre at mid last century and have multiplied to more than 160 bushels per acre today. Similar gains have occurred in cotton and soybeans, as well as in cattle production. Our highly productive agriculture system has often created major surpluses of food crops that have kept retail food costs down and put more disposable income in the pockets of all citizens.

However, the number of acres available for agriculture production continues to shrink through development and the degradation of farmland in other countries. Therefore, we must continue to increase the productivity of every acre of farm and forest land in Tennessee to meet the rapidly increasing needs of world demand. The emerging middle class in China and India is growing at an unprecedented rate, and they are demanding more and more high quality food.

In the years ahead, American agriculture will be asked to provide not only food but also a portion of our energy needs, all from that same acre of land. For this reason, we must better fund agricultural research and extension that today achieves a 9-to-1 return on investments based on research of national land-grant universities. It is important that agricultural production take place here in Tennessee because that economic return is not just to agriculture and forestland owners, but also to our state economy and the wellbeing of our citizens.

The institute serves far beyond the food industry and its consumers. We are deeply engaged in veterinary medicine with its important role in serving our companion and farm animals and ensuring the safety of our food supply. We serve families and communities. We aid in the positive development of youth in our 4-H programs, and we excel in sustainable and environmentally sound practices that preserve Tennessee's natural resources. These collective achievements of our teaching faculty, research scientists and Extension leaders are the core of UT's land-grant status and are a cornerstone of our nation's productivity, food security and outreach service to all citizens.

> *"the institute is better poised today to achieve our mission than ever before"*

There have been several particularly important turning points that have empowered the institute to new levels of achievement:

- In 1970, the title of the head of the Institute of Agriculture, responsible for the collective units of agresearch, extension, and teaching, was changed to vice president, reporting directly to the president of the newly established UT system.

- A transformational achievement for agriculture was realized in the 1960s and '70s when UT played a key role in the development of no-till agriculture. Conventional tillage utilized plowing of the land numerous times each year to control weeds and produce crops. It was highly erosive, and many fields, particularly in West Tennessee, were losing soil at the rate of 100 tons per acre per year. Under no-till production, erosion has been virtually eliminated and yields have continued to increase over time. Today this technology is very broadly applied in Tennessee and many other states and nations. This single achievement saved and healed our farmland, and its value cannot be overstated.

- Another major achievement was the creation of the College of Veterinary Medicine in 1974. Having this college incorporated into the structure of the Institute of Agriculture makes it fully integrated into the food animal production and health system. CVM and its Veterinary Medical Center are highly productive parts of our institute programs.

- In the early 1990s, the institute secured $11 million in federal funding. The state provided an additional $27 million to build a $38 million plant biotechnology building, a forest products center, and the Joe Johnson Animal Research and Teaching Unit. We had long sought those funds, and they transformed the agricultural campus to a state-of-the-art research center. This enabled us to attract grant-competitive faculty who are leading the nation today in agricultural research.

- In 2007, the institute launched the UT Biofuels Initiative, joining with the state of Tennessee and federal and industry partners to provide leadership in the emerging field of bioenergy. Through the initiative, the federal Sun Grant Center and the institute's new Center for Renewable Carbon, our researchers, Extension specialists and Tennessee farmers are advancing the science and technologies that will generate fuel and co-products from a variety of non-food biomass crops—like switchgrass and woody biomass. The initiative promises new opportunities for farmers and rural communities and new jobs in the bioenergy sector.

- In 2010, the chief administrative officer for the Institute of Agriculture was changed from vice president to chancellor and now serves as the chief academic officer for the institute as well as a member of the UT president's staff.

As these transformations occurred, the Institute of Agriculture continued to increase its productivity and service. In my view, the institute is better poised today to achieve our mission than ever before. We are fortunate to have an exceptional chancellor, outstanding deans, department heads, directors and a truly dedicated faculty and staff. We are considered internally and externally as an employer of choice. This reputation allows us to attract exceptional faculty, staff and administrators, even as our funds have been significantly cut in recent years. Our future is unlimited.

Yet our greatest challenge continues to be funding. If reductions continue, they will greatly erode and marginalize our programs in the years ahead. We must continue to work with our legislative leaders in Nashville and Washington, D.C., to increase the investment in high-return enterprises like the Institute of Agriculture. These investments must be made even as there is great and undeniable need to cut governmental spending. The 9-to-1 return on investments that the institute provides stimulates the economy and will achieve more balanced budgets in the future as these economic benefits flow to our citizens.

This is the message we must deliver to the leaders of our state and nation, and we must then respond with greater productivity, greater service and greater accomplishments. I retire into half-time status with great confidence in our leadership, the dedication of our employees and the mission we will continue to fulfill.

‘Permanent responsibility’ lasts a long time

INSTITUTE RESEARCHERS BUILD CONSERVATION EASEMENT MONITORING SYSTEM FOR NRCS



Dr. Heath Hagy

Permanent easements purchased by the U.S. Department of Agriculture Natural Resources Conservation Service last for a long time. In fact, they exist in perpetuity.

That’s why the NRCS has partnered with the Institute of Agriculture to ensure that the agency’s permanent easements, also known as stewardship lands, are monitored and managed to maximize the investment of taxpayers and ensure effective use of conservation dollars. Purchasing easements allows the NRCS to enhance, restore and protect uplands and wetlands for wildlife and environmental benefits, while enabling private citizens to maintain their land ownership rights. The NRCS is responsible for approximately 14,000 permanent easements—greater than 2.6 million acres—among five programs.

Currently, NRCS monitors landowner compliance with easement restrictions, such as building roads or permanent structures. But they’re also seeking to expand monitoring to include ecological components, such as wildlife, vegetation and water quality. This initiative is called the National Easement Assessment Project.

“Following months of surveys, we found that costs of natural resources monitoring by other agencies range from less than $1 to nearly $5 per acre annually, and up to an additional $5 to more than $100 per acre for management,” says project leader Matthew Gray. “Thus, NRCS must allocate substantial financial and staff resources to build a similar program.”

Dr. Gray, an associate professor of Forestry, Wildlife and Fisheries, and a team of six multidisciplinary research specialists are building a set of comprehensive, science-based strategies to assist NRCS in monitoring and managing easements. Their approaches are tailored to work at national, regional and local levels and include everything from remote sensing to “boots-on-the-ground” intensive assessments.

When implemented, this inventory, monitoring and management program will improve natural resources on private lands across the U.S. and benefit wildlife, water and air quality, and general ecosystem health. Ultimately, the NEAP will help the NRCS validate the investment of public funds on private lands for natural resource conservation.

To learn more about NRCS NEAP, visit http://neap.tennessee.edu or contact Dr. Matthew Gray at 865-974-2740 or mgray11@tennessee.edu.

–The NEAP Team: Dr. Heath Hagy, Gabe Upchurch, Dr. Katie Edwards, Dr. Bill Sutton, Dr. Doug Osborne and Dr. Mei Guo with Dr. Gray

Celebrating 150 years of land-grant universities

Teaching, discovery and outreach

The Morrill Act of 1862 established land-grant colleges for education in agriculture and the mechanical arts and made higher education available to all, not just the privileged few. The term "people's colleges" was adopted to reflect the new spirit of serving all citizens.

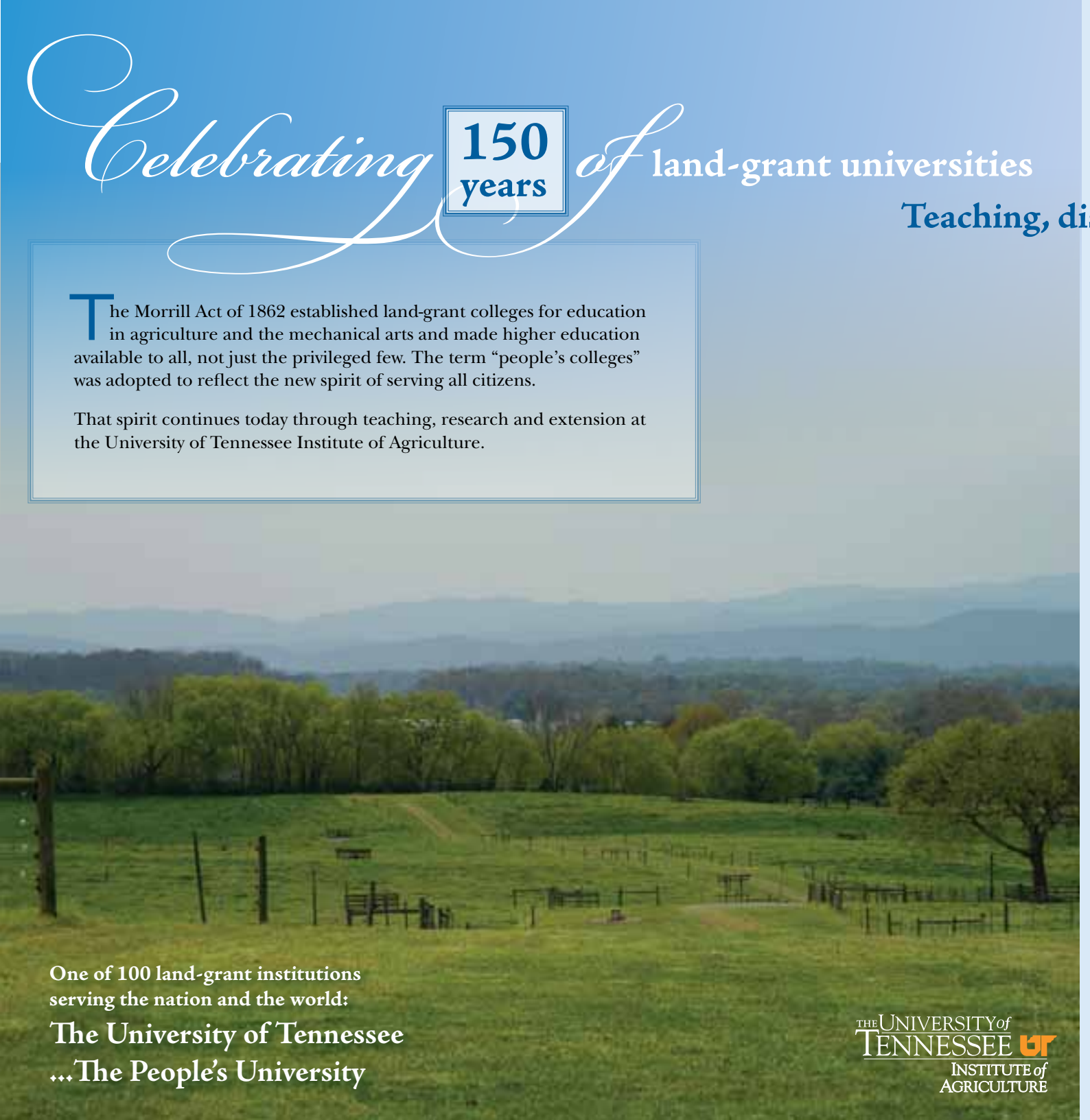
That spirit continues today through teaching, research and extension at the University of Tennessee Institute of Agriculture.

College of Agricultural Sciences and Natural Resources. Preparing undergraduate and graduate students for careers in agriculture, natural resources and other areas. Annual average enrollment of more than 1,000.

College of Veterinary Medicine. One of only 28 veterinary colleges in the nation. 1,914 graduates since 1974. Nearly half of licensed veterinarians in Tennessee are CVM alumni.

UT AgResearch. Ensuring Tennesseans a safe, high-quality supply of food and fiber, while returning $500 million to the state economy annually.

UT Extension. Delivering educational programs and research-based information to Tennesseans through 95 county offices, with about 5.3 million contacts annually. Returning to Tennesseans $9.38 for every dollar invested.



One of 100 land-grant institutions serving the nation and the world:

The University of Tennessee
...The People's University

THE UNIVERSITY of TENNESSEE
INSTITUTE of AGRICULTURE

A New Solution for Monitoring Wildlife



Margot Emery

Graduate student Emily Hockman prepares to fly the bird detection module on tether across a field of "bird boxes."

The Autonomous Aerial Acoustic Recording System has a mouthful of a name, yet it represents a simple concept—a novel, accurate way to survey wildlife populations.

For decades, surveys of wildlife have depended on human observers. No two humans are alike, and the ability to achieve consistent results by observers, and between them, has proven elusive.

"Science is all about validation and replication, and surveying wildlife populations with accuracy is actually an age-old problem," says Dr. David Buehler, professor of wildlife science.

"Variability in point counts has limited our ability to model populations of threatened, endangered and at-risk birds. It's also constrained surveys of other indicator species, such as frogs and bats, over wide areas to document habitat quality and environmental conditions."

Buehler and a team of graduate students and biosystems engineers have developed a solution to this problem. Their system makes use of a sensitive microphone and a digital audio recording system. The microphone is transported aloft in a payload carried by a weather balloon. A laptop computer controls ballast and a valve that releases helium to adjust the balloon's flight over varying terrain and thermal regimes. A quick keystroke command tells the balloon to descend once the desired flight distance is obtained. The module is retrieved, and the sound recordings are downloaded and entered into pattern-recognition software that identifies and counts the vocalizations of individual birds.

"There are three critical questions we want to answer," Buehler says. "We want to know which species

are present, which is inventory; how many are out there, which is abundance; and how are they doing, which is population trend. We think this system is very well suited to answer all three."

In addition to recording actual birds, the balloon is also being flown over test sites to assess the system's ability to deliver accurate, repeatable results. This is the validation component of the team's work. The researchers are using 30 small, portable MP3-based birdcall simulators. Mounted on tripods and distributed across an area of land, these "bird boxes" play specific bird songs on command, along with an audio beep to indicate they are test sounds rather than actual birds making the calls. The scientists then analyze how well the microphone and software detect a known set of different bird songs.

The ingenious balloon-carried payload is a sophisticated update of technology developed by the Cornell Laboratory of Ornithology, a world leader in bird research. Biosystems Engineers Dr. Stacy Worley and David Smith used their expertise to rework the device, increasing computing power eight-fold, devising a ballast system, and writing custom software for the payload and laptop, which monitors the balloon's flight and controls its altitude. UT biosystems engineers also developed the bird boxes.

For Worley, it was a chance to use the expertise in model rocketry he acquired in his youth, as well as his knowledge of microprocessors and computer programming to produce a light, compact and powerful instrumentation payload. Smith provided circuit and fabrication skills. Graduate students Emily Hockman and Michelle Wilcox, as well as teams of field assistants, evaluated the technology in field conditions, providing feedback that Worley and Smith used to refine the system.

"It's been exciting for us to be on this project," Worley says. "I've learned that the most interesting things in life happen at the interfaces, when diverse things come together, such as the interdisciplinary collaboration that is happening on this project integrating biosystems engineering and wildlife science."

The research team is flying their balloon system over three U.S. military installations—the Jefferson Proving Ground in Indiana, Fort Riley in Kansas and Fort Bragg in North Carolina.

Ironically, land areas at the bases that are set aside as impact zones for the firing of munitions and ordnance constitute some of the best habitat for rare birds of any federal lands. Also ironic is that, due to the risks posed by unexploded ordnance, these lands are impossible to access using conventional bird survey techniques.

"The military has a federally mandated requirement to monitor wildlife on their bases," Buehler says. "So the military gives us the opportunity to develop and test this system because they have a real need for it, and they have the funding to support it."

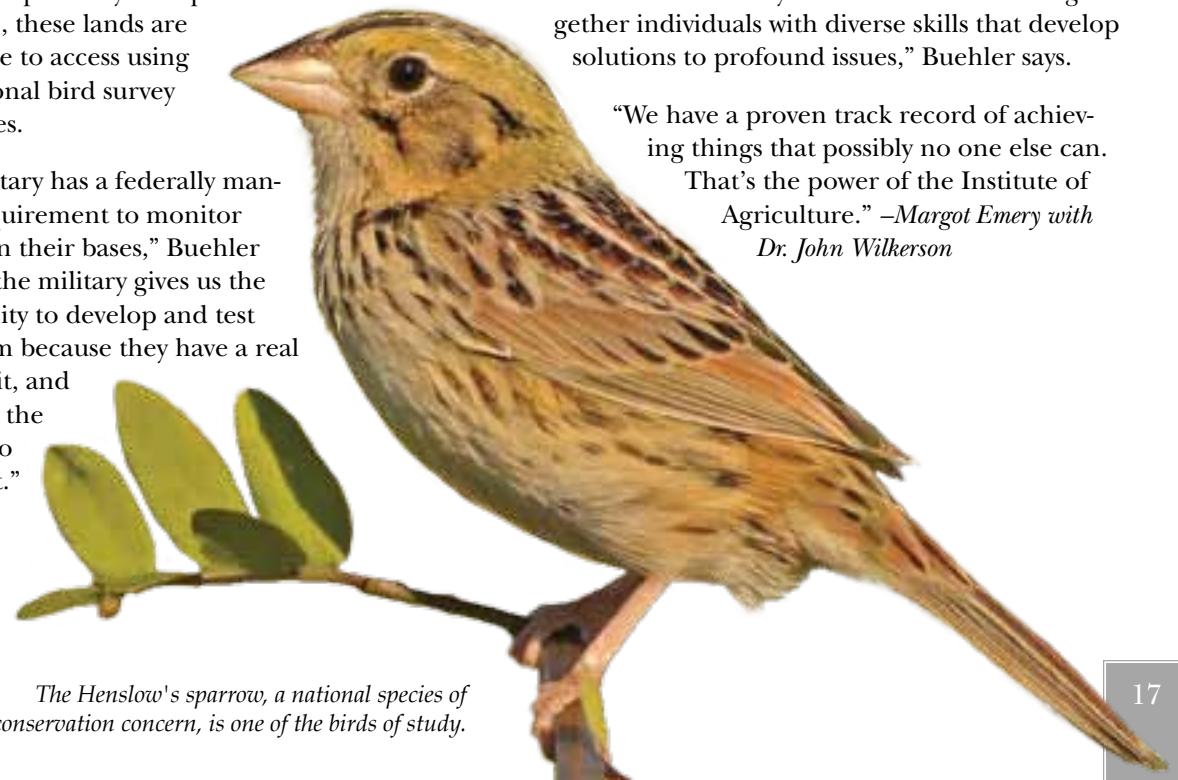
The project is now entering year two of a four-year contract. This and next year are focused on calibrating and refining the system. In the final year of the project, the team will transfer the technology to natural resources managers at the military installations.

"The military is all about developing technology that can be transferred to others," Buehler notes, "and, of course, that's the goal of the Institute of Agriculture's land-grant mission, too."

Once complete, the system will also be useful to the wildlife and conservation communities. Additionally, the system of bird boxes offers a spinoff benefit in providing an innovative method to train and assess the skills of human observers in detecting and counting birds.

"This project and its scope are excellent examples of the institute's ability to form teams that bring together individuals with diverse skills that develop solutions to profound issues," Buehler says.

"We have a proven track record of achieving things that possibly no one else can. That's the power of the Institute of Agriculture." *–Margot Emery with Dr. John Wilkerson*



The Henslow's sparrow, a national species of conservation concern, is one of the birds of study.

Ed Schneider



In the Tropics, Two Projects Aim for Better Lives



This winter, soil specialist Dr. Forbes Walker and vegetable specialist Dr. Annette Wszelaki visited Guatemala as a follow-up to ongoing projects there. The two are working with Health Talents International to encourage households to grow vegetables for both income and home use in the rural community of La Fortuna, population 400, where life is simple but not easy.

As of this year, 16 families have started small garden plots next to their homes, which is double the number of families with plots in 2011. In the past, starting vegetable gardens has been a challenge because of difficulties in obtaining seeds and a lack of knowledge of vegetable husbandry.

The partnership, started in 2006 between UT students and HTI, has been a continued success in helping Guatemalans grow nutritious food for their families. The work is supported by a generous gift from UT alumnus Kelly Milam and his wife, Beverly.

A follow-up trip this spring established drip irrigation for small household gardens and accomplished other goals.

Across the globe, as the Institute of Agriculture expands upon its relationships in Africa, its ties to the nation of Liberia continue to flourish. Liberian native Demanie Musu Flomo traveled to the Institute of Agriculture in 2009 for 10 weeks of intensive study with Dr. Michael Wilcox Jr. in the Department of Agricultural and Resource Economics. The trip was made possible through the Borlaug Fellowship Program's Global Cocoa Initiative administered by the USDA Foreign Agricultural Service in cooperation with the World Cocoa Foundation.

A year ago, Wilcox returned to Liberia for the "mentor visit" designed to sustain and strengthen the working relationship between Flomo and her colleagues at UT. Wilcox met with representatives of the Liberian government and a variety of non-governmental organizations. A highlight was a trip to Medina, Liberia, to discuss Liberia's Extension initiatives with members of the Liberian Extension service.

"Since her visit to the U.S., Musu and I have implemented a grant-funded Extension project in partnership with the non-profit ACDI-VOCA and the World Cocoa Foundation," Wilcox says. "We have also participated in an extensive industry tour in Ghana to examine the cocoa sector in a high-quality yielding, somewhat liberalized marketplace."

Since then, Flomo has begun work for the Liberian Ministry of Agriculture as a fellow in President—and Nobel Laureate—Ellen Johnson Sirleaf's "President's Young Professionals Program" administered by John Snow International. As a complement to this effort, she is presently pursuing a master's degree in agricultural administration at the University of Ghana.

Flomo was the first African woman to receive a Cocoa Borlaug Fellowship, and the first Borlaug Fellow to engage in an exchange with the Institute of Agriculture. *–Doug Edlund*

Top: A garden grows in La Fortuna, Guatemala. Photo credit: Dr. Forbes Walker. Bottom: Demanie Musu Flomo, third from right, being sworn in as a President's Young Professional by Liberia President and 2011 Nobel Laureate Ellen Sirleaf (in purple). Photo credit: Government of Liberia.

In profile: Dr. Arnold Saxton

FROM DATA TO MODELS TO SOLUTIONS, STATISTICIAN ARNOLD SAXTON IS VITAL TO THE INSTITUTE—DESPITE A PERSONAL MOTTO OF "STAY LOW AND HIDE."

Evidence of his impacts can be found in the number of peer-reviewed journal papers in which researchers have listed him as co-author: 104 since 2002.



Rick Maxey

WHAT FASCINATES YOU ABOUT YOUR WORK?

I am a science junkie. Presented with research questions and experimental data, it is absolutely fascinating to discover what answers the data support. Even though I am in Animal Science, I find the entire range of questions being studied within UTIA very interesting, from bacteria to insect pests to spray nozzles to plants to forests to wildlife, and, of course, production and companion animals. Each dataset has its own story to tell, and using statistical methods to extract that story is actually FUN (to me)!

EXPLAIN ABOUT THE DAWG THAT YOU AND THE HEAD OF PLANT SCIENCES, DR. ROBERT "OZ" AUGÉ, DEVELOPED.

It stands for Stats Design and Analysis Web Guide, and we're still growing it. We wanted to give researchers and students an online resource to assist with statistical analysis. The associated danda.sas computer macros make statistics much easier. You can try it out at http://dawg.utk.edu/choose.htm.

TODAY STATISTICS DRIVES SCIENCE. BUT ARE THERE EXAMPLES OF SCIENCE DRIVING STATS?

Absolutely. Statistics and agriculture have been partners since the 1920s when Sir Ronald Fisher first developed many statistical methods. An example today is genomics (the study of the collective function of all genes in an organism), which produces a totally new kind of data for which we had no statistical tools. Statisticians are now very rapidly developing new methods specifically for that kind of data. Genomics has been a revolution for science, and statistics has responded.

WHO DO YOU WORK WITH?

Pick a department, and I've worked with its faculty and graduate students. There's a pressing need for statistical help because the questions nowadays are so complicated that no one person can be an expert in everything that is needed for scientific progress. I am happy to be a member of the UTIA team.

WHAT DO YOU SAY TO PEOPLE WHO CONFESS THEY'RE AFRAID OF STATS?

Statistics is your friend! Think of it as a tool, like a tractor or a pH meter. The computers, software, rules and numbers involved seem complex, but they are designed to help you make correct decisions on how to improve agriculture.

For Better Livestock & Human Health

The Center of Excellence in Livestock Diseases and Human Health. Sounds like a misnomer, doesn't it? It isn't. In the past five years, the center, which is administered through the UT College of Veterinary Medicine, has funded research on everything from mastitis (a complex disease of cows and other ruminants) to malignant catarrhal fever (a costly and mysterious infectious disease of certain livestock) to human heart disease to multiple drug resistance of Staphylococcus strains in both humans and animals.

The center's goals are to:

- Improve the quality of human life through better animal health.
- Identify and characterize animal diseases that are similar to human diseases.
- Develop new strategies to diagnose, treat and prevent disease.


Greg Hirshoren

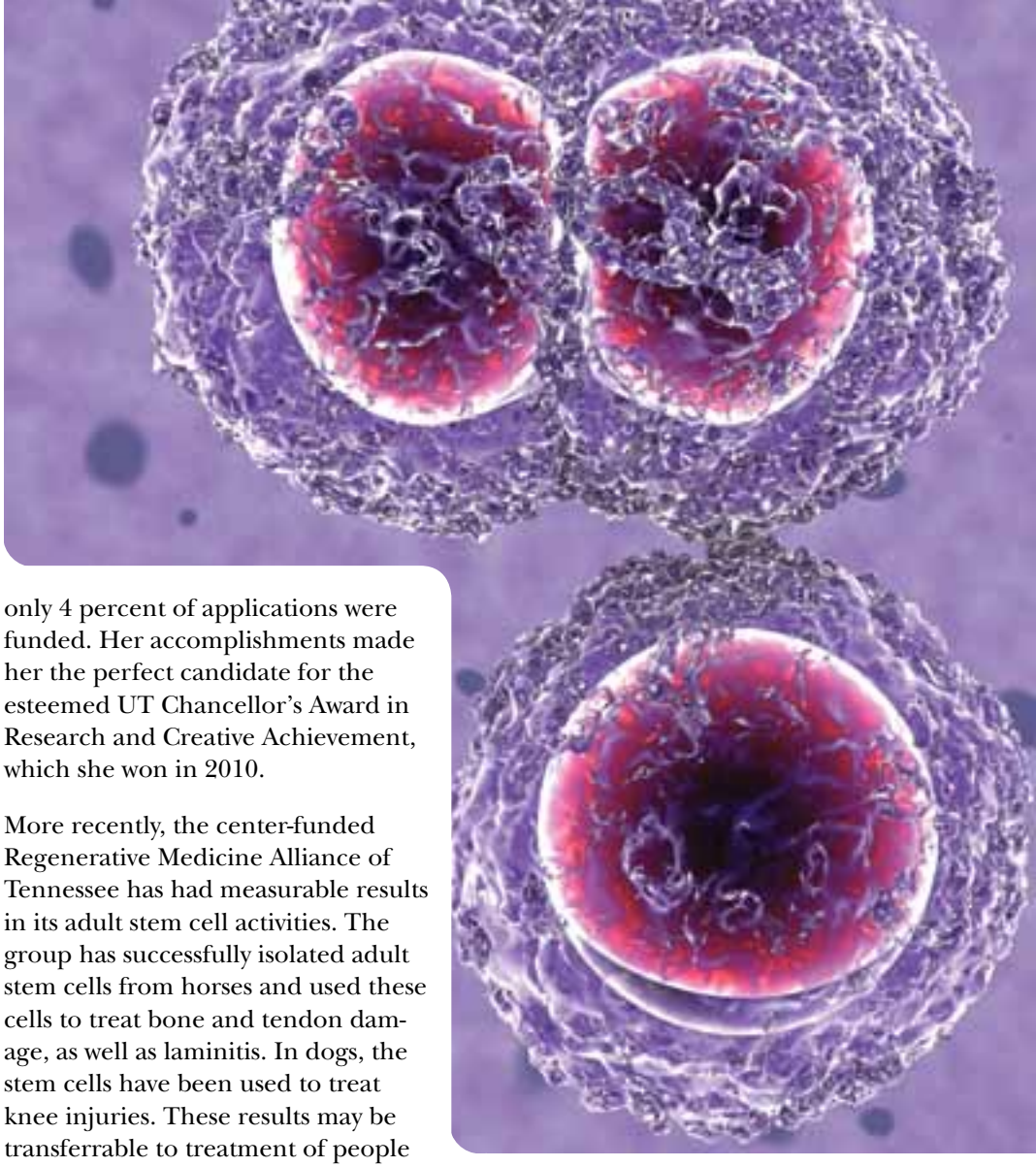
Center faculty began to achieve these goals in 1984, when the state of Tennessee created several centers of excellence for public higher education to provide service to Tennesseans through results of critical research. Through this competitive process, this center was born.

Researchers receiving grants from the center use the funds in one of two ways: as seed money to establish preliminary results and become more competitive for larger grants, and as bridge funding to keep their laboratories competitive during times between grants. Partly as a result of that support, over the past five years center faculty members have been awarded more than $19.5 million in grant funding. That's a 7:1 return on the state's investment.

A recent success story was Distinguished Professor Hildegard Schuller, who used her bridge funding in 2009 to secure more than $2 million for multiyear research on the effects of GABA (an inhibitor in the central nervous system) on lung and pancreatic cancers. This included a highly competitive National Institutes of Health "Challenge Grant," for which only 4 percent of applications were funded. Her accomplishments made her the perfect candidate for the esteemed UT Chancellor's Award in Research and Creative Achievement, which she won in 2010.

More recently, the center-funded Regenerative Medicine Alliance of Tennessee has had measurable results in its adult stem cell activities. The group has successfully isolated adult stem cells from horses and used these cells to treat bone and tendon damage, as well as laminitis. In dogs, the stem cells have been used to treat knee injuries. These results may be transferrable to treatment of people with the same type of therapy.

Dr. Michael McEntee, center director, sums it up best: "The center creates an environment that encourages new, risk-worthy research. Funds offered through the center provide investigators the ability to develop new ideas that might otherwise lie dormant."
–Misty Bailey



Above: A close-up of MRSA, a contagious staph bacteria that can infect skin and also invade other parts of the body. Left: Dr. Seung Joon Baek investigates colorectal cancer prevention and intervention using natural remedies.

Pound Puppy Loses It

FACEBOOK PHENOM CAPTURES HEARTS AS SHE WALKS WEIGHT AWAY

by Sandra Harbison

In UT's Veterinary Medical Center, all eyes are fixed on Mabel, a heart-winning beagle mix with a serious weight problem. Here Mabel writes about her experiences at CVM's Fat Camp.

"**When people see me, they whistle**—not because I've got that hourglass figure—and not even because I'm a cuddly canine. It's because they can't believe just how "non-petite" I am. I hear things like 'Mabel's never met a meal she didn't like.' What's a pooch to do? I'm just a big-boned gal whose ideal HEALTHY body weight is 23 pounds … not the 67 pounds I was hefting around when my original owners took me to a local shelter saying I'd gotten too big for them to care for. Guess I should have learned to read about serving sizes!

"The shelter veterinarian, Dr. Becky DeBolt, took one look (okay, maybe two or three to take it all in) and enrolled me in the obesity management program, or Fat Camp, at the UT Veterinary Medical Center. **Are you kidding me? Fat Camp??** Let me tell you, they know all the tricks (so this dog will have to learn new ones, I guess!). As part of the program, veterinary nutritionists keep up with my calories and amount of time I exercise. **Exercise—a four-letter word times two!** The most exercise I had gotten before was lowering my head to the food bowl, and I was pretty good at it.

"I met my new mom at UT. She is veterinary nutritionist Dr. Angela Witzel at the Veterinary Medical Center. Her love for me was akin to my love for food—instant and infinite. **Unfortunately for me, mom is a strong-willed two-legger**. No matter HOW much and adorably I beg for people food with my big brown eyes, she won't budge. 'A minute on the lips means a lifetime on the hips,' she says.

"It's cool being adored as some sort of role model. **Maybe I can be one of those skinny cover models in a few months!** Wait, no. Don't want to deal with underweight issues. I'll settle for being healthy!"



Greg Hirshoren

Once 67 pounds heavy, Mabel is walking her weight away using an underwater treadmill at the UT Veterinary Medical Center. Her owner says Mabel considers it more a spa treatment than rigorous exercise, but it's delivering solid results, helping this beagle-mix move toward her ideal weight.

At 67 pounds, Mabel was almost three times her ideal size. Dr. Witzel works with Dr. Joe Bartges, another veterinary nutritionist who says most people don't know that their pets are overweight and that keeping weight off is easier than taking it off. Still, during the first month of Fat Camp, Mabel lost 15 percent of her bodyweight. As of May 1 she weighed 42 pounds—well on her way to a perky strut rather than a slow waddle!

To keep up with Mabel as she works her way back to her ideal "bow chicka bow wow" figure, visit www.vet.utk.edu and look for a link to Mabel's Facebook page. Nearly 900 humans "like" her on Facebook. A local middle school language arts class follows her and has sent balls, Frisbees and other toys to keep Mabel up on her paws and moving.

Mabel is not alone regarding her weight issues. She joins more than 88 million pets nationwide. The Association for Pet Obesity Prevention conducted a survey recently and found more than half of adult dogs and cats are classified as overweight or obese by their veterinarian. The health risks for obese dogs and human beings are similar in many respects: insulin resistance, lower urinary tract disease, hypertension, osteoarthritis, respiratory problems, cardiovascular disease, increased incidence of cancer and decreased lifespan.

Research to Protect the Value of Bt Technology

Pesticides derived from the bacterium *Bacillus thuringiensis*—widely known as Bt—have been important to farmers since the 1920s. Sixteen years ago, transgenic seed that produces insecticidal Bt proteins became available. Use of these transgenic Bt crops in the U.S. has reached 75 percent of cotton and 65 percent of corn acreage, while Bt pesticides are the most important insect control method available to organic farmers. The Bt crop technology has saved producers millions of dollars by increasing yields and greatly reducing applications of broad-spectrum chemical pesticides. These factors make Bt important to both agriculture and human health.

Yet entomologists know that constant exposure creates evolutionary pressure for insect pests to become resistant to a pesticide. That's why Bt plants are required to produce a high dose of insecticidal toxin and producers adopting Bt crops have been mandated to plant non-Bt refuges to bolster populations of susceptible insects in their fields. Susceptible insects emerging from these refuges mate with and dilute any resistant populations. However, resistance to Bt crops has already emerged in India, China and Puerto Rico. There damage by resistant fall armyworms to a Bt corn variety resulted, for the first time in the U.S., in withdrawal of this variety from the market. Although cold temperatures prevent their northward movement, Bt-resistant fall armyworms from Puerto Rico are believed to migrate into Florida, representing a risk to southern growers and organic farmers.

"Mathematical models and estimates support that the use of non-Bt refuges would render Bt crops effective for more than 20 years," says institute entomology researcher Dr. Juan Luis Jurat-Fuentes. "However, we're starting to see the first cases of field-evolved resistance, suggesting that some of the high-dose and refuge requirements have not been fulfilled. Companies are now developing new Bt crops containing different combinations of Bt toxins to reduce dependency on refuges and further delay resistance while providing better control of the insects."

Through collaborators at the USDA, Jurat-Fuentes acquired Bt-resistant fall armyworm caterpillars from Puerto Rico to study. In the lab, he and Ph.D. students Siva Jakka and Liang Gong are working to pinpoint the exact mechanism responsible for resistance to Bt corn. That knowledge would enable agrochemical companies to develop improved Bt crops and sensitive assays to quickly determine if resistant insects are present in production fields. While the EPA currently mandates such monitoring, the methods used require capturing insects and analyzing subsequent generations in the lab, which is lengthy, costly and laborious.

"It takes months to do this and a lot of work," Jurat-Fuentes says. "So if we come up with a DNA-based assay that can be done in a day with a caterpillar or moth from the field and tell whether the resistance gene is present, then we can have a great economic impact on monitoring for resistance. We do have collaborations with some companies that support part of our research, so what we find is of great scientific and applied interest." Jurat-Fuentes' research is also funded by a grant from the USDA National Institute of Food and Agriculture, highlighting the importance of his work.

For the promise of his research, Jurat-Fuentes was one of 18 researchers worldwide last year who was honored as a DuPont Young Professor.

"To develop resistance, an insect must change something," Jurat-Fuentes explains. "Although we have some ideas from lab research, our project represents the first effort to understand what field insects change to become resistant to Bt crops. We are also interested in learning about how resistance is transmitted and the fitness of the resistant compared to susceptible armyworms to evaluate and improve current resistance management mandates.

"If we can delay emergence of resistance through better detection and control of the resistant insects, we can perhaps preserve the effectiveness of Bt for years to come." *–Margot Emery*



John Skinner with Juan Luis Jurat-Fuentes

A comparison of a susceptible (left) and resistant (right) fall armyworm larvae feeding on a piece of Bt corn. The susceptible worm died after eating a small piece of the leaf, while the resistant worm has eaten the whole leaf and is very healthy looking.

PALMER PIGWEED HEADACHES

UT Extension weed specialist Larry Steckel has spent the better part of the past four years talking about one thing: glyphosate-resistant Palmer pigweed.

That's not a critique of Dr. Steckel's conversational skills, but rather a testament to how significant this dreaded weed has become to agriculture.

"When just one Palmer pigweed can reduce a crop yield by 30 percent, people want to know about it," Steckel says as he walks through his research plots at the UT West Tennessee AgResearch and Education Center in Jackson. "It's changed the way we farm."

If you haven't heard of it, Palmer amaranth (the resistant version of pigweed) has the highest photosynthetic rates of any plant recorded, growing as much as two inches per day. Several years ago this turbo-charged weed developed a resistance to the glyphosate herbicides like Roundup that were used to control it, rendering widespread farming practices utterly useless.

"Many growers have had to revert to farming methods they used years ago to prevent yield loss," Steckel says, "and that includes chopping these weeds out by hand."

UT's Steckel, who is considered one of the nation's leading experts on resistant weeds, travels extensively, educating producers on how to cope in this new era of weed control. Johnny Dodson, who farms in Dyer and Lauderdale counties, is one producer who has had to employ new management tactics such as chopping crews, preherbicides and hooded applications.

"Five years ago we would simply plant Roundup-ready cotton," says the West Tennessee producer. "Now every acre we plant has a multitude of residual herbicides on it."

And these new weed management tactics are not cheap.

"There's the cost of additional herbicides, more equipment and more workers to closely monitor fields," Steckel says. The extra expenses, he estimates, are costing Tennessee farmers $200 million.

Even worse, scientists have discovered more glyphosate-resistant weed species in the Midsouth, intensifying the need for a solution. One research effort looks beyond herbicides to examine cover crops like rye, crimson clover and vetch. The intent is to determine if these crops can provide enough cover in the winter to help suppress pigweed emergence. In 2011, Steckel's cereal rye research plot did obtain enough growth to help suppress the weeds.

Meanwhile, producers like Dodson are optimistic that solutions to resistant weeds are not far away.

Until then, Steckel still has a lot to talk about.
–Ginger Rowsey



Ginger Rowsey

Weed specialist Larry Steckel, right, and Senior Plot Caretaker Ernest Merriweather examine Palmer pigweed invading a field at the UT West Tennessee AgResearch and Education Center in Jackson.

Rainbow of LEDs Shows Promise *for* Growing Plants


Rich Maxey

Plant Sciences AgResearchers Dean Kopsell, left, and Carl Sams say that LED lights and their advantages will soon be an affordable option to greenhouse producers. "That's the exciting thing about being a researcher," Sams says. "We get to investigate ideas that have significant potential impact and may revolutionize how we do things."

Open the doors of certain growth chambers in UT's Plant Biotechnology Building, and you may think you've stepped into a horticultural disco.

Purple, red and blue lights are all around, beaming down on kale plants. But don't throw away your contact lenses just yet. The colors are correct. These are actually LEDs or light-emitting diodes—which could be a new way to grow plants indoors.

Plant scientists Drs. Dean Kopsell and Carl Sams are investigating how plants respond to LED lighting and what the potential economic impact might be for greenhouse operations. They believe LEDs will produce plants cheaper, faster and with far less energy than those grown under incandescent or fluorescent light.

Comparing two kale plants grown for the same length of time, the plant that grew under LED lighting is considerably taller than the one grown under traditional bulbs. Kopsell is studying how to control the wavelengths of different colors and the light intensity of LEDs, and how that affects plant growth.

> "you're only giving the plant the wavelength it needs... so it makes it very efficient"

"What the LEDs do is you're only giving the plant the wavelength it needs and you're not getting any heat along with that like you would with an incandescent bulb, so it makes it very efficient," Kopsell says.

UT AgResearch scientists are also investigating how plants grown with LED lighting can be cultivated to be more nutritious. "Since plant pigments absorb light, if we can control the light they're absorbing, then what are we actually going to do to the nutritional value of that crop? So far the results have shown that with the LED lighting technology, I can really increase some of those important pigments in there," Kopsell says.

Sams says LED lighting can be a supplement to greenhouse operations. "LEDs run about 50 percent more efficient on the electric bills for the same amount of light output," he says.

While the LED technology remains expensive, it is becoming more cost-effective all the time. Greenhouse operators will eventually save money by using less energy.

When it comes to growing plants indoors, this technology holds great promise in mimicking the sun, at an affordable cost. *–Chuck Denney*

CAMPAIGN FOR TENNESSEE

Thanks to the generosity of our alumni and donors, the Campaign for Tennessee, the most ambitious fundraising effort in the 216-year history of the University of Tennessee, reached its $1 billion goal 18 months ahead of schedule and ended with more than $1.3 billion committed.

The campaign's success places UT among an elite group of only 28 public universities that have successfully completed fundraising campaigns of at least $1 billion, according to the Council for the Advancement and Support of Education.














IMPACT OF CAMPAIGN FOR TENNESSEE ON THE INSTITUTE OF AGRICULTURE

Through the leadership of the Institute of Agriculture Campaign Chair Charles Wharton and steering committee members Waymon Hickman, Ben Kimbrough, Milton Magee, Myers Parsons, Jim Rainey, Jeff Ray, Al Samsel, Jim Webb and Steve Williams, alumni and friends of our programs invested more than $113 million in the Institute of Agriculture. Thanks to the generosity of our donors, we surpassed our original goal of $85 million. The support enables us to recruit the best students with scholarships, educate and challenge them with outstanding faculty who are recruited or retained through privately funded professorships and chairs, and strengthen programs in agriculture, natural resources, extension, research and veterinary medicine.

ENHANCED OPPORTUNITIES TO RECRUIT AND RETAIN OUTSTANDING STUDENTS AND FACULTY

Support for undergraduate and graduate students has resulted in new programs and bolstered existing programs that help the College of Agricultural Sciences and Natural Resources recruit the best and brightest students.

» The Ben Hazlewood Graduate Student Endowment provides stipends to assist financially needy students to pursue advanced degrees.

» Construction industry support during the campaign has helped to launch a new construction science program in the Department of Biosystems Engineering and Soil Science.

» Endowed scholarships for the College of Agricultural Sciences and Natural Resources have more than doubled since the beginning of the Campaign for Tennessee, and in 2010 the college provided more than $1 million in assistance to students in agricultural academic programs.

» Jerry Baird has a love for the land, and through his desire to promote organic farming, he has committed his entire estate valued at $4 million to create the Jerry Baird Organic Horticulture Research and Education Program in Plant Sciences.

Donors who wish to remain anonymous have provided a gift through their estate to create the following:

» A scholarship for students majoring in Animal Science.

» A distinguished professorship in animal quantitative genomics.

» County 4-H endowments.

» A distinguished professorship in animal and public health.

IMPROVED INFRASTRUCTURE

The Campaign for Tennessee's positive impact can be seen on campus with the addition of:

» The John and Ann Tickle Small Animal Hospital in 2008.

» The 4-H Lodge at Greeneville at the Clyde Austin 4-H Center, built with a donation of more than $1 million from a generous anonymous gift.

» The $1 million institute and AstroTurf-funded Center for Athletic Field Safety.

EXPANDING OUR FOOTPRINT ON THE STATE THROUGH EXTENSION

Through UT Extension, UTIA has the capacity and reach to make enormous impacts in Tennessee through 5.4 million personal contacts in the state every year:

» During the seven years of the Campaign for Tennessee, the 4-H Foundation gained more than $4 million and holds a current balance approaching $7 million. UT endowments have been established in almost every county of Tennessee, and Extension endowments with the UT Foundation have increased from $3 million to $10.5







million during the Campaign for Tennessee.

» J.D. and Betty Beene have provided more than $1 million in their estate for endowments for 4-H Congress, 4-H camp scholarships and agent training programs.

» John Mayfield recognized the impact of Extension on his local community and dedicated $400,000 of his estate through the Tennessee 4-H Foundation to benefit all Cheatham County Extension programs.

» Doug Masengill provided $300,000 in his estate plan for support of statewide and Hamblen County 4-H programs as well as the Clyde Austin 4-H Camp in Greeneville, Tennessee.

RAISING THE PROFILE OF VETERINARY MEDICINE

Support for the College of Veterinary Medicine totaling $54.6 million has allowed us to increase program capacity to position the college as one of the top veterinary medicine colleges in the United States.

» Charles Wharton and his late wife Julie had a passion and advocacy for the health and welfare of all animals. They have been extraordinarily generous in supporting CVM faculty and programs and gave exceptional volunteer leadership to the college where Julie served on the Board of Advisors and Charles as a UT Trustee and in many other roles.

» James and Josephine Webb have been dedicated to ensuring the health and welfare of cats. Their giving supports feline medicine facilities and an endowed Webb Family Chair in Feline Medicine in the College of Veterinary Medicine.

» Julie Watts and Bob DeVault have supported veterinary medicine student scholarships for many years and provided more than $1 million in their estate to continue their support for veterinary medical students.

» Diane and Gerry Garrett have provided very generously in their estate in memory of their beloved dog for the Brandy Memorial Endowment recognizing faculty excellence in the College of Veterinary Medicine.

CONDUCTING ESSENTIAL AG RESEARCH

Corporate support for UT AgResearch has reached almost $7.5 million during the campaign benefitting farmers and agricultural consumers across the state.

» Companies such as Bayer, Monsanto, Dow, Syngenta, BASF, DuPont and Cheminova have supported efforts to improve productivity and reduce infestation for row-crop farmers across the Southeast. And our weed science team has received strong support to keep some of the most invasive weeds at bay.

» Waymon Hickman committed an estate gift to the Middle Tennessee AgResearch and Education Center to provide scholarships for students in agricultural education and an improvement fund to maintain the essential applied research mission of this valuable center.

» More than $1 million has been raised for the Forest Resources AgResearch and Education Center in Oak Ridge. Rogers Group gave $500,000 to start a permanent endowment for the UT Arboretum.

The Campaign for Tennessee is over, and we want to sincerely thank everyone who made a contribution. Every gift was important, and as we look toward the next 10 years, private giving will become more important than ever to maintain our current programs and build toward the future. The institute will be in need of support for scholarships, endowed chairs, internship and residency programs, building campaigns in Animal Science and the Veterinary Medical Center, a 4-H camp for West Tennessee, and much more.

Thank you again for your support and please remember that when you make a commitment to the Institute of Agriculture, you are investing in the future of the state of Tennessee and the world. *–Rhodes Logan*

UNDERGRADUATES

LEARN

SCIENCE, CAREER OPPORTUNITIES

THROUGH TICK RESEARCH



Dr. Graham Hickling

Tiny eight-legged creatures, ticks are having huge impacts on undergraduate students at UT.

By studying natural cycles of tick-borne illnesses, students in the College of Agricultural Sciences and Natural Resources are gaining experience in ecological research. The involvement is opening their eyes to career directions and areas of specialization that many had never imagined.

"At first glance, ticks may seem like an odd subject for wildlife research," says Dr. Graham Hickling, director of the UT Center for Wildlife Health.

"Most people don't know much about the underlying ecology of tick-borne diseases and the important role that wildlife species play as the hosts of these ticks. However, there are very real issues that need to be understood, and ticks make ideal research subjects in a university setting.

As an undergraduate, Animal Science pre-veterinary major Jessica Harmon became interested in learning more about the research process, specifically lab work. She contacted Hickling and began investigating tick-borne diseases in Tennessee.

The experience proved pivotal, and instead of veterinary medical school, where she was bound, she chose to pursue an M.S. in wildlife health with a minor in entomology in CASNR. She now works as a research fellow in tick-borne disease with the Centers for Disease Control and Prevention in Atlanta.

"Tick-borne disease can be quite a puzzle," Harmon says. "Tick species, wildlife host species, environmental conditions and timing all have to be perfect for a pathogen to proliferate," she says.

"The research possibilities involving this disease system are endless and anything but boring."

Animal science senior John Norris compared various washing machine heat and washing cycles to determine the best method to kill ticks on clothing. While high temperatures helped, he found an effective way to kill ticks is to include heavy garments such as jeans in the wash – and, better still, is to run the clothes through a dryer.

Undergraduates and veterinary medicine students have also used data gathered by the Center for Wildlife Health to model tick populations. This modeling was done through the summer research experience program of the National Institute for Mathematical and Biological Synthesis (NIMBioS). Hickling is an associate director of NIMBioS at UT.

The Center for Wildlife Health focuses on finding opportunities to involve undergraduate and graduate students. "The best way to proceed with our research projects is to use them as teaching opportunities as well as for straight research findings," Hickling says.

"We see students like Jessica begin to look at ecological and epidemiology research on wildlife as another option or at least as an addition to their vet school interests.

"Similarly," he adds, "students who were focused on livestock or companion animals may realize that wildlife and wildlife disease are areas that would be interesting to them, too. Often they are not aware of the kind of jobs that training such as this can lead to. It's something we're pleased to help them learn about." *–Margot Emery*

Former Center for Wildlife Health researcher Jessica Harmon (B.S. Animal Science '08, M.S. Wildlife Health '10) collects ticks from a deer at a TWRA check station. Investigations of ticks are just one area of specialization for this UT research center.









Tennessee 4-H Opens New Lodge in Greeneville

It's a place where 4-H'ers might tell spooky ghost stories at night, where a company could hold an organizational retreat, or where anyone can relax in a gorgeous mountain setting.

The UT Clyde Austin 4-H Center has opened a new 4-H Lodge in Greeneville, Tenn. The lodge was built with a donation of more than $1 million from generous supporters who wish to remain anonymous. Construction was completed this spring, and visitors are already using the facility.

"Thanks to this amazing act of generosity, the new lodge will serve 4-H youth and adults throughout the state for many years to come. We are so very grateful for this gift and proud of this beautiful facility," says UT Extension Dean Tim Cross.

The 13,000-square-foot facility includes meeting rooms, 16 rooms for housing and a large deck with rocking chairs that overlook the Unaka Mountains. The center also has state-of-the-art electronics and Wi-Fi access, as well as kitchen facilities. The lodge will be used by campers and camp counselors through the summer months and is available any time of year for corporate retreats and organizational gatherings.

"Summer camp is a special experience for thousands of 4-H youth from across the state," Cross says. "The new lodge will help us to continue these opportunities for our campers, and it will also offer a unique meeting location for outside groups to conduct retreats, meetings and other events in a truly outstanding setting."
–Chuck Denney



Photos by Rich Maxey and Jerry Rhinehart



Charles Hatcher and Sara Clariday



John Frady, Jere Jeter and Jimmy Hopper



Carol McDonald



TELL US ABOUT YOUR DREAM JOB AT AGALUMNI@TENNESSEE.EDU



Julius Johnson

Jim Nunn



Alumni Dream Jobs

JIM NUNN, COTTON BROKER

Jim Nunn (Animal Science ’77) is owner of Nunn Cotton Co., Inc., in Brownsville, Tennessee. “I decided while at UT that I wanted a career in the cotton industry.” He opened his business in 1984 after graduating from the famed Memphis Cotton Exchange Cotton School. “I’ve seen lots of changes in the industry in my 27-plus years, but the business still depends on trust and relationships. No two cotton seasons have been the same, and I’ve witnessed market volatility, wide swings in acreage and demand, and changes in the farm programs.” The past two seasons may have been the most challenging for Nunn, following cotton’s sudden move to record highs and subsequent drop following unexpected flooding in Pakistan, India’s suspension of cotton exports, massive Asian mill defaults, and the historic Texas drought and Mississippi River flooding. “I enjoy the challenges of the business, and I especially enjoy working with my farmer and gin customers in Tennessee, Arkansas and Missouri. The cotton business has afforded me opportunities to meet people from six continents and travel to Australia, Asia and Europe, as well as less exotic, but equally interesting places, such as Macon, Mississippi; Monette, Arkansas; Peach Orchard, Missouri; and Nutbush, Tennessee.”

OUR ALUMNI TEAM, TENNESSEE DEPARTMENT OF AGRICULTURE

We know our alums are versatile. We’re proud of the different areas of leadership that our graduates provide to the Tennessee Department of Agriculture. Among our alumni working in the department are:

- Commissioner of Agriculture Julius Johnson, B.S. Animal Science ’70
- Assistant Commissioner for Market Development Joe Gaines, B.S Forestry ’69
- Assistant Commissioner for Policy and Legislation (and former UT Extension agent) Carol McDonald, B.S. Animal Science ’82
- Director of Regulatory Services Jimmy Hopper, M.S. Animal Science ’77
- State Veterinarian Charles Hatcher, DVM ’84
- Assistant State Veterinarian Sara Clariday, DVM ’79
- Assistant State Forester for Operations Jere Jeter, B.S. Forestry ’72
- Agricultural Marketing Specialist Jon Frady, B.S. Plant Sciences and Landscape Systems ’05, M.S. Agricultural Economics ’07

“Agriculture is the foundation of the quality of life we enjoy, and the Tennessee Department of Agriculture is charged with enhancing and growing our rural communities,” says Commissioner Johnson.

“When putting together our leadership team, I’ve tried to look for people who understand and appreciate the unique challenges and opportunities facing our farmers and rural communities. The UT system and all our agricultural institutions have been a great resource for developing this leadership through the years.”

Reciprocally, Johnson provides valued leadership to higher education. As commissioner, he serves on both the UT Board of Trustees and Tennessee Board of Regents.

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University of Tennessee AgResearch hosts one of the most extensive field day schedules of the U.S. land-grant system. Representing the diversity of Tennessee agriculture, these events offer opportunities to learn to be a better producer of almost anything you can grow in the state, from cattle, cotton and crape myrtle to cabbage.

See the schedule at http://tiny.utk.edu/FD

