University of Tennessee, Institute of Agriculture

Unit Review Self Study Report

Tennessee Agricultural Experiment Station

UT AgResearch Review

February 9 to 13, 2014

To: Nancy Cox
Saied Mostaghimi
Steve Slack
Sandy Stewart
Eric Young

From: Bill Brown

Thank you for incorporating into your schedules participation in a review of UT AgResearch. We are very much looking forward to the review and view it as a positive step for moving our research programs forward, as well as learning more about how our various Experiment Stations operate across the country. Our research programs are driven by the philosophy of making a difference; to support our mission of enhancing the lives of citizens of Tennessee and the world. We must rely on high quality science, political skill, public support, personal relationships and an emotional connection across those who support our programs including state and federal government, agency and business awards and fundraising efforts. We view this review as an excellent opportunity to learn more about ourselves through your eyes as leaders in agricultural research administration. We would like to know what we are doing well; what areas need improvement; what areas, if any, should we discontinue or de-emphasize; and what new areas should we be focusing on that are currently not represented or under-represented.

As part of the review process, we would ask that you address the following:

- Is the philosophy, mission and vision of UT AgResearch directed in the proper manner to serve our diverse clientele?
- Should the AgResearch office focus on other or additional guiding principles to support and facilitate faculty-driven, mission-based programs?
- Is AgResearch providing the appropriate services to UTIA faculty to facilitate their success? Are there additional aspects that we should consider to aid in advancing our research programs?
- Relative to your specific experience and your knowledge of peer Agricultural Experiment Stations across the country, is UT AgResearch appropriating its resources in the most effective manner to meet our research mission?
- Is UT AgResearch collaborating effectively with other components of the land-grant mission within UTIA (College of Agricultural Science and Natural Resources, UT Extension and the College of Veterinary Medicine)? Are there ways that we can more effectively work together?
- What are your reactions and thoughts related to our plans for the path forward for UT AgResearch?

UT AgResearch Review Schedule

Bill Brown: Office Phone: 865-974-7121; Cellular Phone: 865-766-9372
Steve Oliver: Office Phone: 865-974-7121; Cellular Phone: 865-235-6169
John Hodges: Office Phone: 865-974-7339; Cellular Phone: 865-567-2092
Nancy Cox: Office Phone: 859-257-3333; Cellular Phone: 859-230-7759
Saied Mostaghimi: Office Phone: 540-231-6336; Cellular Phone: 540-357-0705
Steve Slack: Office Phone: 330-263-3701; Cellular Phone: 330-465-5938
Sandy Stewart: Office Phone: 919-733-3236; Cellular Phone: 919-414-4863
Eric Young: Office Phone: 919-513-1746; Cellular Phone: 919-815-4991

Sunday February 9, 2014	
	Arrive in Jackson, TN Bob Hayes & others to meet review team at Memphis airport and transport to Jackson (Bob Hayes: Office Phone: 731-424-1643; Cellular Phone: 731-695-1887) Accommodations: DoubleTree by Hilton Hotel Jackson 1770 U.S. 45 Bypass, Jackson, TN 38305 Phone: (731) 664-6900
6:00 pm CST	Review Team Dinner with AgResearch Administration Location: Jackson, TBD • Bill Brown • Steve Oliver • John Hodges

Monday February 10, 2014	
am	Review team has breakfast at hotel; check-out of hotel
7:45 am CST	Leave Hotel for travel to West Tennessee Research & Education Center, Jackson
8:00 am CST	Meet with Center Directors. Each Director provides 5 minutes overview of Center followed by discussion. Bob Hayes – Director, West TN REC Blake Brown – Director, Milan REC Rick Carlisle – Director, Ames Plantation (Rick cannot attend due to Bird Dog Trials; Dr. Alan Houston may attend based on his commitments to the trials)
10:00 am CST	Leave Jackson for Plateau Research & Education Center Box lunch en route
2:00 pm CST	Arrive at the Plateau Research & Education Center. Each Director provides 5 minutes overview of Center followed by discussion. Walt Hitch – Director, Plateau REC Barry Sims – Director, Highland Rim REC Kevin Thompson – Director, Middle TN & Dairy REC
4:00 pm CST	Leave Plateau Research & Education Center
6:30 pm EST	Arrive in Knoxville Accommodations for nights of February 10, 11 &12:

	Four Points by Sheraton Knoxville Cumberland House Hotel Address: 1109 White Ave, Knoxville, TN 37916 Phone: (865) 971-4663
pm	Dinner

Tuesday February 11, 2014	
am	Breakfast at Hotel
8:00 am EST	Meet Bobby Simpson – Director, East Tennessee AgResearch and Education Center at Hotel; Tour East Tennessee AgResearch and Education Center Joe Johnson Animal Research & Teaching Unit Tour parts of Unit and meet with: Rob Ellis – Director, Greeneville AgResearch & Education Center Kevin Hoyt – Director, Forestry AgResearch & Education Center Bobby Simpson – Director, East TN Research & Education Center ETREC-Organic Crops Unit Drive through ETREC - Blount Unit ETREC - Little River Animal and Environmental Unit (LRAEU); ETREC - Plant Sciences Unit; Lunch and Discussion with ETREC staff
1:45 pm EST	Depart Plant Science Unit for Morgan Hall Bobby Simpson accompanies review team to meeting with Chancellor
2:00 - 2:45 pm EST	Meet with Chancellor Larry Arrington Location: Morgan Hall 102
2:45 - 3:30 pm EST	Meet with UTIA Deans & Assistant Deans Location: Morgan Hall 102 College of Agricultural Science and Natural Resources Caula Beyl – Dean John Stier – Assistant Dean UT Extension Tim Cross – Dean Robert Burns – Assistant Dean, Agriculture & Natural Resources Laura Stephenson – Assistant Dean, Family & Consumer Sciences College of Veterinary Medicine Jim Thompson – Dean Mike McEntee – Assistant Dean, Research
3:30 - 3:45	Break
3:45 - 4:30 pm	Meet with UTIA Office of Sponsored Programs Location: Morgan Hall 102
4:30 - 5:15 pm	Meet With UT AgResearch Staff Location: Morgan Hall 102
5:15 pm	Bill Brown transports review team to hotel
6:00 pm	Dinner with AgResearch Administration

Wednesday February 12, 2014	
am	Breakfast at Hotel
8:00 am	Neal Schrick picks up review team from hotel and transports to campus
8:20 - 10:00 am	Meet With Department Heads. Each Head provides 5 minutes overview of department followed by discussion Location: Brehm Hall, Room 264 Delton Gerloff - Agricultural & Resource Economics Neal Schrick – Animal Science Eric Drumm – Biosystems Engineering & Soil Science Parwinder Grewal – Entomology & Plant Pathology Mark Morgan – Food Science & Technology Keith Belli – Forestry, Wildlife & Fisheries Scott Senseman – Plant Sciences
10:15 - 11:00 am	Meet With UTIA Faculty Dave Stone accompanies review team to meeting with UTIA faculty Location: PBB 156/157
11:00 am - Noon	Tour UTIA campus
Noon - 1:30 pm	Lunch With UT System President Joe DiPietro (pending legislative activity in Nashville) Dave Stone transports review team to Dr. DiPietro's office Location: 8th floor Andy Holt Tower
1:30 - 2:30 pm	Meet with UT AgResearch Administration Bill Brown Steve Oliver John Hodges Cyndie Nichols – AgResearch Business Officer Location: Food Science & Technology Conference Room
2:30 pm on	Review Panel Work Session & Dinner Location: Morgan Hall 102 Review panel takes station car to hotel and then to dinner if desired

Thursday February 13, 2014	
am - 10:30	Review Panel Work Session and/or Meet With Others as Desired by Panel
10:30 am - noon	Concluding Session with: Larry Arrington Bill Brown Steve Oliver John Hodges Location: Morgan Hall 102
Noon	Lunch
pm	Transport to airport

About the Review Team

Nancy Cox

- *Dean of the University of Kentucky College of Agriculture, Food and Environment*
- *Former Agricultural Experiment Station Director and Associate Dean for Research*

ncox@uky.edu

Dr. Nancy Cox was recently named Dean of the University of Kentucky College of Agriculture, Food and Environment and begins her new assignment in January 2014. Prior to this, Dr. Cox was the Director of the Kentucky Agricultural Experiment Station and Associate Dean for Research in the College of Agriculture at the University of Kentucky (UK). She holds a B.A. (1975) in English from Furman University and advanced degrees in animal physiology from the University of Georgia (M.S., 1977) and North Carolina State University (Ph.D., 1982). From 1982 through 1996 she was a researcher in the Department of Animal and Dairy Sciences at Mississippi State University. From 1997 to 2001 she was Assistant and Associate Director of the Mississippi Agricultural and Forestry Experiment Station.

Dr. Cox's research area is reproductive physiology of farm animals and she has been involved in consulting with producers and animal health companies. She developed strategies to improve reproductive performance in swine and did research on environmental estrogens. In 1998-1999 she co-chaired, with Senator Robert Dearing, the Task Force on the Environment for the Mississippi Legislature; this task force conducted a year-long study on the scientific issues related to environmental regulations on large swine farms. At Mississippi State University she led efforts to establish two university-wide centers, the Remote Sensing Technologies Center and the Life Sciences and Biotechnology Institute.

She joined UK in 2001, and her duties include oversight of Experiment Station state and federal budgets. She is responsible for the college grants office that managed over $31 million in external awards in fiscal year 2007. She represents the College of Agriculture in developing and implementing a partnership with a newly established federal laboratory, USDA Agricultural Research Service Forage-Animal Production Research Unit. The Experiment Station manages research and education facilities at the Kentucky Research and Education Center in Princeton, the Robinson Station in Quicksand, and the Eden Shale Unit in Owenton, Kentucky.

Dr. Cox represents the College on most Kentucky agricultural commodity boards and is on the executive board of the Kentucky Clean Fuels Coalition. She is responsible for current planning efforts for an Equine Institute and a Food Systems Innovation Center at UK, and she is serving as interim executive director of the Gluck Equine Research Foundation. Dr. Cox recently finished terms as chair of the Science and Technology Committee for the Experiment Station Committee on Policy (National Association of State Universities and Land Grant Colleges; NASULGC) and Director of the American Society of Animal Science. In 2005 she became a member of the Board of Policy Directors for the Board on Agriculture Assembly NASULGC. In 2007 she was named to the National Advisory Board for Research, Extension and Economics; this board advises the Secretary of the US Department of Agriculture on research priorities.

Saied Mostaghimi

- H.E. and Elizabeth F. Alphin Professor & Associate Dean

smostagh@vt.edu

Dr. Saied Mostaghimi is director of the Virginia Agricultural Experiment Station (VAES), and associate dean for research and graduate studies in the College of Agriculture and Life Sciences. Mostaghimi provides leadership to the college's comprehensive basic and applied research programs, and to the VAES's 11 agricultural research and extension centers. His responsibilities include program development and overall direction, planning, allocation of resources, oversight of college research facilities, support of faculty in their pursuit of extramural funds, and is accountable to stakeholders. He also administers the graduate studies program, fosters the development of interdisciplinary research programs, provides support for recruitment of graduate students, and assists graduate students with fellowship opportunities.

Prior to this position, Mostaghimi served as the H. E. and Elizabeth F. Alphin professor and department head of Biological Systems Engineering. His research programs concentrated on the design of water quality monitoring systems, the integration of modeling and monitoring for assessing the impacts of human activities on water quality, and the development and/or validation of computer simulation models. Agencies involved in water resources planning and management use his computer simulation models. His research was supported by more than $16.3 million in competitive funds. Mostaghimi published more than 400 archival and conference publications in the field of nonpoint source pollution assessment and control. He conducted U.S. Agency for International Development–sponsored projects, and consulted on nonpoint source pollution control strategies in several countries.

Mostaghimi received honors and awards, including the Virginia Tech Alumni Awards for Graduate Advising and the award for Excellence in Outreach, the Hancor Soil and Water Engineering Award, and Merit Awards from the Soil and Water Conservation Society. He is a Fellow of the American Society of Agricultural and Biological Engineers.

Steven A. Slack

- *Associate Vice President for Agriculture Administration*
- *Director of the Ohio Agricultural Research and Development Center at The Ohio State University*

oardc@osu.edu

Steve Slack has been at the Ohio State University since 1999 as Associate Vice President for Agricultural Administration and Director of the Ohio Agricultural Research and Development Center. Responsibilities include **c**hief research administrator of the College of Food, Agricultural and Environmental Sciences and affiliated programs, including support of selected research efforts in the Colleges of Arts and Sciences, Education and Human Ecology, and Veterinary Medicine both at Columbus and Wooster and oversight of the OARDC campus located at Wooster and 10 statewide outlying research stations.

Accomplishments include extramural funding has more than tripled in this period, the BioHio Research Park investment was established as a public-private OSU affiliate, facility improvements such as state-of-art nutrition and feed formulation Feedstock Processing Research Facility and the Ralph Regula Plant and Animal Agrosecurity Research biocontainment facility have been made.

He received his B.S. and M.S. degrees from the University of Arkansas - Fayetteville and his Ph.D. degree from the University of California - Davis. In 1975, he joined the faculty of the Plant Pathology Department at the University of Wisconsin at Madison and in 1988 he joined the Cornell University faculty as the Henry and Mildred Uihlein Professor of Plant Pathology and was department chair from 1995 - 1999.

He is a fellow and past President of the American Phytopathological Society, an honorary life member and past President of the Potato Association of America, and a fellow of the American Association for the Advancement of Science (AAAS).

Honors include a USDA Group Honor Award for Excellence for work on a non-pesticidal control strategy for the potato golden nematode, the Outstanding Alumnus award from the Dale Bumpers College of Agricultural, Food and Life Sciences at the University of Arkansas, the meritorious service award for research by the National Potato Council, and the Outstanding Achievement Award by the Ohio Soybean Council.

Activities include ESCOP representation: ESCOP Chair for 2013-2014, member of the Board on Agricultural Assembly Policy Board of Directors 2010-2104, 2008 Farm Bill/CREATE-21, ESCOP Budget and Legislature Committee and APLU Systems Integration Task Force member. Additional activities: Consultative Group on International Agricultural Research (CGIAR) Nomination Committee for Science Council 2003-2007, International Sorghum and Millet Collaborative Research Support Program (INTSORMIL CRSP) Board of Directors, Northeast Sun Grant Advisory Board, and past National Agricultural Biotechnology Council Chair.

Sandy Stewart

- *Research Stations Division Director, North Carolina Department of Agriculture and Consumer Services*

sandy.stewart@ncagr.gov

Dr. Alexander "Sandy" Stewart is the director of the Research Stations Division of the N.C. Department of Agriculture and Consumer Services. He began his appointment December of 2011.

The NCDA&CS Research Stations Division manages 18 agricultural research facilities across the state, operating in a unique partnership with N.C. State University's College of Agriculture and Life Sciences and N.C. Agricultural and Technical State University. The stations conduct a wide range of research projects, including variety development, pest management, production techniques, conservation efforts and animal husbandry.

Stewart has most recently served as a research assistant professor and extension specialist with N.C. State University's Crop Science Department. In that role, he was responsible for pesticide residue testing on tobacco and statewide extension education programs. He also helped oversee more than 40 field trials on research station sites and on-farm locations.

Before joining NCSU in 2010, Stewart was a researcher and partner with AgriThority LLC, in Kansas City, Mo., where he managed contract research involving all major row crops, fruits and vegetables and forage sorghum across the United States and internationally for major agricultural firms. Prior to that, he served for eight years as an associate professor and cotton specialist with Louisiana State University's Agricultural Center.

Stewart earned a Bachelor's of Science degree in agronomy from NCSU in 1995. He earned his master's and doctorate degrees in crop science from NCSU.

Stewart and his family live on their family farm in Carthage, which has been a working farm for more than 200 years. Stewart and his wife, Carol, have three small children, Martha Grace, Virgie and Palmer Mac.

Eric Young

- Professor of Horticultural Science
- *Executive Director Southern Association of Agriculture Experiment Station Directors*

eric_young@ncsu.edu

Eric Young is a Professor of Horticultural Science and Executive Director of the Southern Association of Agricultural Experiment Station Directors (SAAESD) working out of North Carolina State University. He received a B.S. in Botany in 1972 from Miami University of Ohio and a Ph.D. in Forestry in 1976 from Michigan State University.

Eric was on the faculty of the Department of Horticulture and Forestry at Rutgers University before moving to the Department of Horticultural Science at North Carolina State University in 1980. He served as Assistant and Associate Director of the North Carolina Agricultural Research Service from 1995 to 2002 when he became Executive Director on October 1, 2002.

As Executive Director, Eric advances the policies and programs of the SAAESD and its member State Agricultural Experiment Stations in the Southern Region and the nation. Duties and responsibilities include assisting the Southern Experiment Station directors in addressing regional and national agricultural research issues, enhancing multi-institutional collaboration, and working with the other regions' Executive Directors to further the Experiment Station Directors' agenda through USDA/NIFA and the Association of Public and Land-grant Universities.

Unit Review Self Study Report

Tennessee Agricultural Experiment Station

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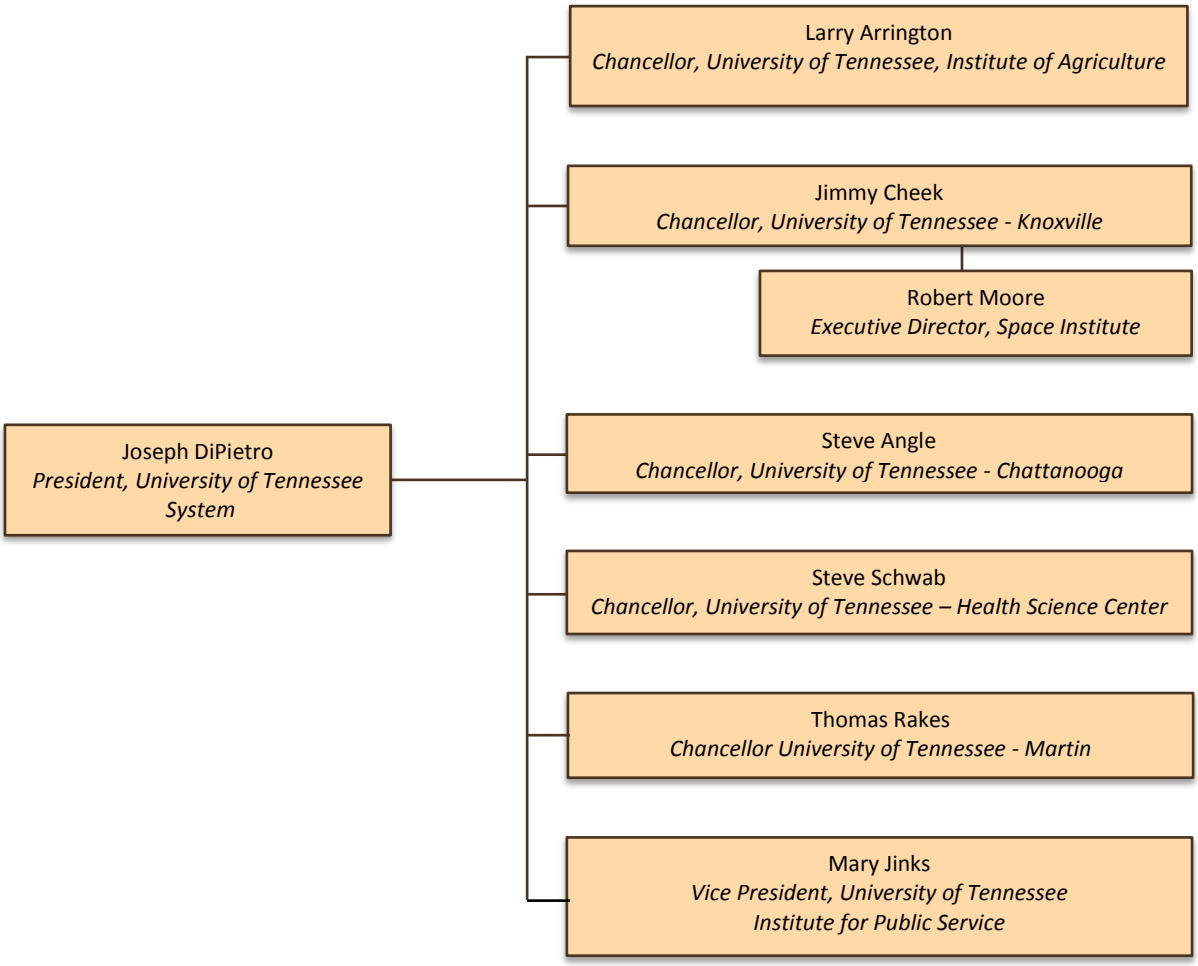
University of Tennessee System

Two higher education systems exist in the state of Tennessee; the University of Tennessee System and the Tennessee Board of Regents Institutions. The Institute of Agriculture is a part of the University of Tennessee System (Figure 1). The UT System is led by a President and is composed of four campuses (Knoxville, Chattanooga, Martin, Health Science Center) and three institutes (Agriculture, Public Service and Space Institute).

Table 1. Organizational Chart for the University of Tennessee System



UT System Mission Statement

The University of Tennessee System, through its multiple campuses and institutes, serves the people of Tennessee and beyond through the discovery, communication and application of knowledge. The System is committed to providing undergraduate, graduate and professional education programs in a diverse learning environment that prepares students to be leaders in a global society. The UT System's delivery of education, discovery, outreach and public service contributes to the economic, social and environmental well-being of all Tennesseans.

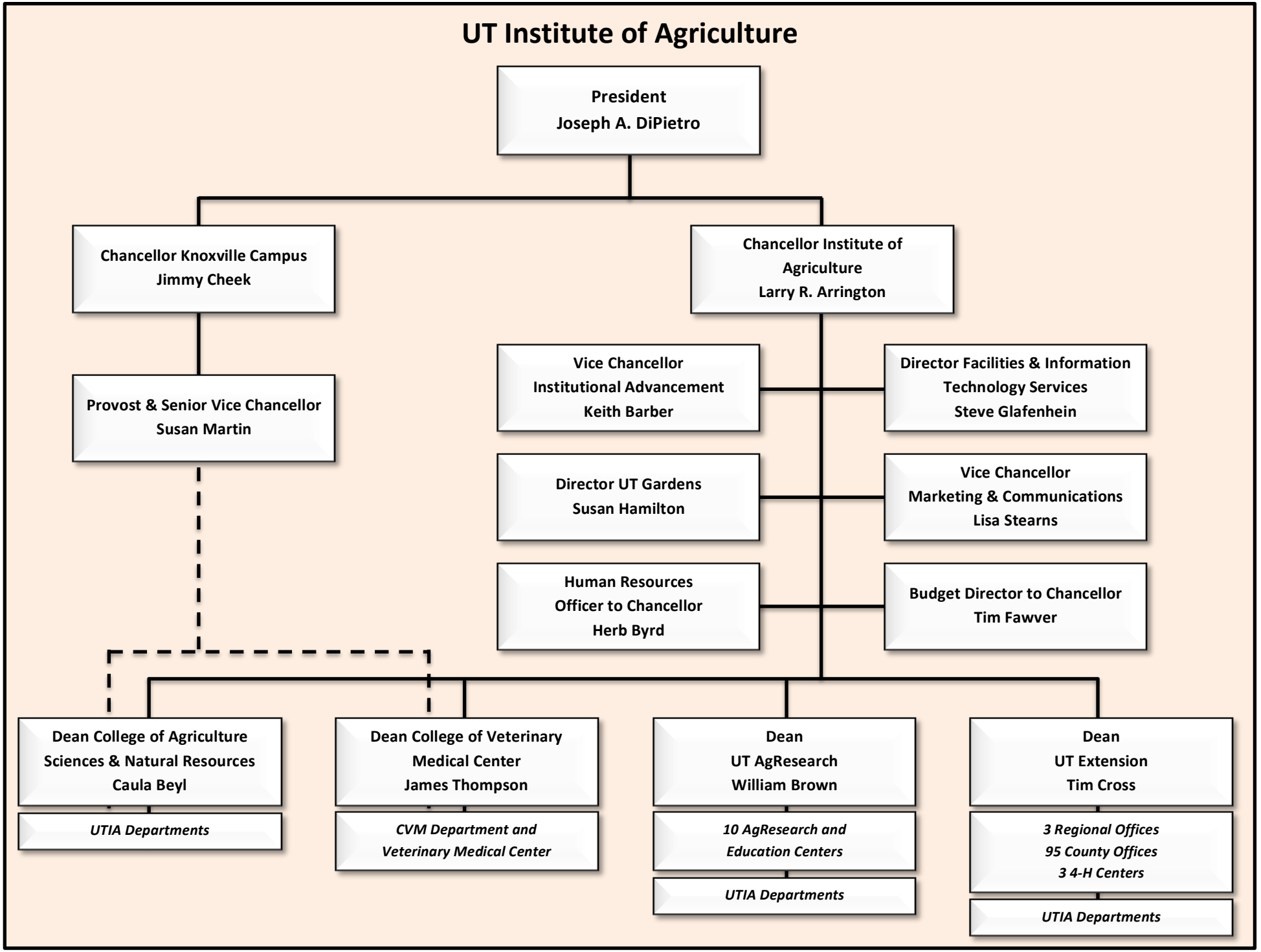
University of Tennessee, Institute of Agriculture

The University of Tennessee, Institute of Agriculture leads the land grant mission of the University of Tennessee System through its' four units. The College of Agricultural Sciences and Natural Resources, which confers degrees through the University of Tennessee at Knoxville, provides comprehensive education in agricultural, natural resources and human sciences at both the undergraduate and graduate levels. AgResearch conducts both basic and applied agricultural and natural resource based research on campus in seven departments and at ten AgResearch and Education Centers across the state. With offices in each of Tennessee's 95 counties, UT Extension delivers educational programs to improve the lives of farmers, families, youth and communities using research-based information. The College of Veterinary Medicine, as the only source of veterinary medical education in Tennessee, provides professional and graduate student education in veterinary medicine and related biomedical sciences, contributes new medical, surgical, and diagnostic knowledge to the health professions, and disseminates discoveries to veterinarians and others in the advancement of animal, human, and environmental health. UTIA's organizational chart is shown on page 3.

UTIA Mission Statement

The University of Tennessee, Institute of Agriculture through its colleges, AgResearch and Education Centers, and county Extension offices serves the people of Tennessee and beyond through the discovery, communication and application of knowledge. The Institute is committed to providing undergraduate, graduate and professional education programs in a diverse learning environment that prepares students to be leaders in a global society. The Institute's delivery of education, discovery, and outreach contributes to the economic, social and environmental well-being of all Tennesseans and focuses on contemporary problems faced by Tennessee, the nation and the world

UT Institute of Agriculture



Institute of Agriculture, Tennessee Agricultural Experiment Station

The Tennessee Agricultural Experiment Station (UT AgResearch) represents the research and discovery arm of the University of Tennessee, Institute of Agriculture. UT AgResearch, in collaboration with the academic and classroom instruction programs of the College of Agricultural Sciences and Natural Resources, the extension and outreach programs of the Tennessee Cooperative Extension Service and the veterinary instruction and clinical activities of the College of Veterinary Medicine, delivers the land-grant mission to citizens of Tennessee and the world.

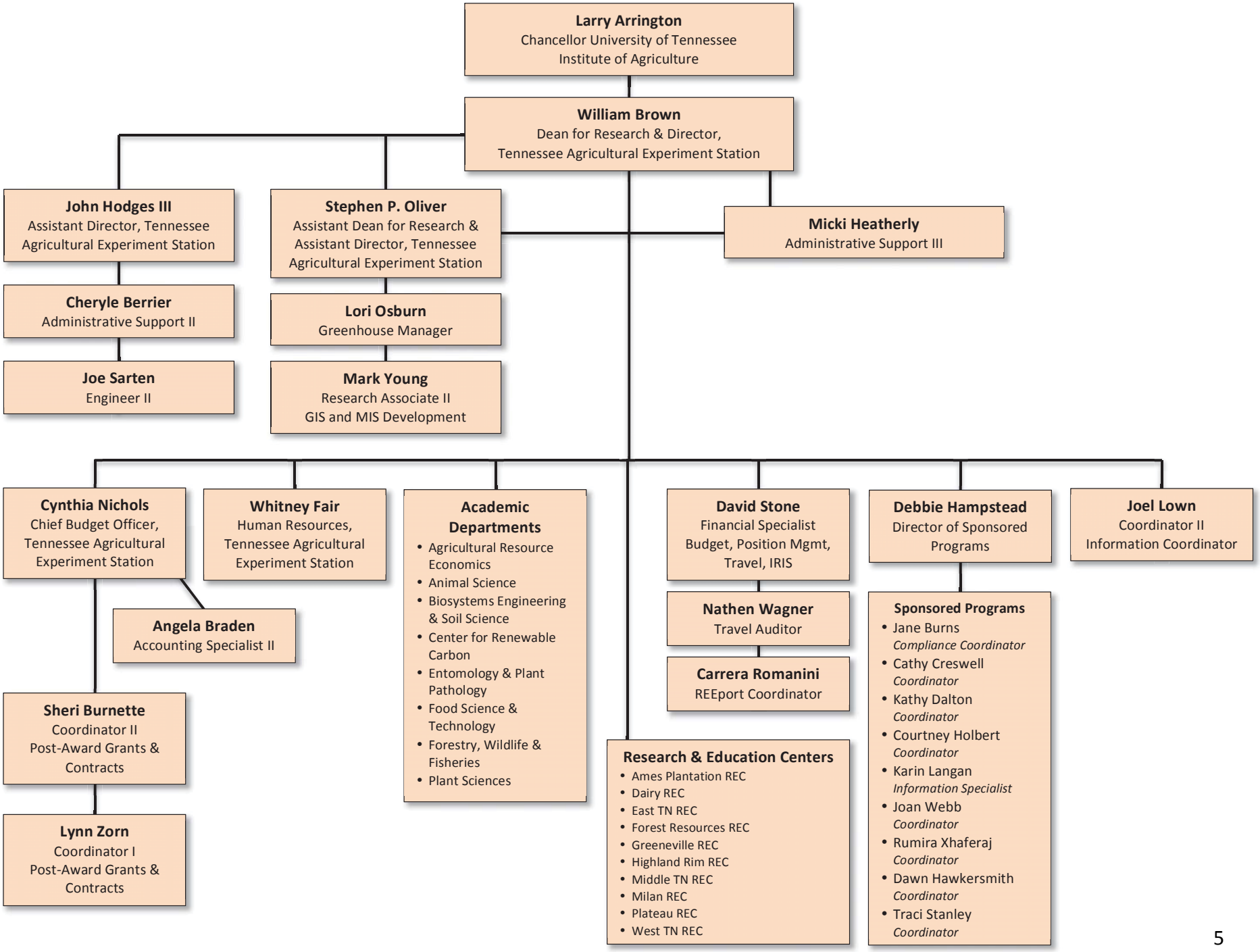
UT AgResearch focuses the combined expertise of approximately 155 faculty and over 450 specialized staff to help the state's agricultural, forest, food processing and wholesale nursery industries improve the profitability of their businesses. The results of applied AgResearch improve the quality of life for all Tennesseans by providing plentiful and affordable food and fiber products as well as conserve soil, water, air and wildlife for the benefit of our society. Faculty conduct world-class research programs in a variety of areas including crop breeding and genetics, soil conservation, agricultural policy, no-till crop production, food biopolymer chemistry, plant pathogens, cattle reproduction, wood product development, wildlife health, and many other areas. Most recently, UT AgResearch has established a strong position in the bio-economy, with the development of biobased fuels, chemicals and materials.

UT AgResearch consists of seven academic departments and ten AgResearch and Education Centers (REC) located across the varying geographic and climate zones of Tennessee. Academic departments include Agricultural and Resource Economics, Animal Science, Biosystems Engineering and Soil Science, Entomology and Plant Pathology, Food Science and Technology, Forestry, Wildlife and Fisheries and Plants Sciences. AgResearch and Education Centers in west Tennessee include the Milan REC in Milan, the West Tennessee REC in Jackson, and the Ames Plantation in Grand Junction. Centers in middle Tennessee include Highland Rim REC in Springfield, Middle TN REC in Spring Hill, Dairy REC in Lewisburg and Plateau REC in Crossville. Centers in east Tennessee include East TN REC in Knoxville, Greeneville REC in Greeneville, and Forest Resources REC headquartered in Oak Ridge.

UT AgResearch Mission Statement

UT AgResearch advances science in agriculture and food systems, natural resource management, family and community sciences through the discovery of new knowledge, the innovation of these discoveries into new products and processes and the application of these innovations to enhance the lives of citizens of Tennessee and the world. We accomplish these objectives by focusing on three key outcome indicators from both a faculty and administrative perspective:

- We achieve sustained, superior short and long term scientific research performance.
- We engage and maintain a satisfied and loyal clientele.
- We attain a culture of highly engaged and loyal faculty, staff, and students with a passion for high performance.


Larry Arrington
Chancellor University of Tennessee
Institute of Agriculture
William Brown
Dean for Research & Director,
Tennessee Agricultural Experiment Station
John Hodges III
Assistant Director, Tennessee
Agricultural Experiment Station
Cheryle Berrier
Administrative Support II
Joe Sarten
Engineer II
Stephen P. Oliver
Assistant Dean for Research &
Assistant Director, Tennessee
Agricultural Experiment Station
Lori Osburn
Greenhouse Manager
Mark Young
Research Associate II
GIS and MIS Development
Micki Heatherly
Administrative Support III
Cynthia Nichols
Chief Budget Officer,
Tennessee Agricultural
Experiment Station
Angela Braden
Accounting Specialist II
Sheri Burnette
Coordinator II
Post-Award Grants &
Contracts
Lynn Zorn
Coordinator I
Post-Award Grants &
Contracts
Whitney Fair
Human Resources,
Tennessee Agricultural
Experiment Station
Academic Departments
Agricultural Resource Economics
Animal Science
Biosystems Engineering & Soil Science
Center for Renewable Carbon
Entomology & Plant Pathology
Food Science & Technology
Forestry, Wildlife & Fisheries
Plant Sciences
Research & Education Centers
Ames Plantation REC
Dairy REC
East TN REC
Forest Resources REC
Greeneville REC
Highland Rim REC
Middle TN REC
Milan REC
Plateau REC
West TN REC
David Stone
Financial Specialist
Budget, Position Mgmt,
Travel, IRIS
Nathen Wagner
Travel Auditor
Carrera Romanini
REEport Coordinator
Debbie Hampstead
Director of Sponsored
Programs
Sponsored Programs
Jane Burns
Compliance Coordinator
Cathy Creswell
Coordinator
Kathy Dalton
Coordinator
Courtney Holbert
Coordinator
Karin Langan
Information Specialist
Joan Webb
Coordinator
Rumira Xhaferaj
Coordinator
Dawn Hawkersmith
Coordinator
Traci Stanley
Coordinator
Joel Lown
Coordinator II
Information Coordinator

UT AgResearch Office Staff

AgResearch Dean's Office								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Cheryle Berrier		1.00				Administrator to REC Director	Administrative Specialist II	27
Angela Braden		.83				Accounting & Financial Support	Accounting Specialist III	20
William Brown		1.00				Dean of AgResearch	Dean	5
Sheri Burnette		.55	.30	.15		Post-Award Accountant	Coordinator II	25
Jane Burns		1.00				Assistant Director and Compliance Officer	Assistant Director	4
Cathy Creswell		.61	.25	.14	61%	Grants Coordinator	Coordinator III	13
Kathy Dalton		.61	.25	.14	61%	Grants Coordinator	Coordinator III	27
Whitney Fair		1.00				Human Resources Coordinator	Coordinator I	< 1
Dawn Hawkersmith		.86		.14	86%	Grants Coordinator	Coordinator II	1
Micki Heatherly		1.00				Administrator to the Deans	Administrative Specialist III	26
John Hodges		1.00				REC Director	Assistant Director	43
Courtney Holbert		.62	.24	.14	62%	Grants Coordinator	Coordinator II	2
Karin Langan		1.00				Information Specialist	Information Specialist I	1
Joel Lown		1.00				Information Technology	Coordinator III	22
Cynthia Nichols		1.00				Budget Director	Budget Director	12
Lori Osburn		1.00				Greenhouse Manager	Manager	19
Stephen Oliver		1.00				Assistant Dean of AgResearch	Assistant Dean	29
Carrera Romanini		1.00				Human Resources & REEport	Accounting Specialist II	5

AgResearch Dean's Office								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Joe Sarten		1.00				Engineering Facilities Design	Engineer II	28
Traci Stanley		.61	.25	.14	61%	Grants Coordinator	Coordinator II	< 1
David Stone		1.00				Financial & Human Resources	Financial Specialist II	17
Nathen Wagner		1.00				Travel Auditing & Post-Award Financial Monitoring	Accounting Specialist II	1
Joan Webb		.62	.24	.14	62%	Grants Coordinator	Coordinator II	3
Rumira Xhaferaj		.61	.25	.14	61%	Contract Specialist	Coordinator III	2
Lynn Zorn		1.00			100%	Post-Award Accountant	Coordinator I	7
Total		21.92	1.78	1.13				
"Soft Funds" represent funding from the AgResearch Deans office share of indirect cost returns								

Dr. William F. Brown

Dr. Bill Brown joined the University of Tennessee, Institute of Agriculture in June of 2008 as Dean for Research and Director of the Tennessee Agricultural Experiment Station (AgResearch). An animal scientist (ruminant nutrition) by training, he obtained his BS degree from the University of Florida, MS degree from the University of Tennessee and PhD degree from the University of Nebraska. He served on the faculty for approximately 15 years at the University of Florida in a research and extension role at the Range Cattle Research and Education Center in Ona, FL. Following approximately 10 years of service as Assistant Dean for Research and Assistant Director of the Florida Agricultural Experiment Station, he moved to his current role. He is responsible for overseeing the programmatic and fiscal activities of UTIA research occurring across approximately 155 tenure and non-tenure track faculty in seven academic departments and ten AgResearch and Education Centers across Tennessee.

Dr. Stephen P. Oliver

Dr. Oliver is responsible to the Dean for Research and Director of the Tennessee Agricultural Experiment Station. He assists and directs the overall administration of the Agricultural Experiment Station, including planning, resource management, program evaluation, program coordination, budget development, prioritizing, and public interaction. He provides leadership and works cooperatively with UT administrators, department heads, center directors, faculty, and external partners to develop,

enhance, evaluate, and administer statewide, regional and national research programs that address constituent and stakeholder needs in the context of the land-grant mission. Special emphasis is placed on identifying and analyzing new and emerging areas of research at the federal, state and industry level in order to support and direct innovative and interdisciplinary research activities that meet programmatic goals. Dr. Oliver nurtures productive internal collaborations to strengthen program effectiveness including the development of multi-disciplinary teams, expansion of existing working relationships, and reports on the impacts engendered by these activities.

Dr. John Hodges, III

John Hodges III moved to the position of Assistant Director of the Tennessee Agricultural Experiment Station (AgResearch) in September of 2009. He received the BS, MS, and Ph.D. degrees from the University of Tennessee while working at the East Tennessee Research and Education Center. He served as Center Director of the East Tennessee Research and Education Center from 1975 until he moved to his current position. As Assistant Director, he assists the Dean and Director with the overall administration, operation and management of AgResearch. His primary responsibilities focus on AgResearch and Education Center operations including land/facilities utilization, remodeling and new facility construction, risk management and liability, coordination and facilitation of resources and enhancement of public interaction through field day and special event planning and execution throughout Tennessee.

Cheryle Berrier

Cheryle Berrier (Administrative Specialist II) has been with AgResearch since 2007. She provides administrative support to Dr. John Hodges. Her duties are related to field days, special events, and construction projects Dr. Hodges is involved in. She also handles the departmental Facilities Inventory and serves as backup for Travel Reimbursement.

Angela Braden

Angela Braden (Accounting Specialist III) has provided support to the Budget Director since 2001. She provides accounting and financial support for AgResearch Deans Office, 7 departments and 10 AgResearch and Education Centers. Position interprets fiscal policy and procedures and makes judgments while recommending solutions to the departments and RECs. Financial duties evolve around IRIS and include invoice processing, deposits, procurement cards, overseeing AgResearch inventory, and her newest duty includes processing accounts payable contracts including leases.

Whitney Fair

Whitney Fair (Coordinator I) serves as a human resources generalist for departments and centers reporting to the AgResearch Dean's Office. Whitney oversees and manages search and employment operations, develops and leads diversity initiatives, oversees and assures compliance in hiring and non-resident alien documentation, and provides unit administrators with guidance in the areas of human resource management, employee relations, and staff professional development. Whitney is the liaison with UT central offices including General Counsel regarding legal matters, Main Payroll, System HR, and others.

Micki Heatherly

Ms. Micki Heatherly provides administrative services to both the Dean and Assistant Dean of the Tennessee Agricultural Experiment Station (AgResearch). She serves as the liaison between the departments, the AgResearch and Education Centers, other UT administrators, external AgResearch clients/stakeholders, private businesses, and other higher education institutions. Micki coordinates faculty matters such as the promotion and tenure process, intellectual property disclosures from research, and annual performance evaluations. Micki coordinates and organizes national and regional seminars and conferences hosted by AgResearch at the direction of the Dean. Finally, she oversees and performs non-accounting administrative support functions for the AgResearch Dean's Office and UT Institute of Agriculture (UTIA) Sponsored Programs Office including travel expenses and time/leave reporting for both offices.

Joel Lown

Mr. Joel Lown assists with information flow within AgResearch and to others. He helps generate dynamic public-facing and internal websites for AgResearch, our regional AgResearch and Education Centers, and other UTIA entities. This work is driven by an extensive database containing faculty and staff details and accomplishments, current events, and news items. This information is also used for federal, departmental, and faculty annual reporting, and to track and improve a number of internal processes, such as the handling of workplans, proposal development, and field day provisioning.

Cyndie Nichols

Ms. Cyndie Nichols (Budget Director) is responsible for the comprehensive administration and management of AgResearch's multi-million dollar budget, including administrative operations, seven academic departments and ten AgResearch and Education Centers. She is part of the senior management team within the AgResearch Deans' Office with responsibility for ensuring that all funds are allocated and expended in support of the mission of AgResearch and in alignment with the strategic goals and initiatives set by the Dean. Cyndie is responsible for strategic planning of the budget, budget

development and allocation, budget reporting, monitoring, revisions and projections. This includes responsibility for local, state and federal funding, including policies, procedures and guidelines. Finally, she is responsible for oversight and management of sponsored programs accounting within AgResearch.

Lori Osburn

Ms. Lori Osburn (UTIA Greenhouse Manager) has been with AgResearch since 1997. She provides oversight for the three new glasshouses on the Agriculture Campus by maintaining, monitoring and troubleshooting the greenhouses and their control systems for proper functioning. She also archives the climate data, coordinates repair work and assists the UTIA Greenhouse Committee with monitoring and assessing space and implementing policies and procedures established by the committee. Providing comprehensive greenhouse support to faculty, staff and graduate student users, she offers users advice and assistance regarding project needs and plant maintenance procedures, including plant nutrition, irrigation systems and pest management.

Carrera Romanini

Ms. Carrera Romanini joined the University of Tennessee in 2008 and began working with the Dean's office in May of 2013. She oversees the submission of research information into the United States Department of Agriculture's REEport online database. She also assists in coordination of resource/payroll records processing for student and term employees. In conjunction with other administrative support staff, she provides general administrative support to the AgResearch Dean's Office.

Joe Sarten

Mr. Joe Sarten, PE (Engineer II) has worked for UT AgResearch since 1991. He is responsible for providing facilities planning, facilities design, specifications, bid reviews, and construction supervision for various projects on the University of Tennessee, AgResearch Centers located throughout the state. These duties involve the practice of engineering in agricultural, civil, mechanical, electrical, and other related fields. He also provides troubleshooting and problem solving related to structural, mechanical, and electrical systems.

David Stone

Mr. David Stone has been with AgResearch since 2002 and with the University of Tennessee since 1996. He manages the multimillion salary budget and has approval authority, in conjunction with AgResearch's chief business officer, over financial activity and human resource actions. He maintains the integrity of salary budget and ensures harmony between its financial elements and personnel/position structures. Additionally, Mr. Stone supervises the travel reimbursement staff, provides both financial and HR reporting to administrators, serves as helpdesk to end users regarding UT's enterprise software systems, and provides guidance to unit level employees in policy and procedure compliance.

Nathen Wagner

Mr. Nathen Wagner has been part of the University of Tennessee since 2012 and joined the Dean's office in April of 2013. He reviews travel expense reports for compliance with all UT Travel Policies and Procedures and approves reimbursement of these expenses to the travelers. He also conducts post-award financial monitoring and provides general administrative support to the AgResearch Dean's Office.

Office of Sponsored Programs Office Staff

Pre-Award Staff

Director, Debbie Hampstead

Debbie Hampstead, the Director of the UTIA Office of Sponsored Programs, autonomously oversees all aspects of proposal administration, cost share commitment, and contract and subcontract negotiation with external agencies. In addition, this position develops policies and procedures to ensure compliance with all federal administrative requirements and costing principles, state regulations, grantor restrictions, and university fiscal policies. The position directs and supervises the Office of Sponsored Programs' staff and assists the Chancellor of the Institute of Agriculture, Dean of AgResearch, Dean of Extension, Dean of the College of Veterinary Medicine, and Dean of the College of Agricultural Sciences and Natural Resources with issues related to externally-sponsored research activities and contractual obligations.

Jane Burns

Jane Burns (Assistant Director and Compliance Officer) assists the Director of the Office of Sponsored Programs (OSP), including review, approval, and submission of proposals; contract negotiation, material transfer agreements, and confidentiality agreements; participation in the development of policies and procedures to ensure compliance with all federal administrative requirements and costing principles, state regulations, grantor restrictions, and university fiscal policies; and supervision/mentoring of OSP staff. As compliance officer, she formulates and implements compliance programs for UTIA in accordance with federal regulations and university policies, in a manner that facilitates faculty and staff, coordinates with other university offices, and concentrates on high risk issues.

Cathy Creswell

Ms. Cathy Creswell has been with AgResearch since 2009 and with the University of Tennessee since 2000. Her primary role is to assist principal investigators (faculty) across the four UTIA entities by constructing proposal packages, generating budgetary figures, submitting proposals, identify funding opportunities, documenting policies and procedures, mentoring junior coordinators, administering contracts, and creating and maintaining a database of information to ease and improve proposal development. She reports directly to the Sponsored Programs Director. By assuming responsibilities for many of the technical aspects of the proposal package and allowing principal investigators more time to focus on the science, she enhances quantity and quality of outgoing proposals and thereby increases the strength and size of the Institute of Agriculture's research and public service enterprise. Serving as the principal investigators' primary point-of-contact for all pre-award functions, she takes a leadership role in identifying relevant external funding opportunities, communicating these opportunities to faculty/program leaders, and assisting them in pursuing these funds through proposal development and submission to the agency. By facilitating the acquisition of sponsored program funds, she enhances the Institute's ability to accomplish its mission.

Kathy Dalton

Ms. Kathy Dalton has been with AgResearch since 2009 and with the University of Tennessee since 1986. Her primary role is to assist principal investigators (faculty) across the four UTIA entities by constructing proposal packages, generating budgetary figures, submitting proposals, identify funding opportunities, documenting policies and procedures, mentoring junior coordinators, administering contracts, and creating and maintaining a database of information to ease and improve proposal development. She reports directly to the Sponsored Programs Director. By assuming responsibilities for many of the technical aspects of the proposal package and allowing principal investigators more time to focus on the science, she enhances quantity and quality of outgoing proposals and thereby increases the strength and size of the Institute of Agriculture's research and public service enterprise. Serving as the principal investigators' primary point-of-contact for all pre-award functions, she takes a leadership role in identifying relevant external funding opportunities, communicating these opportunities to faculty/program leaders, and assisting them in pursuing these funds through proposal development and submission to the agency. By facilitating the acquisition of sponsored program funds, she enhances the Institute's ability to accomplish its mission.

Dawn Hawkersmith

Ms. Dawn Hawkersmith has been with AgResearch since May 2013 and with the University of Tennessee since July 2012, beginning in Extension. Dawn serves as a Coordinator in the Office of Sponsored Programs whereby she provides technical support and assistance to departmental faculty including proposal preparation, budget development, assembly of proposal packages, and submissions via agency specific electronic means or other specified guidelines. She also works directly with faculty

and in coordination with the Sponsored Programs team assuring timely routing of proposals to UT offices and external funding agencies. In addition, Dawn works to ensure that faculty, departments, and units receive appropriate credit and funding for proposals submitted, including multi-disciplinary, multi-institutional and multi-state proposals. Finally, Dawn also assists in identification of funding opportunities consistent with research, education, and Extension missions.

Courtney Holbert

Ms. Courtney Holbert serves as a Grants Coordinator in the Office of Sponsored Programs. She provides pre-award services to the UTIA faculty in the preparation of grant proposal packages and budget development. She works directly with faculty and in coordination with the sponsored programs team to submit proposals to external funding agencies and to UT offices. She also ensures that faculty and their departments, as well as off-campus collaborators, receive credit and funding for successful proposals.

Karin Langan

Ms. Karin Langan (Information Specialist I) plans and produces communication-related materials for the various faculty, scientists, and research programs of the UTIA as a whole. She provides a full range of design resources to the UTIA Sponsored Programs Office and the PI's that submit grant/contract proposals to the office, including original design, creation, and updating of media materials. She identifies funding opportunities and designs materials promoting the services that the Office of Sponsored Programs offer. In addition, this position continues to support grant proposals and the process of submitting these proposals to funding agencies.

Traci Stanley

Ms. Traci Stanley joined UTIA in June 2013 as Grants Coordinator in the Office of Sponsored Programs. She provides pre-award services to the UTIA faculty in the preparation of grant proposal packages and budget development. She works directly with faculty and in coordination with the sponsored programs team to submit proposals to external funding agencies and to UT offices. She also ensures that faculty and their departments, as well as off-campus collaborators, receive credit and funding for successful proposals.

Joan Webb

Ms. Joan Webb serves in the Office of Sponsored Programs as a Grants Coordinator. She provides pre-award services to the UTIA faculty in the preparation of grant proposal packages and budget development. She works directly with faculty and in coordination with the sponsored programs team to submit proposals to external funding agencies and to UT offices. She also ensures that faculty and their departments, as well as off-campus collaborators, receive credit and funding for successful proposals.

Rumira Xhaferaj

Rumira Xhaferaj, Contract Specialist, joined UTIA Office of Sponsored Programs in April 2011. Under the supervision of the Director of the Office of Sponsored Programs, acts as a UTIA contract administrator and independent negotiator for all federal, state and private agency sponsored contracts/agreements. Reviews and negotiates contracts and other research related agreements (material transfer agreements, confidentiality agreements, memorandums of understanding, etc.) with external entities on behalf of the University. Responsibilities include; solving complex issues; reading and analyzing legal agreements; independently conducting contract negotiations with external agency; recognizing unacceptable contract language; marking-up documents to comply with University policies and laws, and maintaining up to date electronic files. Proposals Development: Provides pre-award services to the UTIA faculty in the preparation of grant proposal packages and budget development, and awards set up. Works directly with faculty and in coordination with the Sponsored Programs team to submit proposals to external funding agencies and to UT offices. Also ensures that faculty and their departments, as well as off-campus collaborators, receive credit and funding for successful proposals.

Post-Award Staff

Sheri Burnette

Sheri Burnette (Coordinator II) manages external financial reporting for AgResearch, Extension and College of Veterinary Medicine for all research, teaching and outreach sponsored projects. She also creates new WBS elements for new projects and follows activity until close. This requires extensive interaction with the departments and agencies during the life of the project. These responsibilities require knowledge of federal, state, local and private regulations as they relate to UT policy while reporting all activity, meeting reporting deadlines and to close on a timely manner. Also, along with the mailing of payment requests, funds are requested via the ASAP payment system for all University-wide funds for USDA NIFA and several Institute specific projects which include USGS, USDI, NPS and EPA.

Lynn Zorn

Lynn Zorn (Post-Award Accountant) joined UT in 2006 in The Office of Institutional Research and Assessment. After coming to UT, Lynn also served as business manager for the Department of Plant Sciences. Currently as the Post-award accountant for Ag Research, Lynn performs post-award financial monitoring and fiscal compliance of externally funded sponsored programs. She administers other financial programs within the Dean's Office for Ag Research such as the Faculty Incentive Plan and the F&A Distribution to the Departments.

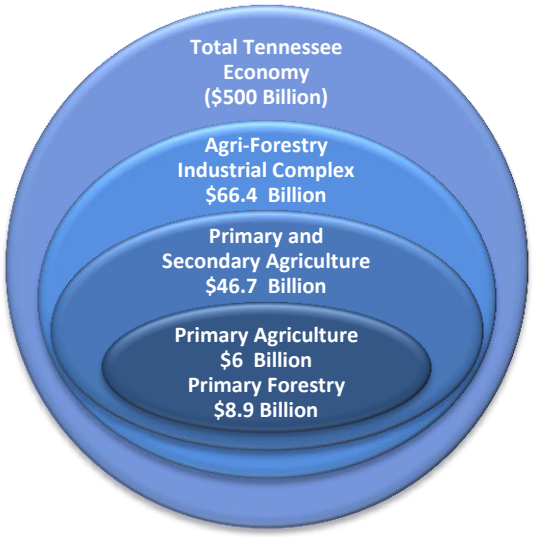
Academic Departments

Department of Agricultural and Resource Economics

Dr. Delton Gerloff, Department Head

The Department of Agricultural and Resource Economics has strength in its diversity of research topics. These topics provide significant research breakthroughs and support for both undergraduate and graduate teaching. Extension education offers applied research to answer farm level educational needs. The department offers two undergraduate majors: Food and Agricultural Business; and Natural Resources and Environmental Economics. The department also offers an M.S. degree and a joint M.S./MBA degree in coordination with the College of Business Administration. The Department offers students the opportunity to pursue a Ph.D. in Natural Resources with a concentration in Natural Resource Economics. Currently there are approximately 85 undergraduates enrolled in the department, along with 20 M.S. and 4 Ph.D. students.

A biannual report on the contributions agriculture has on Tennessee's economy shows that agriculture receipts are approximately $6 billion and forestry receipts are $8.9 billion. As a result of purchases, wages, salaries, and profit agriculture and forestry account for $66.4 billion in economic activity in the state.



Departmental research emphasis areas include:

- Land Use
- Agricultural Policy
- Environmental and Resource Economics
- Bioenergy
- Agricultural Finance
- Agricultural Marketing
- Production Economics

Some of our specific projects include:

Land Use

Recent research has focused on the economic effectiveness of land use policy and its ecological impacts. NSF funding of $250K was received in 2012 for a project under the Dynamics of Coupled Natural and Human Systems program with an ecologist at UTK and a forest scientist at ORNL. The project examines the influence of the size of protected areas on their ecological and economic effectiveness, and provides the first rigorous test of whether and why protected area acquisition costs show economies of scale with area. The project uses areas created by The Nature Conservancy (TNC) to protect Central and Southern Appalachian forest ecosystems as a case study. Thus, the results of the project will be directly

used by TNC and other conservation groups and agencies to develop economically and ecologically efficient strategies for protected area acquisitions.

Supported by research funded by USDA's AFRI grant program, faculty are analyzing consumer demand for, and producer willingness to supply, beef grown using grazing management practices that reduce greenhouse gas (GHG) emissions associated with beef production. It was found that substantial interest in prescribed grazing exists among livestock producers. Incentive programs could reduce GHG emissions from livestock producers by increasing willingness to adopt or expand prescribed grazing among interested producers. Educational programs to explain the benefits of prescribed grazing could also influence farmer interest in prescribed grazing programs and willingness to participate in such programs. A research group examined impacts of flooding agricultural lands below Pickwick Dam. In this project, it was demonstrated how TVA could avoid damage by flooding more acreage, but for less time. For soybeans, if flood waters in the spring could be removed after only 2 days, instead of 4 days, about $70/acre would be saved.

Agricultural Policy

Departmental research touches a wide variety of agricultural policy issues including: the impact of the global food crisis on vulnerable populations; and, the importance of physical—as opposed to virtual—reserves of storable commodities to moderate extreme market swings that negatively impact the agricultural industry. In 2012 a major study used the POLYSYS simulation model to estimate what the agricultural supply, demand, price and income impacts that a) would have been if a grain reserve program had been in effect during the historical period 1998-2010 and b) would occur if a grain reserve were superimposed on the Congressional Budget Office's and U.S. Department of Agriculture's baseline agricultural policies and projections thru 2021. Reports were written and Journal Articles on this topic and graduate student research are in process. Publications, presentations, and weekly columns further the national and international reputation of the department, UTIA and the University of Tennessee across a broad spectrum of interested groups. Included groups are professional peers, policymakers in the executive and legislative branches of U.S. government, as well as domestic and international agricultural organizations, farmers and other agricultural groups and stakeholders. Written materials are sent to over 300,000 weekly farm magazine subscribers and well over a thousand people see invited presentations each year.

Environmental and Resource Economics

Faculty are completing analyses of consumer willingness to pay for appliances (i) awarded USEPA's Energy Star label or (ii) manufactured by a participant in USEPA's *Climate Leaders* program. Results suggest that respondents were willing to pay an average of $69.22 more for a refrigerator manufactured by a participant in the *Climate Leaders* program. Although the *Climate Leaders* program was discontinued in 2011, these results suggest that a program designed to induce manufacturers to reduce greenhouse gas emissions could serve as the basis for an effective environmental labeling program. A journal article reporting these results is forthcoming in *Environmental Economics & Policy Studies*.

Cattle producers in the Oostanaula Creek watershed were surveyed to determine their willingness to adopt one or more of four different Best Management Practices (BMPs) - stream crossings, rotational grazing, pasture improvement, and cattle water tanks. Best Management Practices contribute to a broader range of efforts to improve the environmental performance of the livestock sector and its impact on water quality. Results (forthcoming in the *Journal of Soil and Water Conservation*) suggest that there was a clear preference for a suite of BMPs that did not include stream crossings, reinforcing anecdotal evidence that the maintenance associated with frequent high flow events may reduce willingness to install stream crossings. Instead, producers were more willing to implement rotational grazing and pasture improvement BMPs, which were associated with cattle health and productivity. The results suggest that educational efforts and incentive programs focusing on these BMPs are more likely to promote adoption and improve water quality than efforts to promote exclusionary fencing.

From an environmental aspect, research was conducted on carbon sequestration of switchgrass. With the long rooting system, it was found that carbon sequestration was occurring after 4 years in some of East Tennessee soils. While no market for the environmental service of carbon storage, this data will be ready when the market is set up by the federal government.

Bioenergy

One bioenergy research project focuses on the identification of key factors impacting the economic and environmental performance of biomass logistics for bioenergy production. The research has been primarily funded by Southeastern Sun Grant Program, U.S. Department of Agriculture, and Southeastern Integrated Biomass Supply System. Applying a mathematical programming model to high resolution geographical data, the location of biorefineries and associated feedstock draw area can be determined through optimizing a single objective (i.e. cost minimization) or multiple objectives (i.e. balancing both cost and GHG emissions). In a case study of Tennessee, it was found that the type of land converted into switchgrass production has an important impact on both plant-gate feedstock cost and GHG emissions of the switchgrass supply chain. Also, a tradeoff relationship was found between cost and GHG emissions for the switchgrass supply chain.

Swichgrass hay from the farmer biofuels initiative located at the Genera Energy's storage site in the Vonore industrial park

Analysis indicates that creating a cellulosic industry in Tennessee could result in significant economic activity. A single facility could generate $900 million in economic activity during construction. Once in operation, annual economic gains are estimated at $400 million and 2500 jobs. The economic impact of seventeen 80 million gallon facilities would be over six billion dollars annually to the state's economy, creating 28,000 jobs. To achieve this impact, however, the feedstock must be delivered efficiently to the biorefinery. For instance, a cost savings of 12 to 18 cents per gallon of ethanol could be realized if

square bales are used. Densification could create additional savings. Working with BaleTech, a reduction in delivered costs of $11 per ton is projected largely as a result of chopping the feedstock in the field and delivering it to bale densification equipment.

Research Productivity Measures for the Department of Agriculture and Resource Economics

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current calendar year	32	27	38	36	33	37
Unique refereed papers 3-year rolling average			32	34	36	35
Unique scientific presentations at professional society meeting, with abstract	16	29	16	38	24	33
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			20	28	26	32
Research grant awards, Current fiscal year	$1,341,719	$1,222,358	$961,113	$545,790	$2,214,335	$561,126
Research grant awards, 3-year rolling average		$1,017,500	$1,175,063	$909,753	$1,240,413	$1,107,084
Research "R-account" expenditures Fiscal year, includes gifts	$907,769	$1,038,857	$1,574,349	$1,611,749	$1,283,035	$1,223,362
Research grant submissions, calendar year	$2,577,592	$3,012,701	$7,588,094	$5,720,494	$3,358,868	$15,198,534
Number of proposals submitted, calendar year	26	31	25	18	34	33

Agricultural and Resource Economics Faculty and Staff

Agricultural & Resource Economics Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Christopher Boyer	.20	.80				Production & Natural Resources	Assistant Professor	1
Seong-Hoon Cho	.12	.88				Natural Resource & Environmental Economics and Policy	Associate Professor	9
Christopher Clark	.25	.75				Environmental & Natural Resource Economics	Associate Professor	11
Daniel De La Torre Ugarte	.10	.90				Commodity and Energy Policy	Professor	21
Burton English	.18	.82				Research in Agribusiness Development	Professor	27
Jason Fewell			1.00			Farm & Financial Management	Assistant Professor	< 1
Delton Gerloff	.33	.16	.51			Farm & Financial Management	Professor and Head	21
Andrew Griffith			1.00			Livestock Marketing	Assistant Professor	1
Kimberly Jensen	.22	.78				Agribusiness Development & Marketing	Professor	27
Dayton Lambert	.10	.90				Rural Economic Development	Associate Professor	7
James Larson	.20	.80				Farm Management	Professor	20
William Park	1.00					Natural Resource Conservation	Professor	33
Daryll Ray	.46	.54				Agricultural & Natural Resource Policy	Professor	22
Roland Roberts	.19	.81				Precision Agriculture	Professor	29
Stephen Smith			1.00			Commodity Marketing	Assistant Professor	< 1
Margarita Velandia		.75	.25			Behavioral Economics	Associate Professor	6
Tun-Hsiang Yu		1.00				Marketing & Logistics	Assistant Professor	4
Total	3.35	9.89	3.76					

Agricultural & Resource Economics Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Chad Hellwinckel		.76			100%	Agriculture Policy	Research Assistant Professor	12
Harwood Schaffer		1.00			100%	Farm Policy	Research Assistant Professor	13
Total		1.76						

Agricultural & Resource Economics Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Rebecca Bowling			1.00		100%	Marketing & Management Systems	Extension Assistant I	< 1
Julie Goldman		1.00				Administrative Assistant	Administrative Support Assistant III	10
Morgan Gray		1.00				Computer Programmer/ Analyst	IT Administrator IV	36
Patricia Hickman		.68	.32			Support to Department Head	Administrative Specialist I	40
Tina Johnson		1.00			100%	Communication Specialist	Extension Assistant I	14
Taeyoung Kim		1.00			100%	Natural Resource Conservation	Post-doctoral Research Associate	< 1
Lixia Lambert		.86			100%	Water Resource Management	Research Scientist I	6
Nicole Leverton		1.00				Accounting Specialist	Accounting Specialist I	2
Tammy McKinley			.100			Tennessee Beef Evaluation	Extension Specialist I	18
Robert Menard		1.00				Agricultural & Forest Products Industry	Research Leader I	14
Chris Rhodes	.19	.62	.19			Business Manager	Business Manager	5

Agricultural & Resource Economics Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Renee Sharp			1.00			Income Tax School registrations	Administrative Support Assistant III	11
Jane Starnes		1.00			100%	Coordinator for Center for Tobacco Grower Research	Research Associate III	4
Melitta Stoutt		1.00				Administrative Assistant	Administrative Support Assistant II	44
Stacy Williams	.60		.40			Administrative Assistant	Administrative Support Assistant III	2
Bradly Wilson		1.00			49%	Computer Programmer/ Network Specialist	IT Analyst III	18
Xia Zhou		1.00				Natural Resource Economics	Research Associate II	2
Total	0.79	12.16	3.01					

Department of Animal Science

Dr. F. Neal Schrick, Department Head

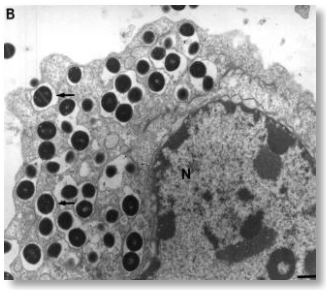
Animal Science is a diverse blend of applied and basic life sciences focused on enhancing the efficiency, profitability and sustainability of the domestic animal industries. Our mission is to provide high quality, relevant education and training for undergraduate (Bachelor's degree) and graduate students (Masters and Doctoral programs) to serve internationally competitive animal agriculture; and develop and transfer new knowledge in the animal commodities that make significant contributions to the economy of Tennessee and the world. UT Animal Science AgResearchers address high-priority issues for producers, consumers, and all Tennessee stakeholders through high-quality, cutting-edge science. Many of our researchers are nationally and internationally known for their work to increase animal production and health; thus, benefiting society by providing affordable, healthy, and high-value food products, and providing for a greater well-being of companion animals and their owners. Research emphasis areas include:

- Animal Health & Well-Being
- Physiological Genomics
- Nutrition
- Reproductive Biology

Animal Health & Well-Being

Maximizing the health and well-being of animals in our food systems is critical for maintaining animal welfare and productivity, as well as providing a safe, high quality and abundant food supply. Recent research has focused on increasing our knowledge and developing intervention based strategies that target disease and limit the impact of environmental and other stressors. Three research areas predominate within the department. One focuses on understanding the interactions of biological and behavioral responses with stress and management-based systems in order to derive management strategies that are more effective in maintaining animal welfare and productivity. A second focuses on mastitis, a complex multifactor disease that is one of the most costly to the dairy industry. A third centers on *Campylobacter jejuni*, a common inhabitant of the chicken digestive tract and a common cause of foodborne illness resulting from the consumption of undercooked chickens or food contaminated by poultry products.

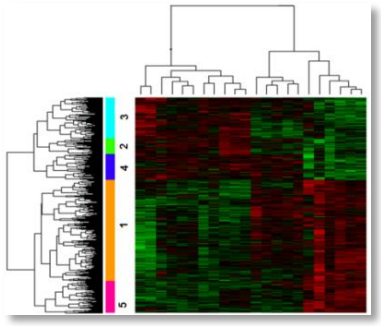
Bedding and facility design studies at the ETREC Little River Environmental Research Unit dairy



Mammary cell invaded by mastitis pathogens

Physiological Genomics

The cellular pathways that underlie important production traits such as feed efficiency and growth represent targets that can be manipulated to improve performance of production animals. Comprehensive 'omics tools coupled with traditional systems physiology and biochemistry allow a discovery-based approach to identify new targets that can be regulated through nutrition, management or genetic strategies to improve performance and profitability. Current efforts are focused on uncovering mechanisms that drive excess fat deposition in commercial broiler chickens. To date these studies have identified metabolic pathways that appear to contribute to fatness in chickens and can be regulated by feeding strategies to increase leanness and thus reduce feed costs. This research also highlights the value of broiler chickens as a new dual purpose model that may be used to identify mechanisms of childhood obesity in humans.



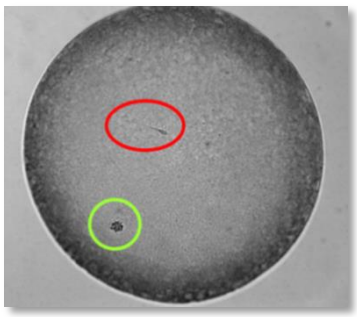
Clusters of genes associated with leanness in broiler chicken adipose tissue

Nutrition

High grain and feedstuff prices add to the increasing importance of expanded and more efficient nutrient utilization for enhanced production efficiency in agriculturally important animals. Success in doing so will reduce on-farm costs and waste benefiting both industry and the environment. While research efforts are multifaceted, efforts aimed at gaining an understanding of the role of nutrients, hormones and regulatory mechanisms of key metabolic pathways to increase nutrient utilization in growing and lactating animals are a priority.

Fistulated cows to be used in digestion studies

Reproductive Biology



Bovine oocyte soon after fertilization by a spermatozoon

Increased selection for traits of economic importance in farm animals (e.g., milk production) has been coincident with significant reductions in fertility. Infertility is not without consequence as the efficiency and economic livelihood of animal production systems are compromised. Research interests are broad and range from applied studies for improving estrous synchronization and timed insemination, to unraveling the mystery of fetal-maternal chemical communication, to identifying the mechanisms of and alleviating environmental and endogenous stressors that negatively impact embryonic survival.

Research Productivity Measures for the Department of Animal Science

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current calendar year	33	25	33	24	44	30
Unique refereed papers 3-year rolling average			30	27	34	33
Unique scientific presentations at professional society meeting, with abstract	53	67	66	68	70	50
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			62	67	68	63
Research grant awards, Current fiscal year, no gifts	$2,115,182	$1,730,194	$1,846,613	$1,368,978	$941,255	$2,444,122
Research grant awards, 3-year rolling average			$1,897,330	$1,648,595	$1,385,615	$1,584,785
Research "R-account" expenditures Fiscal year, includes gifts	$1,164,584	$1,172,932	$1,442,663	$1,596,109	$1,558,214	$1,461,747
Research grant submissions	$5,713,815	$5,422,542	$14,904,965	$18,265,628	$18,408,824	$13,350,792
Number of proposals submitted	22	24	31	31	33	30

Animal Science Faculty and Staff

Animal Science								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Janice Edwards	.14	.86				Reproductive Physiology and Embryology	Professor	15
James Godkin	.13	.87				Reproductive Physiology	Professor	30
Henry Kattesh	.51	.49				Animal Health and Well-Being	Professor	34
David Kirkpatrick			1.00			Beef Extension	Professor	46
Cheryl Kojima	.42	.58				Animal Genetics and Genomics	Associate Professor	9
Peter Krawczel		.70	.30			Dairy Well-being & Extension	Assistant Professor	2
Jun Lin	.10	.90				Infectious Diseases	Associate Professor	9
Bridgett McIntosh			1.00			Equine Extension	Assistant Professor	6
Travis Mulliniks		1.00				Beef Nutrition	Assistant Professor	1
James Neel			1.00			Beef Extension	Professor	44
Gina Pighetti	.26	.74				Immunology and Mammary Gland biology	Associate Professor	12
Justin Rhinehart			1.00			Beef Extension	Assistant Professor	3
Arnold Saxton	.19	.81				Statistics and Statistical Genomics	Professor	21
F. Neal Schrick	.33	.34	.33			Reproductive Physiology and Endocrinology	Professor and Head	19
Michael Smith	.49	.51				Poultry Nutrition and Scholarship Coordinator	Professor	25
Brynn Voy	.09	.91				Nutritional Physiology	Associate Professor	11
Total	2.66	8.71	4.63					

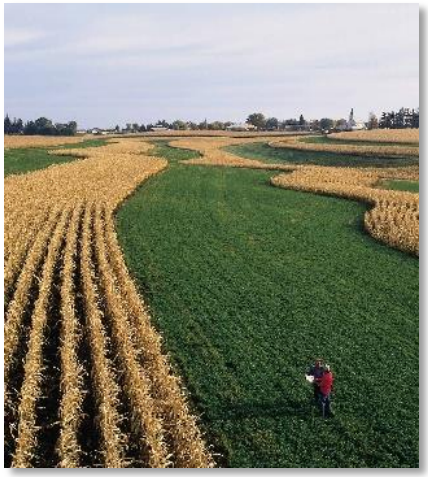
Animal Science								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Raul Almeida		1.00			100%	Mastitis Research , Director Tennessee Quality Milk Laboratory	Research Associate Professor	16
Claudia Baney			1.00			4-H Livestock Specialist	Extension Specialist I	1
Jeffrey Mitchell	.27		.73		47%	Dairy Herd Improvement	Extension Assistant II	28
Alese Parks	1.00					Equine Management	Lecturer	3
Maria Prado	.55					Mastitis Research	Assistant Professor in Practice	8
Louisa Rispoli		1.00			100%	Reproductive Physiology and Endocrinology	Research Assistant Professor	8
David Roper	1.00					Farm Animal Management	Lecturer	6
Jessica Shanks	1.00					Farm Animal Management	Lecturer	2
Total	3.15	2.00	1.73					

Animal Science								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Suchita Das		1.00			100%		Research Associate I	18
Barbara Gillespie		1.00					Research Associate II	29
Susan Headrick		1.00					Research Associate I	16
George Jarboe		1.00					Coordinator II	45

Animal Science								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Shelley Johnson	.35	.65				Human Resources	Administrative Specialist II	1
Oudessa Kerro Dego		1.00			100%		Post-doctoral Research Associate	5
Evelyn King			1.00			Extension Administrative Assistant	Administrative Specialist II	23
Heather Means	.31	.36	.33			Business Manager	Business Manager	20
Linda Miller		1.00					Research Associate II	33
Denice Milligan	1.00					Student Records	Administrative Support Assistant III	< 1
Rebecca Payton		1.00					Research Associate I	4
Avis Smith		1.00				Bookkeeper	Accounting Specialist I	30
Jason Spence		1.00			100%		Research Coordinator I	1
Renee Thomas			.90				Administrative Support Assistant II	34
Leszek Wojakiewicz		1.00					Research Associate I	3
Ximin Zeng		1.00			100%		Post-doctoral Research Associate	6
Total	1.66	12.01	2.23					

Department of Biosystems Engineering and Soil Science

Dr. Eric Drumm, Department Head



Row Crop research

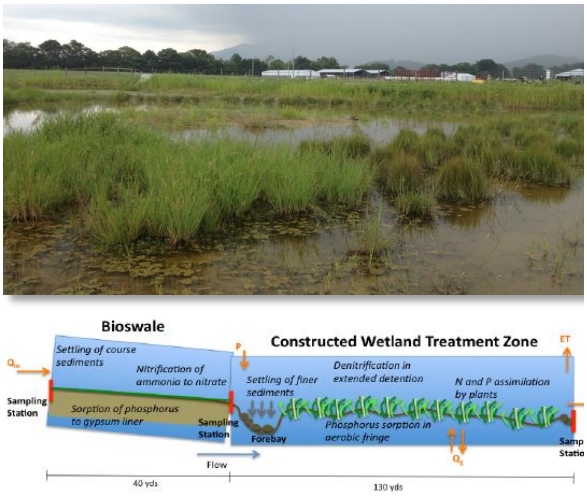
The Department of Biosystems Engineering and Soil Science is comprised of researchers practicing in the two diverse areas of Biosystems Engineering (BsE) and Environmental and Soil Science (ESS). Our teaching faculty offers two undergraduate concentrations in BsE, three concentrations in ESS, as well as Masters and doctorial programs in each. In addition, three Biosystems Engineering Technology (BsET) concentrations in Agricultural Systems, Construction Science, Geodetics/Surveying, and Off-Road Vehicles are offered, and a MS in BsET. Total enrollment stands at about 200 undergraduates and 40 graduates. Our Extension faculty support outreach education programs in the areas including nutrient and waste management, precision agriculture, soil and water conservation, soil fertility, irrigation, alternative energy/conservation and ecological engineering, as well as youth programming in support of STEM education in the areas of energy and the environment.

Biosystems Engineering

The faculty of Biosystems Engineering (BsE) represents the core competencies of Biosystems Engineering including: bioprocessing, instrumentation, hydrology, and machinery systems, and can readily work within larger integrated systems comprising multiple engineering elements.

Biosystems Engineering Research areas:

- Biological process engineering, and value-added bioprocess/ chemical/ thermal engineering;
- Improving agricultural production systems using engineering-based precision agriculture technologies, row crop sustainability management strategies, and air quality assessment;
- Power, machinery, and equipment systems engineering for improved agricultural production and processes, renewable energy systems, and reduced environmental impact;
- Disaster preparedness and disability-enabling engineering;
- Sensor and instrumentation development for physical and biological systems including: precision agriculture,



Constructed Wetlands

environmental/ecological impact, and water quality;

- Soil and water engineering including: water resource management and irrigation, soil erosion, stormwater management, and water quality;
- Wastewater and animal waste management through improved engineered systems and nutrient cycling.

Environmental and Soil Science

Environmental Science emphasizes human impacts on the long-term use and productivity of land and water resources, and the tools used in the management of these resources. Primary research areas in Soil Science focus on the formation, biology, chemistry, and physics of soils.

Environmental and Soil Science Research areas:

- Environmental Microbiology, Microbial ecology of soil, sediment and aquatic systems, Biodegradation and biotransformation of contaminants, Role of microbes in nutrient and biogeochemical cycling
- Soil Science, Carbon Cycling, Nutrient Management, Tillage and Soil Carbon Sequestration, Environmental soil physics Sustainable Conservation Agricultural Production Systems for Smallholder Farmers in South Africa
- Soil chemistry and mineralogy, the fate and behavior of plant nutrients, trace elements and trace organic compounds in the soil environment.
- Environmental soil physics, soil and water quality
- Applied Climatology and Climate Change Climatic effects on agriculture and the natural environment, applications of geographic information systems and remote sensing
- Soil microbiology & biochemistry Biodegradation; Bioavailability of nutrients and contaminants; Ecology of soil bacteriophage
- Biogeochemistry, Coupled carbon and nitrogen cycles, Carbon sequestration, Soil ecology, Drought biogeochemistry in grasslands, Soil carbon stability in Arctic ecosystems
- No-till and precision farming technologies for improved agronomic research to enhance agricultural sustainability
- Fate and Transport of Environmental Contaminants, Fate and Transport of Colloids and Contaminants (viruses, radionuclides, agrochemicals, and heavy metals) in Subsurface Environments, Eco-environmental Sustainability of Biofuels Production, Soil Carbon Management, Application of Nanotechnology in Environmental Clean-up

Nutrient Management

Traditional manure spraying vs. direct injection to reduce nutrient loss

Recent Externally Funded Research in BsE and ESS

- Develop and Evaluate a Pilot Scale Seed Corn Yield System for Documenting In-Field Yield Variability
- Eco-Morphological Stream Design and Assessment Tools
- Mapping Site-specific Stream Bank Erosion on the East Fork Poplar Creek GIS-based stream bank mapping to identify areas of erosion potential on rivers
- Robust and sustainable utilization of biofuel co-products to increase biorefinery efficiency
- Engineered Strategy to Remediate Trace Organic Content in waters at Decentralized Wastewater Treatment Systems
- Sustainable Lactic Acid Production from Crude Glycerin Using Subcritical Water Technology
- Efficient Production of Acrylic Acid from Renewable Crude Glycerin
- Development of a bulk-format system to harvest, handle, store, and deliver high-tonnage low-moisture switchgrass feedstock.
- Development and Evaluation of a Computer-based ROPS Design Program
- On-Farm Production and Utilization of Biofuel Crops and Bedding Byproducts for Wintertime Heating at Broiler Chicken Grow-out Farms
- Development of a Statewide Nitrogen and Phosphorus Pollution Reduction Strategy
- Development and implementation of scientific improvements for RESLE2
- Effective Urban Stream Bank Stability Projects to Decrease Sediments in Oostanaula Creek
- Transfer and Survival of Organisms to Produce From Surface Irrigation Water
- On Demand Generation of Microdroplets
- Ground Penetrating Radar Investigation of Citrus Root Mass
- Controls over C sequestration: physiology vs. physics
- A Multidisciplinary Validation Study of Nonhuman Animal Models for Forensic Decomposition Research
- A new Biologically Based Soil-P Index for Environmentally Sustainable Management of Phosphorus.
- Influence of Land Management Practices on Virus-Host Interactions in Soil
- Developing Sustainable Conservation Agricultural Production Systems for Smallholder Farmers in Southern Africa.
- Assessing the potential consequences of subsurface bioremediation: Fe-oxide bioreductive processes and the propensity for contaminant-colloid

Research Productivity Measures for the Department of Biosystems Engineering and Soil Science

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current calendar year	38	36	44	42	45	49
Unique refereed papers 3-year rolling average			39	41	44	46
Unique scientific presentations at professional society meeting, with abstract	63	50	65	94	94	66
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			59	70	84	85
Research grant awards, Current fiscal year, no gifts	$1,229,025	$785,056	$1,686,928	$1,379,474	$1,278,167	$2,551,404
Research grant awards, 3-year rolling average		$1,029,226	$1,233,670	$1,253,819	$1,448,190	$1,736,348
Research "R-account" expenditures Fiscal year, includes gifts	$1,106,051	$980,820	$1,680,758	$1,541,568	$1,662,377	$2,342,710
Research grant submissions,	$2,723,783	$4,094,230	$7,089,567	$7,412,207	$9,890,098	$6,678,287
Number of proposals submitted	22	32	34	29	36	34

Biosystems Engineering and Soil Science Faculty and Staff

Biosystems Engineering and Soil Science Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Paul Ayers	.27	.73				Machine Systems	Professor	11
John Buchanan		.76	.24		15%	Wastewater Management	Associate Professor	24
Michael Buschermohle			1.00			Precision Agriculture	Professor	23
Jennifer DeBruyn		.75	.25			Environmental Microbiology	Assistant Professor	5
Eric Drumm	.33	.34	.33			Soil Mechanics and Geotechnics	Professor and Head	30
Neal Eash	.41	.59				Soil Science	Associate Professor	11

Biosystems Engineering and Soil Science Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Michael Essington	.18	.82				Soil Chemistry and Mineralogy	Professor	23
Robert Freeland	.21	.79				Biological Instrumentation	Professor	32
William Hart	.76	.24				Power and Machinery	Associate Professor	34
Shawn Hawkins		.29	.71			Animal Waste Management	Associate Professor	8
Douglas Hayes	.28	.72				Biological Process Engineering	Professor	9
Jaehoon Lee	.20	.80				Environmental Soil Physics	Associate Professor	12
Brian Leib			1.00			Irrigation & Water Management	Associate Professor	10
Joanne Logan	.66	.34				Applied Climatology & Climate Change	Associate Professor	26
Andrea Ludwig		.25	.75			Watershed Science and Management	Assistant Professor	3
Mark Radosevich	.26	.74				Soil Microbiology & Biochemistry	Professor	10
Hubert Savoy			1.00			Soil Fertility and Testing	Associate Professor	23
Sean Schaeffer	.19	.81				Biogeochemistry	Assistant Professor	1
Fred Tompkins	.85	.15				Power and Machinery	Distinguished Professor	40
Donald Tyler		1.00				No-till and Precision Farming	Professor	35
John Tyner	.32	.68				Unsaturated Flow and Transport	Associate Professor	12
Forbes Walker			1.00			Wastewater Management	Associate Professor	15

Biosystems Engineering and Soil Science Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
John Wilkerson	.30	.70				Sensor Development	Professor	34
Alvin Womac	.23	.77				Mechanical & Spray Applications	Professor	21
Xiaofei Ye	.28	.72				Value-Added Bioprocess Engineering	Associate Professor	9
Daniel Yoder	.35	.65				Soil and Water Engineering	Professor	22
Total	6.08	13.64	6.28					

Biosystems Engineering and Soil Science Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Lori Duncan			1.00		100%	Row Crop Sustainability	Extension Specialist I	1
Elizabeth Gall			1.00		100%	Youth Education-Solar and Sustainable Energy and the Environment	Extension Specialist I	<1
Baohua Gu					100%	Soil Contaminant Remediation & Removal	UT-ORNL Joint Faculty	<1
Philip Jardine		1.00			100%	Contaminant Fate and Transport, Subsurface Bioremediation	Research Professor	3
Steven McNeany		1.00			100%	Superhydrophobic Materials	Research Professor	< 1
Charlie Parker	1.00				100%	Construction Management	Senior Lecturer	<1
Timothy Prather			1.00		87%	Alternative Energy Systems, Farm Safety, AgrAbility	Extension Specialist I	30

Biosystems Engineering and Soil Science Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Andrew Sherfy	1.00					Soil Physics, Pedology	Lecturer	8
John Simpson		1.00			100%	Superhydrophobic Materials	Research Professor	< 1
Jie Zhuang		1.00			100%	Fate and Transport of Envir. Contaminants	Research Professor	10
Total	2.00	4.00	3.00					

Biosystems Engineering and Soil Science Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Ryan Blair		1.00			100%	Soil Management Research	Research Associate II	3
Kelly Cobaugh		1.00			100%	Soil Microbiology	Research Associate I	2
Zhenyi Du		1.00			100%	Chemicals Production from Glycerol	Post-doctoral Research Associate	< 1
Corina Fernandez		.50				GIS Applications to Envir. Issues	Research Associate II	1
Sharon Foy	.29	.42	.29			Business Manager	Business Manager	13
Sandra Marine	.32	.36	.32			Graduate Students, Travel, & Administrative Support	Administrative Support Assistant III	24
Hannah McClellan		.90	.10		100%	Water Quality Modeling (SWAT)	Research Associate I	2
Galina Melnichenko		.97	.03		21%	Water Quality Lab Manager	Research Associate II	14
Brent Pilon			1.00		100%	Stormwater Engineering	Research Associate II	2
Shoujie Ren		1.00			100%	Chemicals Production from Glycerol	Post-doctoral Research Associate	1

Biosystems Engineering and Soil Science Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Lesia Rucker	.34	.41	.25			Undergraduate Records & Administrative Support	Administrative Support Assistant III	9
David Smith	.34	.66			19%	Circuits and Sensor Design	Research Associate II	12
Melanie Stewart		1.00			54%	Soil Environmental Chemistry	Research Associate III	8
Lois Stinnett	.32	.35	.33			Accounting Specialist	Accounting Specialist II	29
Craig Wagoner		1.00				Laboratory Machinist	Maintenance Assistant III	29
Ying Wang		1.00			100%	Microbiology	Post-doctoral Research Associate	4
Julie Werner	.51	.24			100%	Science Fair Manager and Student Contact Coordinator	Manager	9
Wesley Wright		1.00			18%	Instrumentation & Soil & Water Management	Research Associate II	17
Artan Xhaferaj	.17	.50	.33			Human Resources	Administrative Specialist I	1
Ran Ye		1.00			100%	Value-Added Bioprocess Engineering	Post-doctoral Research Associate	2
Total	2.29	14.31	4.65					

Department of Entomology and Plant Pathology

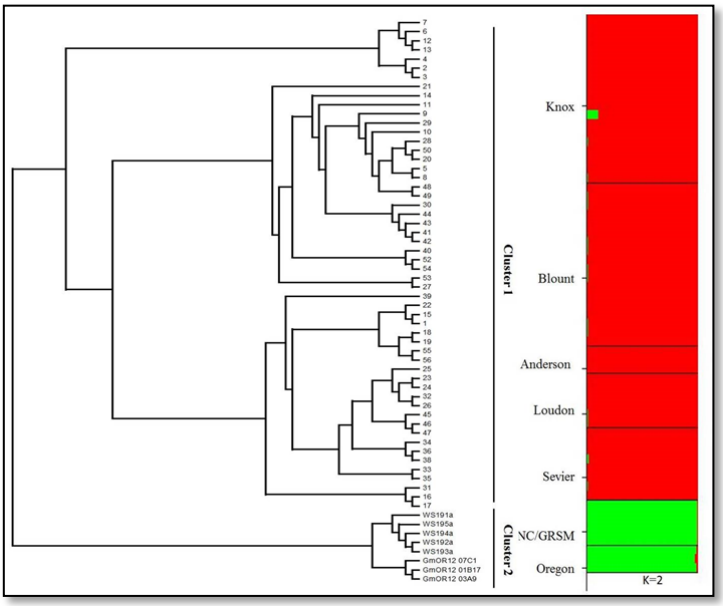
Dr. Parwinder Grewal, Department Head

The Entomology and Plant Pathology Department is a multidisciplinary department with diverse and vibrant research, extension, and teaching programs in Entomology, Plant Pathology, and Nematology. It takes a comprehensive *molecule to ecosystem* approach to teaching, research and outreach on the insects, nematodes and microbes affecting agroecosystems, humans and their structures, animals and wildlife, urban landscapes, and forests. The department offers undergraduate minors and MS degrees in Entomology and Plant Pathology and a Ph.D. degree through the Plants, Soils, and Insects program and leads the college-based Undergraduate Research and Honors Program. It conducts research, extension, and outreach programs in biodiversity; pest, pathogen and vector biology; plant-insect/nematode/microbe interactions; and biological and integrated control, with particular emphasis on developing sustainable solutions to invasive and emerging insect pests and plant diseases while protecting natural resources and thwarting the threats to food, fiber, clean water, and energy security. Core research areas include:

- Biodiversity, Ecosystem Services, and Climate Change
- Biological Control of Invasive and Emerging Diseases and Pests
- Vector Biology and Ecology
- Plant-Microbe, Insect, and Nematode Interactions
- Systems Approaches to Sustainable Pest and Disease Management

Biodiversity, Ecosystem Services, and Climate Change

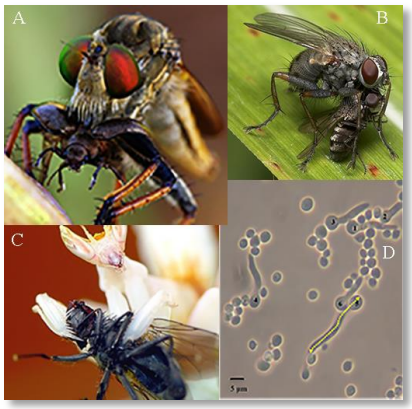
Biodiversity is important for human well-being including provision of food, fuel, fiber and shelter, purification of air and water, formation of soil, cycling of nutrients, regulation of pests and diseases, and promotion of stability and resilience in ecosystems. Biodiversity is threatened due to increased demand for the earth's resources, land use change, intensification of agriculture and fisheries, urbanization, and global warming. Our scientists study biodiversity from genes and molecules to the ecosystem level, explore the functions and attributes of biodiversity, and develop strategies to preserve and restore biodiversity and its desirable services. Examples include identification of novel enzymes for biofuel production; characterization of genetic diversity in plants, pests, and pathogens for the



Genetic diversity study revealed two distinct clusters among *Geosmithia morbida* populations

development of pest and disease resistant cultivars; identification of genetic and species diversity for improving the biological control agents and honey bee health; and quantification of microbial and invertebrate species, population, community and trophic diversity to develop sustainable biological control programs and bolster resilience of managed and natural ecosystems while sustaining the desirable ecosystem services they provide.

Biological Control of Invasive and Emerging Diseases and Pests



A. *Tachinid feeding on fly;* ***B.*** *Fly eating beetle;* ***C.*** *Mantid eating fly;* ***D.*** *Germinating spores of Beauveria bassiana, an entomopathogenic fungus used for biological control of seedling diseases and insect pests.*

Biological control is the science and practice of using living organisms to manage pests and pathogens. The department is particularly well recognized for its excellence in biological control of invasive and emerging diseases and pests. Entomologists and Plant Pathologists are studying the biology and ecology of invasive insect pests and plant pathogens and their biological control agents to develop more efficient strategies for the release, establishment, and utilization of biological control agents. Scientists in the department are also world-renowned for their work on biological control of soil-borne plant pathogens and insect pests using antagonistic microbes and entomopathogenic bacteria, fungi, and nematodes.

Plant- Microbe, Insect, and Nematode Interactions

Walnut twig beetle pupa (A) and the newly emerged adult beetle (B) surrounded by the white fungus Geosmithia morbida, which causes canker in black walnut trees (C)

Studies on the ecology, genetics, and physiology of plant- microbe, insect, and nematode interactions can reveal important information about the underlying mechanisms of insect feeding, nematode parasitism and pathogen virulence, and plant defenses. Our researchers are studying the interactions between plants and bacteria, fungi, viruses, nematodes, and insects to decipher complex molecular and physiological mechanisms that will identify genes and gene products mediating these interactions. The overarching goal of this research is to develop more effective approaches for pest and disease management including genetic selection, mutagenesis, molecular breeding, and transgenic cultivar development through greater understanding of the mechanisms of insect feeding, nematode parasitism, and pathogen virulence.

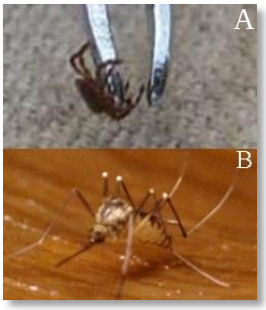
Systems Approaches to Sustainable Pest and Disease Management

Single-tactic approaches to pathogen or pest management often fail due to resistance development, government regulations, unintended non-target environmental consequences, and costs. Researchers in the department are engaged in developing and disseminating comprehensive systems approaches that include multiple tactics such as chemical, biological, mechanical, physical, and cultural methods to combat destructive pests and diseases in natural and managed ecosystems including conventional, sustainable and organic agriculture, biofuel crops, horticulture, forestry, production nurseries, turf grass, human structures, and animal production units.

The department disseminates research-based information on systems approaches to disease and pest management

Vector Biology and Ecology

Arthropods and nematodes often serve as vectors of serious diseases of humans (malaria and dengue fever), animals (Anaplasma and Heartwater), and plants (Geosmithia morbida, sharka, tristeza, grapevine fan leaf, banana bunchy top). Additionally they are responsible for the spread of food-borne diseases caused by Salmonella and Escherichia coli. Our scientists are studying the complex biology and ecology of disease vectors including their life histories, transmission patterns, links to reservoirs, and vector competency to identify points for management and to develop a better understanding of transmission to minimize disease spread and incidence.



Two common vectors in Tennessee include lone star ticks, *Amblyomma americanum,* which transmit bacteria causing Ehrlichiosis (A) and Eastern tree-hole mosquitoes, *Aedes triseriatus,* which transmit La Crosse virus (B).

Research Productivity Measures for the Department of Entomology and Plant Pathology

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current year	40	39	42	44	51	53
Unique refereed papers 3-year rolling average			40	42	46	49
Unique scientific presentations at professional society meeting, w/ abstract	43	48	33	50	47	41
Unique scientific presentations at professional society meeting, w/ abstract 3-yr rolling average			41	44	43	46
Research grant awards, Current year	$1,171,333	$1,196,251	$1,539,588	$2,090,685	$1,116,554	$2,554,635
Research grant awards, 3-year rolling average		$1,614,148	$1,302,391	$1,608,841	$1,582,276	$1,920,625
Research "R-account" expenditures Fiscal year, includes gifts	$1,562,849	$1,455,538	$1,132,051	$1,379,517	$1,724,104	$1,836,516
Research grant submissions	$1,978,483	$4,935,480	$5,344,407	$4,467,472	$15,871,056	$4,597,598
Proposals submitted	26	35	33	31	33	37

Entomology and Plant Pathology Faculty and Staff

Entomology and Plant Pathology Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Ernest Bernard	.10	.90				Nematology, Soil Zoology	Professor	36
Steven Bost			1.00			Vegetable, Fruit and Tobacco Plant Pathology	Professor	28
Craig Canaday		1.00				Seedling Diseases of Soybean and Snap Bean	Associate Professor	27
Jerome Grant	.19	.81				Biological Control and IPM	Professor	28
Parwinder Grewal	.34	.33	.33			Biological Control, Soil Ecology, and Urban Ecology	Professor and Head	<1
Kimberly Gwinn	.17	.83				Bioactive Natural Products	Associate Professor	26
Mohammad Hajimorad	.10	.90				Plant Virology	Associate Professor	9
Frank Hale			1.00			Horticulture Crop Entomology	Professor	21
Juan Jurat-Fuentes	.10	.90				Insect Physiology	Associate Professor	7
Paris Lambdin	.18	.82				Entomology	Professor	39
Kurt Lamour	.10	.90				Molecular Epidemiology	Associate Professor	10
John Moulton	.10	.90				Insect Taxonomy, Biodiversity and Phylogenetic Relationships	Associate Professor	11
Bonnie Ownley	.18	.82				Soil-borne Plant Pathology and Biological Control	Professor	21
John Skinner			1.00			Apiculture	Professor	23
Scott Stewart			1.00			IPM in Field Crops	Professor	11

Entomology and Plant Pathology Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Robert Trigiano	.11	.89				Ornamental Plant Breeding and Biotechnology	Professor	29
Rebecca Trout Fryxell	.10	.90				Medical and Veterinary Entomology	Assistant Professor	1
Karen Vail			1.00			Urban Integrated Pest Management	Professor	17
Mark Windham	.20	.80				Ornamental Pathology	Distinguished Professor	28
Alan Windham			1.00			Ornamental and Turf Pathology	Professor	28
Heather Young		.30	.70			Disease Management in Field Crops	Assistant Professor	1
Total	1.97	12.00	7.03					

Entomology and Plant Pathology Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Denita Hadziabdic		1.00			100%	Fungal Genetics/Plant Pathology	Research Assistant Professor	7
James Parkman		.83			100%	Biological Control and IPM	Research Assistant Professor	17
Phillip Wadl		1.00			100%	Ornamental Plant Breeding and Biotechnology	Research Assistant Professor	7
Gregory Wiggins		1.00			100%	IPM and Biological Control Laboratory	Research Assistant Professor	18
Total		3.83						

Entomology and Plant Pathology Department								
Staff								
Name	**Tch**	**Res-**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Heba Abdelgaffar		1.00			100%	Insect Physiology	Post-doctoral Research Associate	<1
Alexander Bruce		1.00			100%	Soilborne Plant Pathology and Biological Control	Research Specialist II	1
Kimberly Campbell	.14	.54	.33			Business Manager	Business Manager	7
Jennifer Chandler			1.00		100%	Ant and Termite Project	Research Specialist II	6
Wesley Crowder		.70			100%	Disease Management in Field Crops	Agricultural Service Assistant I	3
Mary Dee		1.00				Soil Borne Plant Pathogens Lab	Research Assistant II	29
James Dee		1.00			100%	Control of Hemlock Woolly Adelgid	Research Specialist II	6
Sonya Dexter		.51	.49			Travel Payroll	Accounting Assistant III	23
Renee Follum		1.00				Biological Control and IPM	Research Associate I	24
Ashley Galloway		1.00			100%	Biology and Behavior of Hemlock Woolly Adelgid	Post-doctoral Research Associate	3
Darrell Hensley			1.00		100%	Pesticide Safety and Education Program	Extension Specialist III	29
William Jordan		1.00			100%	Disease Management in Field Crops	Research Specialist III	<1
Brian Kozlowski			1.00		100%	IPM in Field Crops	Research Technician III	3
Elizabeth Long			1.00		100%	Tennessee CAPS State Survey Coordinator (invasive species)	Extension Specialist III	29

Entomology and Plant Pathology Department								
Staff								
Name	**Tch**	**Res-**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Carrie Lykins		.73	.27			Communication Materials and Website	Communications Specialist II	1
Christopher Maguigan			1.00		100%	Pesticide Safety Education Program Assistant	Ext Program Assistant II	<1
Marjorie McKee		1.00			100%	Predator Rearing for Hemlock Woolly Adelgid	Research Specialist II	9
David Paulsen		1.00				Medical and Veterinary Entomology and Entomology	Research Associate II	29
Vedra Proaps-Abouchane		1.00				Human Resources	Administrative Specialist I	<1
Robert Robinson	.33	.33	.34			Departmental Records of Income and Expense, Ledgers	Accounting Specialist II	6
Sandra Steckel			1.00		100%	IPM in Field Crops	Research Coordinator	9
Lisa Vito		1.00				Maintain Woody Ornamental Disease Lab	Research Associate I	9
Michael Wilson			1.00		100%	Honey Bees and Native Bees	Extension Assistant II	19
Total	0.47	13.81	8.43					

Department of Food Science and Technology

Dr. Mark T. Morgan, Department Head

Food Science is a discipline in which biological sciences, physical sciences, and engineering are used to study the nature of foods, the causes of their deterioration, factors affecting safety, and the principles underlying food processing. Food Technology is the application of Food Science to the preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome food. The Department of Food Science & Technology links production agriculture with consumers by addressing issues relating to the manufacturing of value-added foods from raw agricultural commodities. Our mission is to ensure a high quality food supply for the citizens of Tennessee and beyond by providing outstanding programs in undergraduate and graduate education, fundamental and applied research, and consumer and industry education. The department includes faculty with expertise in microbiology, chemistry, and engineering. Research emphasis areas include:

- Microbiological Food Safety
- Food Biopolymer Chemistry

Microbiological Food Safety.

Microbiological Food Safety faculty investigate those microorganisms that are a major concern for food processors and consumers nationwide including: *E. coli* O157:H7, *Salmonella* enterica serovars, *Listeria monocytogenes*, *Campylobacter jejuni*, and human norovirus. Our current research focuses on all these major pathogens in which studies are focused on improving detection methods, ecology, survival and control in foods and food environments, reducing the incidence of pathogens in foods from the farm to the fork, natural antimicrobials, and novel processing methods. Research on detection methods ranges from traditional to next-generation, molecular methods. Control technologies include the use of natural antimicrobial compounds, such as plant essential oils and chitosan, to processing technologies such as cold plasma, chlorine dioxide gas, high-pressure homogenization, and microwave heating. Gene expression analysis and other metagenomic tools are used to understand the molecular basis for microbial pathogenesis and survival in foods and various environmental conditions.

Food Biopolymer Chemistry.

The Food Biopolymers faculty conducts research on structure, function, and application of food proteins and polysaccharides for improved food quality, safety, and healthfulness. They promote the discovery and use of biopolymers in food and non-food applications through interdisciplinary collaborations in the fields of physical chemistry, material and polymer science, engineering, and microbiology. Current research areas include protein and polysaccharide-based delivery systems for hydrophobic and hydrophilic compounds, use of nonthermal and nanotechnologies to improve biopolymer functionalities, the discovery/development of antimicrobial biopolymers and novel packaging films, and the manufacture of value added products from food industry biopolymer wastes.

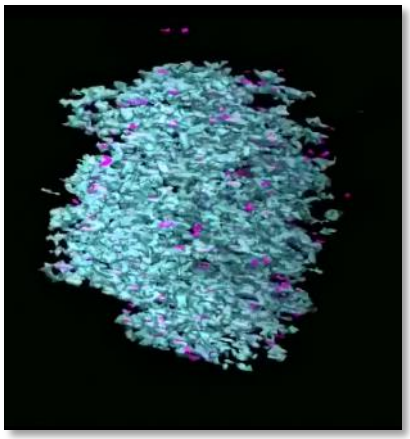


Figure 1 The casein micelle in milk. Model shows protein-rich fraction (light blue), calcium phosphate-rich clusters (pink), and void areas that aid in transmission of milk additives such as vitamins.

Figure 2 Ground peanuts packaged in chitosan (left) and improved, gallic acid-grafted chitosan (right) films

Research Productivity Measures for the Department of Food Science & Technology

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current year	16	19	24	21	32	29
Unique refereed papers 3-year rolling average			20	21	26	27
Unique scientific presentations at professional society meeting, with abstract	39	46	34	39	42	69
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			40	40	38	50
Research grant awards, Current fiscal year, no gifts	$600,860	$348,265	$1,508,007	$1,115,766	$1,884,907	$1,616,081
Research grant awards, 3-year rolling average		$585,864	$819,044	$990,679	$1,502,893	$1,538,918
Research "R-account" expenditures Fiscal year, includes gifts	$1,036,898	$645,296	$699,511	$831,701	$813,248	$1,353,991
Research grant submissions	$4,388,178	$7,654,595	$6,954,570	$5,522,809	$12,309,617	$18,126,443
Number of proposals submitted	23	24	34	28	29	35

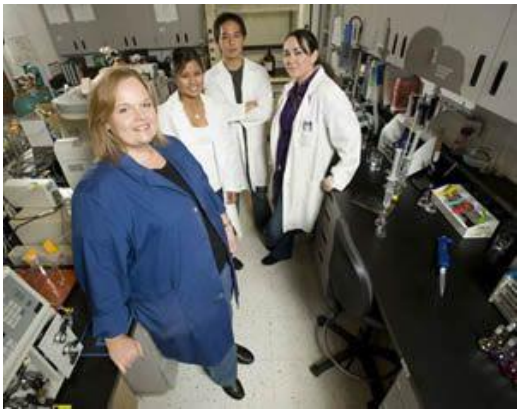
Food Science and Technology Faculty and Staff

Food Science and Technology Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Faith Critzer		.27	.63			Food Microbiology and Food Safety Extension	Assistant Professor	2
Philip Davidson	.60	.40				Microbiological Food Safety and Food Antimicrobials	Professor	14
Doris D'Souza	.14	.86				Molecular Biology	Associate Professor	7
David Golden	.32	.68				Food Microbiology	Professor	20
Irene Hanning-Jarquin		1.00				Food Microbiology	Assistant Professor	2
Federico Harte	.21	.79				Proteins Polymers	Associate Professor	8
Francine Hollis	.75	.25				Product Development	Assistant Professor	<1
Dwight Loveday	.37		.63			Meat and Animal Growth Development; Meat Quality	Associate Professor	30
Mark Morgan	.33	.33	.34			Process Food Engineering	Professor and Head	<1
Qixin Zhong	.20	.80				Food Physical Properties	Associate Professor	8
Svetlana Zivanovic	.27	.73				Carbohydrate Chemistry; General Food Chemistry	Professor	12
Total	3.2	6.1	1.6					

Food Science and Technology Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Ray Burden			.61	.39	100%	Homeland Security, Food Security	Research Associate Professor	17
Jennifer Richards	.58	1.00			41%	Food Safety Education	Research Assistant Professor	10
Total	.58	1.00	.61	.39				

Food Science and Technology Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Nancy Austin		.45	.55			Principal Secretary	Administrative Support Assistant II	32
Amy Beavers		1.00			95%	Research Director for Hands On Programs	Post-doctoral Research Associate	5
Davean Brown	.30	.39	.31			Business Manager	Business Manager	18
Sandra Diaz Sanchez		1.00			100%	Epidemiology of Foodborne Pathogens	Post-doctoral Research Associate	1
Lezlee Dice		1.00				Research, Lab Management, Chair of Safety Committee	Research Associate I	2
Eric Goan		.80	.20			Pilot Plant Manager	Research Associate I	5
Roben Henry	.32	.39	.29			Administrative Specialist	Administrative Specialist I	29
Gang Liu		1.00			100%	Structure and Functionality of Food Biopolymers	Post-doctoral Research Associate	2

Food Science and Technology Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Emefa Monu		1.00			100%	Food Microbiology	Post-doctoral Research Associate	1
Philipus Pangloli		1.00				Research Coordinator	Research Coordinator I	3
Priya Ranjan		1.00			100%	Bioinformatics and Systems biology	Research Scientist I	3
Chayapa Techathuvanan		1.00			100%	Food Microbiology	Post-doctoral Research Associate	1
Janice Wager		.50			100%	Coordinator for Hands-On Projects	Research Associate I	3
Yue Zhang		1.00			100%	Nanotech-nologies in Food	Post-doctoral Research Associate	2
Total	.62	11.33	1.35					



Food Lab

A *MacConkey* agar plate with an active bacterial culture

Department of Forestry, Wildlife, and Fisheries

Dr. Keith Belli, Department Head

The Department of Forestry, Wildlife and Fisheries (FWF) is perhaps the broadest unit within the Institute of Agriculture in terms of disciplinary areas. Faculty experience and training include such diverse specialties as forest ecology, psychology, fisheries biology, wildlife management, polymer chemistry, resource economics, and biometrics (to name just a few). The department supports two undergraduate majors, two Master's programs and a doctoral program. Total enrollment is approximately 250 students (200 undergraduate, 50 graduate).

Research programs are faculty-driven, and reflect the diversity mentioned above. The department has embraced several strategic focus areas -

- Disturbance-related ecology and land management
- Wildlife health
- Native grasslands ecology and management
- Bio-based products

These focus areas are enhanced by the creation of virtual "centers" including: the Natural Resource Policy Center; the Center for Native Grassland Management; and the Center for Wildlife Health. FWF faculty members are also active affiliates of the Center for Renewable Carbon. Three additional departmental entities that enhance our research capabilities, add to our regional and national recognition, and provide focus to our programs include the UT Tree Improvement Program, the National Bobwhite Conservation Initiative, and the Human Dimensions Research Lab. We also serve as the host institution for the Southern Appalachian Cooperative Ecosystem Studies Unit (SA-CESU).

Disturbance-related ecology and land management

The use of prescribed burning as a management tool for the restoration and maintenance of Tennessee ecosystems is being studied by FWF researchers.

Disturbances of our natural ecosystems include such traditional causes as timber harvesting, storms, wildfires, and endemic insects and diseases. Other, less traditional, sources of "disturbance" are also leading to changes in our forested lands, changes that must be addressed if we are to continue to serve the needs of our constituents. Exotic invasive species, both plant and animal, are crowding out native varieties. Exotic insects and disease pests such as the hemlock wooly adelgid have caused devastation in native populations of eastern hemlocks, and threats from other potential pests such as the emerald ash borer, thousand canker disease, sudden oak death, and the gypsy moth could be just as severe in the future. Land conversion is another type of disturbance, one that includes changes in crops (e.g., to feed stocks for biofuels), fragmentation due to ownership changes, and general population growth that is also leading to increased urbanization (and suburbanization).

Energy concerns have led to increased interest and activity in the extraction of non-renewable resources such as coal and natural gas that can also disturb the environment. Finally, climate change is an issue that will conceivably affect, directly or indirectly, all of the other disturbances just mentioned. These disturbances ultimately lead to questions regarding the best practices for land management and conservation.

Wildlife health

Wildlife Health research, and the related field of Conservation Medicine, are academic areas that are growing rapidly in importance. This growth is being driven in part by concern about zoonotic diseases — cross-species diseases that travel to humans from other animals — as well as diseases that travel from wildlife to livestock and thereby threaten our agricultural production systems. Furthermore, given the increasing stress being placed on our ecosystems, there are growing health threats to valued wildlife populations themselves. Such issues require not only fundamental research into wildlife disease ecology and diagnosis, but also the application of research findings in ways that provide practical assistance for resource managers, policy-makers, and landowners. These problems must be addressed using a team approach that involves wildlife biologists, entomologists, veterinarians, animal production managers, public health specialists, epidemiologists and scientists in numerous other disciplines.

Juvenile opossum being checked for ticks, as a part of Dr. Graham Hickling's NSF-funded study of tick-borne pathogens in the eastern United States

Native grasslands ecology and management

Native grasslands, once a significant component of Eastern landscapes, have been reduced more than any other ecosystem in North America. These grasslands included extensive prairies, pine and oak savannahs, oak woodlands, and cedar glades, each with especially adapted flora and fauna. Today, approximately 51 million acres of pasture and hay lands (with mostly non-native grass species) occur in the Mid-South alone, a very significant component of non-forested cover within the region. Grasslands also occur on reclaimed surface mines, military training areas, and as small but important features within row crop dominated landscapes (e.g., grassed waterways, field buffers, and filter strips). In recent years, a number of opportunities to incorporate native grasses into various management systems have been proposed. These include silvopastures, wildlife habitat, traditional forage production for hay and pasture, soil conservation, and surface mine reclamation. More recently, use of native grasses as biofuels feedstock has become an important issue. In order to improve deployment of native grasses and to ensure optimum ecological benefits are realized, better information on ecology and management is needed.

Dr. Pat Keyser, Director of the Center for Native Grasslands Management, explains use of native warm-season grasses in forage production systems

Bio-based products

Research into the manufacture and performance of wood materials and wood-based composites has been a key component of FWF forest products faculty.

This strategic area includes energy, chemicals, composites and solid wood products from cellulosic sources. The initiative cuts across land management (forest and grassland), policy and socio-economics, wildlife management and ecology, and watershed management projects. Included in this strategic focus area is the production of both biofuels and biobased products from cellulosic feed stocks such as switchgrass and woody biomass from our forests. Increased acreage in biomass crops will have significant implications for wildlife populations. Increased use of timber resources for biomass will also affect plant and animal species, as well as the markets for traditional wood products. Communities dependent on natural resources for jobs and tax revenues will also be affected, depending on the success of statewide, and region-wide efforts to convert cellulosic feedstocks into marketable products. Rather than wait until such changes have occurred to determine appropriate forest and wildlife management strategies, as well as appropriate socio-economic policies, proactive work is needed if we are to help promote sustainable use of our valuable natural resources.

Research Productivity Measures for the Department of Forestry, Wildlife, and Fisheries

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current calendar year	55	64	65	57	59	65
Unique refereed papers 3-year rolling average			61	62	60	60
Unique scientific presentations at professional society meeting, with abstract	110	112	102	103	114	87
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			108	106	106	101
Research grant awards, Current fiscal year, no gifts	$5,906,625	$2,123,257	$2,890,984	$3,938,707	$2,787,825	$5,220,455
Research grant awards, 3-year rolling average			$3,640,289	$2,984,316	$3,205,839	$3,982329
Research "R-account" expenditures	$4,179,581	$4,052,095	$4,356,932	$2,390,176	$3,472,505	$3,696,679
Research grant submissions	$15,754,228	$9,958,842	$9,257,728	$9,477,672	$17,513,374	$17,994,125
Number of proposals submitted	75	97	74	70	99	83

Forestry, Wildlife, and Fisheries Faculty and Staff

Forestry, Wildlife and Fisheries Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
J. Brian Alford	.30	.70				Fisheries Conservation and Management	Assistant Professor	<1
Keith Belli	.23	.50	.27			Forestry-Biometrics	Professor and Head	6
Joseph Bozell		1.00				Wood Science	Professor	7
David Buckley	.53	.47				Forest Science (Dendrology)	Professor	15
David Buehler	.46	.54				Avian Ecology and Management, Member – UT Center for Wildlife Health	Professor	22
Wayne Clatterbuck			1.00			Forest Management	Professor	18
Shigetoshi Eda		1.00				Animal Disease Diagnostics, Member - UT Center for Wildlife Health	Associate Professor	10
Mark Fly	.42	.58				Wildland Recreation, Director - Human Dimensions Lab	Professor	21
Jennifer Franklin	.60	.40				Tree Physiology & Biology, Land Reclamation	Associate Professor	10
Matthew Gray	.38	.62				Wetland Ecology & Mgmt, Member - UT Center for Wildlife Health	Associate Professor	9
David Harper		1.00				Wood Products/Polymer Interfaces	Associate Professor	9

Forestry, Wildlife and Fisheries Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Craig Harper			1.00			Wildlife Management	Professor	15
Donald Hodges	.49	.51				Natural Resource Economics	Professor	14
Sharon Jean-Philippe	.76	.24				Urban Forestry	Assistant Professor	3
Patrick Keyser		.60	.40			Wildlife Management, Director-Center for Native Grassland Management	Professor	7
Charles Kwit	1.00					Wildlife Ecology, Plant Biology	Assistant Professor	4
Nicole Labbé		1.00				Wood Science	Associate Professor	11
Debra Miller	.10	.60		30		Wildlife Pathology, Member - UT Center for Wildlife Health;, Department Pathobiology, UTCVM	Professor	2
Lisa Muller	.43	.57				Wildlife Ecology and Management, Member UT Center for Wildlife Health	Associate Professor	14
Timothy Rials		1.00				Wood Science & Technology, Director Center for Renewable Carbon	Professor and Director	12
Scott Schlarbaum	.11	.89				Forest Genetics, Director - UT Tree Improvement Program	Professor	29

Forestry, Wildlife and Fisheries Department								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Richard Strange	.65	.35				Fisheries Science, Fish Physiology	Professor	35
Malcolm Taylor			1.00			Forest Products	Associate Professor	9
Siqun Wang		1.00				Wood Based Composites & Nano-Mechanics	Professor	16
Emma Willcox	.60	.40				Wildlife Ecology and Management	Assistant Professor	1
Timothy Young		1.00				Forest Products manufacturing	Professor	16
Total	7.06	14.97	3.67					

Forestry, Wildlife and Fisheries Department								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Christopher Graves	1.00					Wildlife Lecturer	Lecturer	< 1
Graham Hickling	.10	.90				Wildlife Disease Ecology and Management, Director - UT Center for Wildlife Health	Research Associate Professor	8
Adam Willcox	1.00					Wildlife Human Dimensions	Research Assistant Professor	1
Total	2.10	.90						

Forestry, Wildlife and Fisheries Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Nicolas Andre		1.00			100%	Bio-Based Wood Products	Post-doctoral Research Associate	10
Amanda Ashworth		1.00			100%	Native Grasslands	Research Associate II	3
Penny Barnhart		1.00				HR- Regular Employees	Administrative Specialist I	5
Michael Black		1.00			100%	Wildlife (NBCI)	Research Consultant	3
Kyle Brazil		1.00			100%	Wildlife (NBCI)	Research Consultant	< 1
Christopher Burcher		1.00			100%	Natural Resource Policy	Research Scientist I	3
Lisa Cashion		.75	.25			Business Manager	Business Manager	4
Sara Clatterbuck		1.00			100%	Environmental Research	IT Analyst III	4
Joyce Coombs		1.00			100%	Fisheries Management	Research Associate I	12
Thomas Dailey		1.00			100%	Wildlife (Asst. Director NBCI)	Research Scientist I	3
John Doty		1.00			100%	Wildlife (NBCI)	Information Specialist I	3
April Griffin		1.00			100%	Wildland Recreation	Research Specialist II	12
Christopher Helton		1.00				BioBased Wood Products	Research Coordinator II	19
Rachel Hill		1.00			100%	Wildlife Management	Research Associate II	2
Jason Hogan		1.00				Forest Genetics	Research Associate I	2
Elizabeth Holcomb		1.00			100%	Native Grasslands	Research Scientist I	3
Heather Inman		.50	.50			Department Communications	Communications Specialist I	7
John Johnson		1.00			100%	Forest Genetics	Research Specialist III	3

Forestry, Wildlife and Fisheries Department								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Pyoung Chung Kim		1.00			100%	CRC Scientist	Post-doctoral Research Associate	3
Donald McKenzie		1.00			100%	National Bobwhite Conservation Initiative (NBCI)	Research Leader I	4
David Mercker			1.00			Hardwood Timber Management	Extension Specialist II	14
Shelley Miller		1.00			100%	Forestry- Natural Resource Policy	Research Associate I	1
Brien Ostby		1.00				Forest Science	Research Associate I	28
Teresa Payne		1.00			100%	Natural Resource Policy	Research Associate II	2
Daniel Reed		1.00			100%	Natural Resource Policy	Research Associate I	4
Susan Schexnayder		1.00			100%	Coordinates Dr. Fly's projects	Research Associate III	25
Ami Sharp		1.00				Forest Genetics	Research Associate I	7
Lavetta Spann	.50	.50				HR- Biweekly Term	Administrative Support Assistant II	25
Sharon Sparks	.33	.33	.34			Departmental Accounts Payable/ Receivable	Accounting Specialist II	4
Larry Tankersley			1.00			Extension Forest Stewardship	Extension Specialist II	21
Martha Thompson	.58	.42				Banner Input (Student & faculty classes)	Administrative Support Assistant II	32
Terry White		.83			100%	Wood Science Admin Support	Administrative Specialist I	27
Mirian Wright			1.00			Extension Faculty Admin Support	Administrative Support Assistant III	16
Total	1.41	27.33	4.09		20			

Plant Sciences

Dr. Scott Senseman, Department Head

Our mission is to discover, develop and disseminate science and technologies to serve the teaching, research and outreach needs of students, stakeholders and peers and agronomic or cultural plant sciences. Our vision is to be an innovative and leading source for information technologies and agronomic and horticultural plant sciences. Our core values are innovation, professional integrity and diligence in fulfilling our mission of teaching, research, extension and service. We value objectivity, teamwork, clear communication, diversity, inclusiveness of opinion and respect for each other and those we serve. We strive to responsibly use resources entrusted to us and to honestly present our creative achievements to stakeholders.

Agronomic Crops

Corn harvest in West Tennessee

Tennessee row crops are produced on more than 70,000 farms with crop land accounting for almost 55% of all farm land. Three of the top five state agricultural commodities are row crops: soybean, corn and cotton. Soybean, corn, cotton, wheat and tobacco make up almost 45% of all cash receipts annually from production agriculture. Over the past five years, row crops generated an estimated $6.3 billion in total revenue for Tennessee producers. In recent years, steady to increasing commodity prices have encouraged growers to plant more corn and wheat while adjusting crop acreage of soybean and cotton.

Plant Variety Testing

Mature soybeans before harvest

Based on surveys conducted by extension agents with grain producers in major row crop counties in northwest Tennessee, over 90% of the producers reported that they base their variety buying decisions on data provided in UT variety test publications. If one conservatively assumes that 50% of the grain producers in TN buy and grow the higher yielding varieties based on the variety test data, and applies that to the total corn (970,000 acres), soybean (1.3 million acres), wheat (420,000 acres) and cotton (375,000 acres) acreage in the state in 2012, then the increased income per year to those grain producers in TN is over $130 million. During the past five years (1998-2012), approximately 139,578 acres of UT AgResearch soybean varieties were grown by farmers. USDA AgStatistics show Tennessee statewide yields averaged 36 Bu/acre, with average commodity price ~$11.30. Our improved soybeans provided >$56 million in revenue directly to farmers that grew our UT varieties.

Food & Floral Horticulture

Harvested tomatoes

The economic impact in the U.S. of the fresh produce and floral industry in 2006 was nearly $1.7 million direct U.S. full time equivalent jobs and an additional 1 million jobs through industry and worker spending. Overall, fresh produce and floral industry sales and worker spending generates >$500 billion in output within the U.S. economy. The broader economic impact of the industry touches every U.S. state and legislative district. Within Tennessee, the fresh produce and floral industry accounts for a total employment impact of >48,000 jobs. In total, these workers earn $1.2 billion and the total economic output is >$9 billion. Because the fruit and vegetable industry in Tennessee is comprised primarily of small acreage growers, often selling direct to the public, the true value of the industry is dramatically underrated by most people.

Organic Agriculture

Greenhouse nursery production

In 2007, the University of Tennessee, in cooperation with the Tennessee Department of Agriculture, launched a statewide organic initiative to engage more traditional Tennessee farmers in organic production, enhance the delivery of organic production information to stakeholders, and create statewide organic research trials. In the past five years, the UT Organic and Sustainable Crop Production (OSCP) Program has become one of the top programs in organic agriculture among land-grant universities across the country. The OSCP Program has reached stakeholders in every county of the state, as well as in all 50 states and 145 countries. The UT East TN AgResearch and Education Center's Organic Crops Unit (OCU) is a 90-acre farm dedicated to organic production, with 21 acres under cultivation and 14 acres certified organic. In the past five years, the OCU has supported nearly 30 organic research trials in innovative farming practices and has served as the nucleus for 17 additional grants totaling nearly $9 million. Since 2007, the number of certified farms in Tennessee has more than doubled, covering over 2,500 acres across the state.

Nursery Industry

The Tennessee Green Industry includes more than 950 nursery and greenhouse firms, as well as a diverse group of affiliated service, landscape management, and supporting industries. During peak production in the late 2000s, Tennessee's ornamental industry was the fastest growing agricultural industry sector and contributed about 51,000 direct full-time equivalent jobs to the state's economy. Tennessee yields ~$180 million in annual farm gate sales. Taken as a whole, Tennessee's entire Green Industry was projected in 2006 to generate ~$6 billion in overall annual value.

Tree nursery production inventory

Landscape Architecture

Landscape design draft

The impact of the profession of landscape architecture in Tennessee, throughout the U.S., and around the world is dynamic, profound, and expanding. With expertise in the sustainable planning, design, and management of natural and built environments, landscape architects collaborate with allied disciplines at a range of scales on a variety of project types, including regional resource corridors, parks, greenways, waterfronts, and other recreation infrastructures, mixed-use and commercial developments, residential communities and urban neighborhoods, academic and institutional campuses, brownfield reclamations, restoration of ecologically impaired sites, revitalization of abandoned and underutilized properties, public and residential gardens, and transportation corridors. Tennessee's population is projected to surge by more than 1 million people between 2010 and 2030. This will place significant pressure on municipalities to provide infrastructure to support such rapid growth while protecting rural landscapes, productive farmsteads, and sensitive natural resource areas. These iconic landscapes fuel Tennessee's robust tourism industry, feed our population, and support our culture of outdoor recreation. Similar trends of growth and urbanization rates are echoed across the country and around the world. Landscape architects are rising to meet these challenges through the application of natural sciences, art, and technology, working with clients to develop creative, high performance, and strategic project solutions that balance social, economic, and environmental implications of growth and development, enhance the experiential qualities of place, are sensitive to environmental and cultural context, and enhance public health, safety, and welfare

Weed Management

Glyphosate-resistant weeds in West Tennessee

Glyphosate-resistant weeds have changed agriculture in Tennessee. Growers in recent surveys have indicated that they value the research and extension effort to help them manage this huge production issue. Growers in TN reported that 60% of them changed their weed control practices based on UT recommendations. Moreover, they valued UT weed control recommendations at an average of $40.00/acre. Based on those survey results, our UT weed control program would have a $72 million per year impact to TN growers.

Turfgrass

Turfgrass covers ~50 million acres in the U.S. and has an estimated annual value of more than $40 billion. The Tennessee turfgrass industry involves both turf production and management and is composed of wholesale and retail suppliers of turf care equipment and products, service providers and

consumers. A comprehensive 1991 survey of the state's turfgrass industry conducted by researchers in the Departments of Agricultural Economics and Rural Sociology, and Ornamental Horticulture and Landscape Design revealed that ~$360 million was spent to maintain almost 900,000 acres of turf. In response to this demand for information, both basic and applied research is being conducted in the Department of Plant Sciences to educate suppliers and consumers regarding the performance of new products and technologies being developed or available for use in a Best Management Turf Care Program to provide an appropriate level of quality while protecting the environment and preserving natural resources. In July 2011, the Center for Athletic Field Safety was dedicated to researching the performance and safety of both natural and synthetic turf surfaces used on athletic fields. The Center was created through a partnership with AstroTurf and to the best of our knowledge the 2010 ~$3.5 million award from AstroTurf is the largest single sports turf award ever provided to a faculty member team in this country.

Turf management at a golf course

Research Productivity Measures for the Department of Plant Sciences

	2007	2008	2009	2010	2011	2012
Unique refereed papers Current calendar year	53	53	74	61	82	86
Unique refereed papers 3-year rolling average			60	63	71	76
Unique scientific presentations at professional society meeting, with abstract	90	133	118	134	127	160
Unique scientific presentations at professional society meeting, with abstract 3-year rolling average			114	128	126	140
Research grant awards, Current fiscal year, no gifts	$1,530,486	$1,247,321	$1,763,730	$3,163,071	$3,825,218	$4,012,965
Research grant awards, 3-year rolling average		$1,769,752	$1,513,846	$2,058,041	$2,917,340	$3,667,084
Research "R-account" expenditures Fiscal year, includes gifts	$2,356,280	$2,139,021	$2,489,998	$3,163,007	$3,413,385	$3,986,676
Research grant submissions	$7,427,128	$7,899,878	$12,738,392	$9,169,142	$22,924,860	$25,836,783
Number of proposals submitted	60	61	70	65	94	87

Plant Sciences Faculty and Staff

Plant Science								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Fred Allen		.60	.40			Variety Testing	Professor and Coordinator	38
Robert Auge	.40	.60				Environmental Plant Physiology	Professor	26
Gary Bates		.05	.95			Forage Production	Professor and Director	20
Hem Bhandari	.20	.80				Bioenergy/ Biomass Feedstock	Assistant Professor	2
James Brosnan		.75	.25			Turf Weed Science	Associate Professor	5
David Butler	.25	.75				Organic/Sustain-able Cropping	Assistant Professor	3
Feng Chen	.17	.83				Functional Genomics	Associate Professor	9
Zong-Ming Cheng	.05	.95				Tree Physiology	Professor	12
Bradford Collett	1.00					Landscape Architecture	Assistant Professor	2
Dennis Deyton	.22	.78				Fruit Crop Physiology	Professor	34
Amy Fulcher		.24	.76			Sustainable Ornamental Plants	Assistant Professor	3
Tarek Hewezi		1.00				Plant Molecular Biology	Assistant Professor	< 1
Brandon Horvath	.74	.26				Turf Pathology	Assistant Professor	4
William Klingeman	.28	.72				Nursery Production	Professor	14
Dean Kopsell	.17	.83				Vegetable Physiology	Professor	9
Renata La Guardia Nave		1.00				Forage	Assistant Professor	< 1
David Lockwood			1.00			Tree Fruits and Nuts	Professor	31
Angela McClure			1.00			Extension Corn and Soybeans	Associate Professor	11

Plant Science								
Tenured and Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Gary Menendez	1.00					Landscape Design	Associate Professor	24
Thomas Mueller	.18	.82				Weed Science	Professor	22
Vincent Pantalone	.04	.96				Soybean Breeding	Professor	15
Neil Rhodes			1.00			Weed Control	Professor	28
Thomas Samples			1.00			Cool-Season Turfgrasses	Professor	28
Carl Sams	.11	.89				Crop Physiology	Distinguished Professor	30
Scott Senseman	.33	.33	.34			Department Head	Professor and Head	< 1
John Sorochan	.29	.71				Turfgrass Biology	Associate Professor	11
Lawrence Steckel		.26	.74			Weed Science	Professor	10
Curtis Stewart	1.00					Landscape Design	Associate Professor	9
Charles Stewart	.16	.84				Racheff Chair	Professor	12
David Verbree		.75	.25			Crop Physiology and Agronomy	Assistant Professor	1
Dennis West	.19	.81					Professor	34
Annette Wszelaki			1.00			Extension Vegetable Production	Associate Professor	6
Xinhua Yin		1.00				Systems Agronomy	Assistant Professor	5
Total	6.78	17.53	8.69					

Plant Science								
Non Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Andrew Pulte	1.00					Public Horticulture	Lecturer	5
Total	1.00							

Plant Science								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Sujata Agarwal		1.00				Monocot Transformation	Research Associate II	27
Lisa Alexander		1.00			100%	Molecular Genetics	Post-doctoral Research Associate	2
Sara Allen		1.00			100%	Molecular Genetics	Research Coordinator I	2
Muthukumar Balasubramaniam	1.00				100%	Molecular Genetics	Post-doctoral Research Associate	4
Thomas Barickman		1.00				Vegetable & Fruits Physiology	Research Associate II	8
Holly Baxter		1.00			100%	Monocot Genetics	Research Specialist II	5
Scott Boyle		1.00			100%	Turfgrass Science	Communications Coordinator II	< 1
Gregory Breeden		.56	.44		56%	Turf Weed Management	Extension Specialist I	19
Kellie Burris	1.00				100%	Yerba Mate Research	Post-doctoral Research Associate	4
Jason Burris		1.00			100%	Molecular Genetics	Research Associate I	10
Xinlu Chen		1.00				Molecular Biology	Research Associate II	4
John Cummins		1.00				Fruit & Vegetable Physiology	Research Associate II	27
Matthew Cutulle		1.00			100%	Weed Science	Post-doctoral Research Associate	2
Sarah Eichler-Inwood		.88			100%	Organic Production	Research Associate I	3
Deborah Ellis		.90				Soybean Breeding	Research Associate III	28
Phillip Flanagan	.12	.88				Nursery Production	Research Associate II	18
Ellen Haynes		1.00			100%	Molecular Genetics	Research Technician III	5
Jessica Hentchel		1.00			100%	Bioenergy/Bio-mass Feedstock	Research Associate I	1

Plant Science								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Jennifer Hinds	.50	.50			100%	Administrative Assistant to Neal Stewart	Administrative Specialist I	4
Audrey Hill		1.00			100%	Undergraduate Supervisor	Research Specialist I	2
Michelle Howerton		.62	.38			Bookkeeper	Accounting Specialist I	3
Trevor Israel		.41	.59		100%	Weed Control	Extension Assistant I	2
David Kincer		1.00			17%	Weed Science; Corn Breeding	Research Associate I	32
Arlene King		1.00			20%	Department Bookkeeper	Accounting Specialist I	20
Sandra Kitts	.31	.69				Student Records	Administrative Support Assistant II	25
Jingyu Lin		1.00			100%	Molecular Genetics	Post-doctoral Research Associate	1
Wuling Lin		1.00			100%	Tree Physiology	Post-doctoral Research Associate	4
Wusheng Liu	1.00				100%	Molecular Genetics	Post-doctoral Research Associate	5
Jeffrey Martin			1.00		40%	Organic Crop Production	Extension Agent I	4
Mitra Mazarei		1.00			100%	Molecular Genetics	Research Scientist II	6
Wanda McCall		.05	.95			Receptionist	Administrative Support Assistant II	19
David McIntosh		.50	.50		100%	Beef and Forage Center	Coordinator III	6
Lizabeth McLeod	.21	.56	.23			Business Manager	Business Manager	1
Elizabeth Meyer		1.00			100%	Soybean Breeding	Research Associate I	14
Reginald Millwood		1.00				Molecular Genetics	Research Associate III	11
Madhugiri Nageswara Rao		1.00			100%	Molecular Genetics	Post-doctoral Research Associate	2

Plant Science								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
James Newburn		1.00				Public Horticulture	Research Associate I	20
John Parham		1.00				Turfgrass	Research Associate I	23
Yanhui Peng		1.00			100%	Molecular Genetics	Post-doctoral Research Associate	5
Mary Rogers			1.00		99%	Vegetable Extension	Research Associate II	5
Mary Rudis		1.00			100%	Molecular Genetics	Research Associate II	8
Yi Sang	.50	.50			100%	Switchgrass Bioconfinement Research	Post-doctoral Research Associate	1
Dorothy Seigel		.60	.40			Human Resources	Administrative Specialist I	23
Robert Sharp		.54	.46		100%	Systems Agronomy	Research Associate I	5
James Simmons		.51	.49		100%	Crop Physiology and Agronomy	Research Associate II	3
Christopher Smallwood		1.00			100%	Plant Breeding	Research Associate II	3
Virginia Sykes		.60	.40			Plant Breeding	Research Associate II	4
Adam Thoms		1.00			100%	Turfgrass Biology	Research Leader I	7
Heather Toler		1.00				Environmental Physiology, Sustainable Ag	Research Associate II	13
Jose Vargas Almodovar		.67	.33		67%	Weed Science	Research Associate II	5
Cynthia Walker	.14	.86				Corn and Soybeans	IT Administrator II	31
Christopher Walker			1.00		100%	IT and Web Support	Research Technician III	8
Patsy Witt	.44	.56				Travel, Petty Cash and Payroll	Administrative Support Assistant III	32
Benjamin Wolfe		1.00			100%	Field Trials Supervisor	Research Supervisor III	3
Rongjian Ye	1.00				100%	Molecular Genetics	Post-doctoral Research Associate	1
Total	6.22	40.39	8.17					

AgResearch Campus Infrastructure

Faculty, staff and students in the seven academic departments are housed in several different buildings on the UTIA campus. Some of these buildings are quite old (1930's and 1940's) and in varying states of condition ranging from poor research space to new research laboratories (see Table below). The Department of Animal Science (111,797 gross square feet of space) and the Department of Food Science & Technology (34,286 gross square feet of space) recently moved into new buildings in February 2013; offices, classrooms, and research laboratories are state-of-the-art. The Plant Biotech building is about 10 years old and contains 48,000 square feet of high quality research space. Between 2008 and 2012, three large, state-of-the-art greenhouse facilities, Central, South and North, were constructed; the total footprint of the three new greenhouse facilities covers 38,982 square feet.

Ellington Plant Sciences building which houses faculty in the Departments of Plant Sciences; Forestry, Wildlife & Fisheries; Biosystems Engineering and Soil Science; and Entomology & Plant Pathology is scheduled for demolition in 2014-2015 and will be replaced with a new 157,483 square foot facility that will include 32,764 square feet of state-of-the-art research laboratory space to accommodate current needs and also provide space for research growth as we increase faculty FTE's. Additional greenhouse space is planned for 2014-2015 and McCord Hall is scheduled for renovation in 2018-2019. A number of Capital Maintenance projects are underway/planned for the near future and are described below. Information on Research and Education Center infrastructure can be found in each Center's write-up.

Current Space Devoted to UTIA AgResearch as of February 22, 2013

(R=Research, E= Engineering, T=Teaching)

Building	Research Space	Condition of Space
McCord Hall (1947)	9,925	(R)-75% poor /25% good
Food Safety & Processing (1948)	11,000	(R/E)-acceptable
Crop Genetics Lab (1935)	3,136	(R)-poor
Food Science and Technology (2013)	10,100 (Total GSF 34,286)	(R/T/E)-good
Brehm Animal Science (2013)	10,888 (Total GSF 111,797)	(R/T)-good
Plant Biotech (2003)	48,000	(R/T)-good
Ellington Plant Sciences (1966)	18,240	(R/T/E)-poor
Biosystems Engineering and Soil Science (1983)	33,345	(R/T/E)-acceptable
CRC/MAST Lab (2001)	4,763	(R/E)-good
CRC/BEST Lab (2001)	4,855	(R)-good
North Greenhouse (2011)	6,790	(R)-good
Central Greenhouse (2006)	7,626	(R)-good
South Greenhouse (2009)	9,957	(R)-good
Greenhouse 10 and 13 (1974)	2,841	(R)-poor
TVA Greenhouse (1936)	2,628	(R)-poor
Forest Genetics Greenhouse (1992)	2,208	(R)-poor
Johnson Animal Research & Teaching (1998)	37,918	(R)-acceptable

Five-Year Capital Outlay/Maintenance

(Projects to Replace/Renovate Science Research, Engineering and Teaching Laboratories)

Capital Outlay	Budget Year
Energy & Environmental Science Education Research Center (Ellington PS) - GSF-157,483, NSF-91,340, 32,764 NSFR	2014-2015
Interdisciplinary Research & Education Greenhouse (Greenhouse 10 and 13)	2014-2015
McCord Hall Renovation	2018-2019
ETREC Subsurface drainage	2013-2014
WTREC Greenhouse Improvements	2013-2014
WTREC/Milan Facilities Improvement	2014-2015

Multi-Disciplinary UTIA Centers

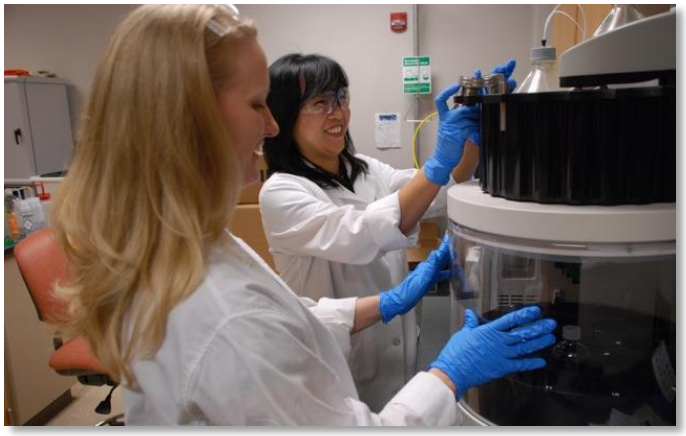
Center for Renewable Carbon

Dr. Timothy G. Rials, Director

The Center for Renewable Carbon (CRC) was established in 2010 in response to new demands and opportunities for lignocellulosic biomass in the bioeconomy. Building on the foundation of the Forest Products Center and a successful history of wood science and technology, the CRC's research and development program continues to target informational needs associated with the use of wood for durable materials. However, new sources of lignocellulosic biomass are appearing on the Tennessee landscape that will ultimately provide solutions to our nation's energy challenges, raw materials for affordable housing and chemical feedstock to continue advancing our quality of life, all from renewable forest and agricultural products. In contrast to most academic departments, the CRC relies on its multi-disciplinary faculty to apply a transdisciplinary approach to reduce biomass production barriers and broaden the market potential of renewable products. The Center's program balances fundamental research on topics such as chemical transformations of molecules isolated from biorefining processes with applied projects designed to assess environmental performance of new crop production systems, and engages industry collaborators to implement successes in the marketplace. Additionally, the CRC works to disseminate new information with its stakeholders through an active outreach program that includes conference organization, workshops and traditional extension activities. This integrated research, development and outreach effort is proving effective in transitioning Tennessee's bioeconomy toward a valuable leadership position for the future.

BioEnergy Science & Technology

A significant component of the CRC's overall research program addresses the opportunity to utilize lignocellulosic material as a feedstock for liquid fuels and industrial chemicals. In contrast to conventional approaches, alternative reaction media like ionic liquids and novel organic solvent processes are being studied to separate the constituents of biomass – cellulose, hemicellulose, lignin and extractives – into clean streams for conversion in downstream processes. Research is developing both homogeneous and heterogeneous catalyst systems to produce renewable carbon molecules at high-yields and high-purities, broadening the suite of chemicals available from biomass. Additionally, the use of lignin as a building block for polymer materials and as a precursor for innovative materials like activated carbon and carbon foams is being explored. The development of high-value products to supplement needed liquid fuels directly supports the concept of biomass refining, analogous to petroleum refining, as an approach to improve the economics of renewable fuels.



CRC researchers prepare to extract the individual constituents of lignocellulosic biomass.

Materials Science & Technology

The CRC's research and development program on advanced materials primarily addresses the efficient and effective use of lignocellulosic resources to improve durability of conventional products, while developing engineered composites with multi-functional characteristics. The Center is home to an internationally renowned program on statistical process control for wood conversion that incorporates the use of new sensor technologies to monitor key characteristics of the raw material during the process. Incorporating new information into a statistical process control framework, with state-of-the-art algorithms, is enabling dramatic reductions in off-specification product, greatly improving the bottom line. Research is also exploring the potential to utilize low-quality hardwood, process residue and alternative sources of lignocellulosic resources as a raw material for high-technology products. Cellulose nanocrystals have recently been recognized as a valuable building block for applications like video displays and high-efficiency air filters. CRC researchers have isolated cellulose nanocrystals from switchgrass and determined their dimensions and other key properties, opening doors for this new source of cellulose fiber.

Workforce Development

Although the Center for Renewable Carbon is not affiliated with an academic program, it plays an important active role in providing students with the skills required for successful careers in the biomass industry. This activity hinges on valuable partnerships with universities, industry and national laboratories that create unique opportunities for the exchange of ideas, as well as students and faculty. Each year, the Center hosts approximately 8 interns, 5 graduate students and 4 postdoctoral scholars from countries around the world including: China, Chile, Denmark, Austria, Korea, Japan and France.

CRC researcher makes new measurements on the densification of medium-density fiberboard production for improved process monitoring and control.

Over the past few years, the Center has developed a particularly close relationship with Salzburg University of Applied Sciences' Kuchl Campus and the Universidad del Bio-Bio, Chile. Through a formal agreement, Salzburg University sends several highly qualified graduate students and research associates each year to the Center to conduct the research project required for their graduate degree. Similarly, exchanges have occurred with faculty and students at Bio-Bio in Concepcion, Chile. These relationships create valuable educational and professional development opportunities for students and researchers affiliated with the CRC. A similar internship program is being established with Florida International University in Miami to train select undergraduates in the science and technology of biomass.

The Integrated Biomass Supply Systems (IBSS) SEED Fellowship program was successfully piloted in 2012 with five students from Tuskegee University and Auburn University. The second class of fellows is underway with students from the University of Tennessee, North Carolina State University, and Auburn University. This program has resulted in a highly trained cadre of undergraduate students who are well versed in biomass and biofuel production issues and ready to go to work in the biofuel industry.

Grant and Contract Measures for the Center for Renewable Carbon

	2008	2009	2010	2011	2012
Research grant awards, Current fiscal year, no gifts	$10,852,033	$2,163,542	$4,090,131	$4,944,243	$6,329,797
Research grant awards, 3-year rolling average		$5,701,902	$3,732, 639	$3,205,839	$5,121,390
Research "R-account" expenditures	$894,307	$1,906,211	$2,488,157	$4,312,022	$4,596,320
Research grant submissions	$5,199,108	$3,287,947	$2,570,127	$67,511,798	$10,728,323
Number of proposals submitted	5	7	4	13	5

Center for Renewable Carbon Faculty and Staff

Center for Renewable Carbon		
Faculty		
Name	**Department**	**Specialty/ Responsibilities**
Joe Bozell	Forestry, Wildlife, and Fisheries	Research focuses on wood science
David Harper	Forestry, Wildlife, and Fisheries	Studies wood products and polymer interfaces
Niki Labbé	Forestry, Wildlife, and Fisheries	Research focuses on wood science
Timothy Rials	Forestry, Wildlife, and Fisheries	Studies wood science and technology
Timothy Young	Forestry, Wildlife, and Fisheries	Research focuses on forest products including applied wood products
Siqun Wang	Forestry, Wildlife, and Fisheries	Studies wood based composites and nano-mechanics

Center for Renewable Carbon								
Non Tenured Tenure-Track Faculty								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Stephen Chmely		1.00			25%	Ligno-Cellusosic Biomass	Research Assistant Professor	< 1
Scott Lenaghan		1.00			50%	Nanoscale Materials and Devices for Biomedical Applications	Research Assistant Professor	< 1
Total		2.00						

Center for Renewable Carbon								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Mark Alexander		1.00			100%	Lignin and Biomass Sampling	Research Associate I	2
Anton Astner		1.00			100%	Organisolve Fractionation	Research Associate I	< 1
Priyanka Bhattacharya		1.00			100%	Biomass Pyrolysis and Bio Oil	Post-doctoral Research Associate	2
Amanda Curde		1.00			24%	Human Resources	Administrative Support Assistant III	7
Damon Drinnon		1.00			100%	Switchgrass Production and Logistics	Coordinator III	1
Ashok Ganta		1.00			100%	Compound Research and Compound Analysis	Post-doctoral Research Associate	1
Choo Hamilton		1.00			100%	Biomass Chemical Analysis and Quality	Research Associate II	12

Center for Renewable Carbon								
Staff								
Name	**Tch**	**Res**	**Ext**	**Vet**	**Soft Funds**	**Specialty/ Responsibilities**	**Job Title**	**Yrs of Serv.**
Omid Hosseinaei		1.00			100%	Extraction and Analysis of Lignin from Biomass and Carbon Fiber	Post-doctoral Research Associate	4
Keon Hee Kim		1.00			100%	Biomass Chemical Analysis and Quality	Research Associate I	4
Lindsey Kline		1.00			100%	Biomass Pretreatment and Activation	Research Associate II	4
Jessica McCord		1.00			26%	Program Management for Sun Grant Center and IBSS	Research Associate II	5
Lisa Morgan		1.00				Financial accounting	Accounting Specialist III	20
Martha Ryan		1.00				Travel, Accounting and Event Coordination	Administrative Specialist I	6
Jingming Tao		1.00			100%	Biomass Characterization	Research Associate I	< 1
Total		14.00						

The UTIA Genomics Hub

The University of Tennessee, Institute of Agriculture Genomics Hub was founded in 2004 with support from the Tennessee Agriculture Experiment Station. The mission of this core lab is to provide, research collaboration, equipment training, usage and academic support to TAES, UT campus and beyond. The lab manager has to maintain existing instruments in good condition and acquire new instruments to serve major research needs.

General Principles

Since service contracts are prohibitively expensive, the Hub lab started an equipment maintenance account with the support of AgResearch and all the academic departments in UTIA in 2010. Based on a department's annual usage, each department contributes towards this fund. Funds put in the account are mainly used to repair existing equipment and used as leverage to purchase new or upgrade any equipment. One function of the Hub Lab manager is to assure adequate user training and no major equipment failure; funds are then rolled-over to the next year to hedge against any catastrophic failure and savings for new equipment.

The Hub lab manager also keeps a running equipment wish list. Based on the needs and research interest of the scientists, instruments are purchased when funding is available from UT AgResearch.

Equipment Usage and Fees

Currently, there are no uniform usage fees since the lab is used as a strict co-op. This plan was set up to help scientists and students in the UTIA research community have free access to high tech instruments for their research free of cost; support hands-on research and prevent outsourcing. UTIA scientists are very thankful to have these Bioinformatics, Cellomics, Genomics, Transcriptomics, Metabolomics, Proteomics and Imaging resources at their availability.

Genomics Hub Staff

Genomics Hub		
Staff		
Name	Department	Specialty/ Responsibilities
Sujata Agarwal	Plant Sciences	Ms. Agarwal has a wide range of experience in molecular biology research and in lab management. These skills have been acquired over the years at University of Tennessee, Knoxville and at Oak Ridge National Laboratory. Ms. Agarwal is currently involved with training students and post-docs with all the instruments and computer software available at the UTIA Genomics Hub lab. She also helps researchers with setting up their experiments, analyzing the results, interpreting the data and trouble-shooting any problems. She hosts workshops and seminars to familiarize scientists with the latest in the world of "Omics".

Bioinformatics

Dell Studio XPS 9000 computer & Dell precision T7600: The lab has two computers (64bit), with 24GB and 250 GB of RAM and 3 TB disk space to accommodate *de novo* sequence assembly and data analysis from various Next Gen sequencing platforms, like the Ion Torrent, Illumina and 454. Software's available are CLC*bio*, SeqMan NGen, Lasergene and Sequencher.

Cellomics

Cellometer Vision:
This is an automated cell counter and analyzer which does brightfield and multichannel fluorescence.

Accuri Flow Cytometer:
A quick and simple way to perform cytometry in the lab with blue and red lasers.

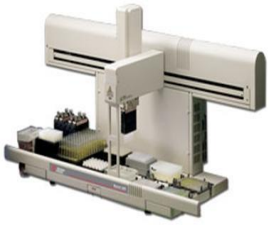
Genomics

Ion Torrent Next Generation DNA Sequencer:
The lab manager works closely with students to perform sequencing. Data from this instrument is analyzed using the Bioinformatics tools available in the lab.

Qiaxel:
This is a capillary electrophoresis system that is used for quantitation of DNA and RNA fragments.

Nanodrop ND-1000 Spectrophotometer:
This has full-spectrum UV-Vis absorbance analysis (220-750nm) capability for measuring absorbance of DNA, RNA and proteins in using 1ul of sample.

Experion Automated Electrophoresis Station:
This is electrophoresis in a chip to quantify DNA, RNA, and proteins for sequencing and microarrays.



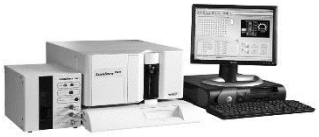
Biomek 2000 Station:
High-throughput liquid handling robot. It is used for DNA extraction, PCR and Elisas.

Transcriptomics

Maui Hybridization System:
This 4 bay system is used to hybridize microarray slides from various vendors (Aigilent, Exiqon, Invitrogen, NimbleGen, Operon, and Phalanx Biotech).

ABI 7900HT Fast Real-Time PCR:
This is used for quantitative study of gene expression, genotyping, SNP analysis and pathogen detection. This has a fast 96-well and a 384-well plate option.

Proteomics



Luminex 200:
This is a multiplexing immunoassay system allows the study of up to 100 analytes in a single well of a microtiter plate. This is very useful in studying expression of various cytokines and adipokines in human, mouse and rats.

2D gel Electrophoresis:
Protein and PAGE instruments are available for research.

Ettan Spot Picker:
This is a robotic system is designed to accurately pick protein spots from 2-D gels, and transfer the picked proteins into microplate wells for further analyses.

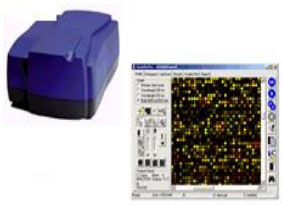
Bioteck Plate Reader:
This is used for fluorescence, absorbance and luminescence measurements.

Metabolomics

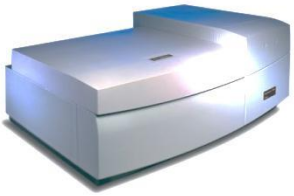
High Performance Liquid Chromatography: This system consists of an Auto-Sampler and Photo Diode Array and the Refractive Index detectors.

Imaging

Molecular Imager FX:
This system detects a wide range of fluorophores and can be used with storage phosphor technology to quantitate radioisotopes. It is used for analysis of DNA fragments on Southern and Northern Blots.



Axon GenePix 4000 Scanner:
This scanner is used for the analysis of expression data from cDNA and proteins.



Typhoon Imager:
This imager is equipped with blue, green and red excited fluorescence (457, 488, 532 and 633nm). This is used to analyze 2D gels and Western blots.

Tennessee Plant Research Center

C. Neal Stewart, Jr. and Andreas Nebenfuhr, Co-Directors

The PRC is a new, founded 2013, Center that was borne of a 5-year old cross campus initiative to integrate plant science research across The University of Tennessee, Knoxville, and the UT Institute of Agriculture as well as the Oak Ridge National Lab. There are at least 70 faculty-level people in these units that have some professional interest in plants and 24 of them are members of the PRC (prc.utk.edu), representing 7 academic departments and ORNL.

The PRC was formed to bring together research groups from UTK, UTIA and ORNL that have a common interest in understanding and applying plant biology. Plant science researchers in the Knoxville-Oak Ridge area geographically scattered and in vastly different administrative units. The main purpose is to create a **sense of community** among plant scientists in the region which can then lead to increased cooperation between research groups in the different administrative units.

The PRC funds small seed grants for the initiation of collaborative projects, student travel to professional meetings to give presentations, and holds monthly colloquia with internal and external speakers. The graduate students and postdocs of the center share leadership roles to invite and host speakers. Therefore, the center has an important training role for junior scientist professional development. Since its beginning, 5-years ago, the program has been funded jointly by the UTK and UTIA Offices of Research and is invested widely across both campuses.

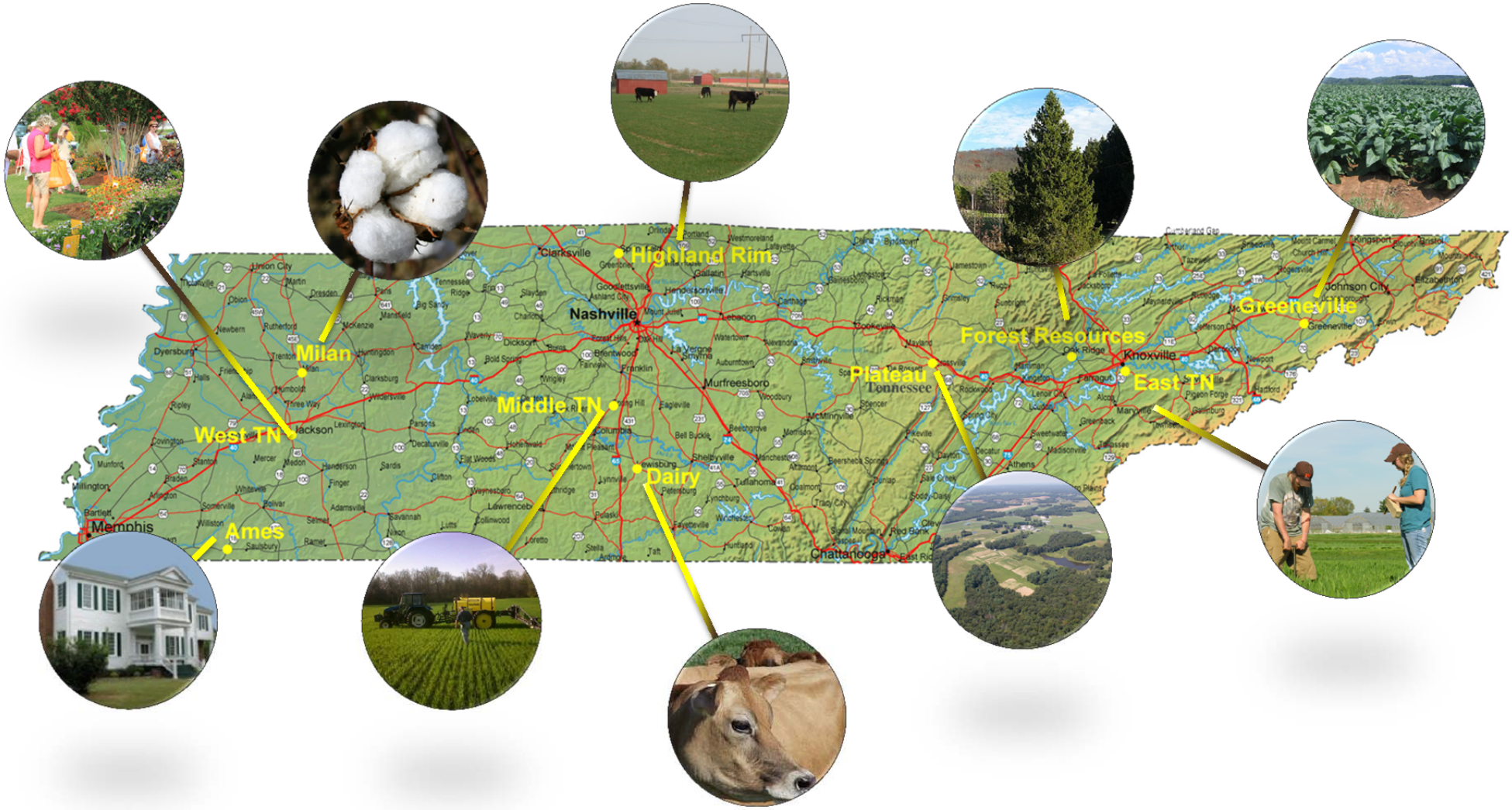
Plant Research Center Faculty and Staff

Tennessee Plant Research Center		
Faculty		
Name	**Department**	**Specialty/ Responsibilities**
Hem Bhandari	Plant Sciences	Research in Dr. Bhandari's lab is focused on genetic improvement of biomass/feedstock crops by integrating conventional selection methodologies and molecular genetics.
Brad Binder	Biochemistry and Cellular and Molecular Biology	Research in the Binder lab focuses on ethylene signal transduction.
Tessa Burch-Smith	Biochemistry and Cellular and Molecular Biology	The broad focus of the Burch-Smith Lab is the fundamental process of intercellular transport between plant cells.
Barry Bruce	Biochemistry and Cellular and Molecular Biology	Dr. Bruce's lab investigates chloroplast biogenesis, protein transport, photosynthesis cyanobacteria, and bioenergy.

Tennessee Plant Research Center		
Faculty		
Name	**Department**	**Specialty/ Responsibilities**
Feng Chen	Plant Sciences	Research in the Chen lab is centered around functional genomics of plant metabolism.
Jennifer Franklin	Forestry, Wildlife, and Fisheries	Research in the Tennessee Tree Physiology lab investigates abiotic stress on trees, tree-soil interactions, and forest restoration.
David Harper	Forest Products Center	Research in the Harper group is involved in development of technologies that foster the use and economic viability of materials derived from renewable sources for a sustainable and more secure future.
Juan Luis Jurat-Fuentes	Entomology and Plant Pathology	Dr. Jurat- Fuentes' lab focuses on the characterization of the mode of action bacterial toxins expressed in transgenic plants for insect control and potential alterations in resistant insects
Charles Kwit	Plant Sciences	Dr. Kwit's research interests include gene flow and introgression, and conservation biology, as well as plant-animal interactions, habitat management, disturbance ecology, and climate change
Niki Labbé	Forestry, Wildlife, and Fisheries	The overall goal of Labbé's research program will directly help advance the mission and vision of the Center for Renewable Carbon, Agricultural Experiment Station, University of Tennessee.
Kurt Lamour	Forestry, Wildlife, and Fisheries	Dr. Lamour studies a destructive group of fungal-like plant pathogens that cause serious damage to a huge variety of plants worldwide.
Madhavi Martin	Oak Ridge National Laboratory	Dr. Martin is pursuing R&D in the design, fabrication, and testing of environmental sensors specifically for chemical and biological applications.
Brandon Matheny	Ecology and Evolutionary Biology	Dr. Matheny's lab uses natural history collections and molecular sequence data to identify fungal biodiversity and to preform phylogeny reconstruction, particularly of mushroom-forming fungi
Andreas Nebenfuhr	Biochemistry and Cellular and Molecular Biology	Dr. Nebenfuhr's lab research centers around intracellular transport processes.
Vince Pantalone	Plant Sciences	Dr. Pantalone is responsible for the University of Tennessee AgResearch's Soybean breeding and genetics program
Dan Roberts	Biochemistry and Cellular and Molecular Biology	Dr. Robert's lab studies the role of the nodulin protein Nod26 in metabolism and osmoregulation in nitrogen fixing root nodules and evaluation of the roles of Arabidopsis NIPs in metalloid nutrition and adaptation to hypoxia stress.

Tennessee Plant Research Center		
Faculty		
Name	**Department**	**Specialty/ Responsibilities**
Elana Shpak	Biochemistry and Cellular and Molecular Biology	Dr. Shpak is interested in the cellular mechanisms of growth and development in plants.
Neal Stewart	Plant Sciences	Dr. Stewart's lab is interested in plant biotechnology and genomics.
Elizabeth Schussler	Ecology & Evolutionary Biology	Dr. Schussler's research interests are in student learning and teaching of plants.
Jen Schweitzer	Ecology & Evolutionary Biology	Dr. Schweitzer's research is broadly centered on the genetic interactions between species and the ecological and evolutionary consequences of these interactions for ecosystem processes.
Albrecht Vonarnim	Biochemistry and Cellular and Molecular Biology	Dr. Vornarnim's lab focuses on BRET, Bioluminescence Resonance Energy Transfer.
Joe Williams	Ecology and Evolutionary Biology	Dr. Williams studies the evolution of development of plant reproduction.

AgResearch and Education Centers



AgResearch and Education Center at Ames Plantation

Dr. Ricky Carlisle, Center Director

Ames Plantation was established in 1901 by Hobart Ames, a wealthy New England industrialist. He operated the grounds as a hunting preserve, livestock operation and cotton plantation until his death in 1945. His widow, Julia Colony Ames, created in her Will in 1950, the Hobart Ames Foundation, to own and operate the Ames Plantation for the benefit of the University of Tennessee and to provide the grounds for the National Championship for Field Trialing Bird Dogs. In 1950, the Ames Plantation became an "Agricultural Field Station" for AgResearch and in the early 1970's became an "Agricultural Experiment Station".

The AgResearch and Education Center (AREC) at Ames Plantation consists of 18,400 acres in the southwestern corner of West Tennessee. The AREC at Ames is the largest land base available to the UT AgResearch system. It spans two counties with 15,000 acres in Fayette County and 3,400 acres in Hardeman County. Today, the AREC at Ames Plantation is a working farm, but agricultural research is superimposed on all aspects of the row-crop and livestock commodities as well as the forestry/wildlife programs. Approximately 2,200 acres of corn, cotton, soybeans, wheat and grain sorghum are grown on the Center. The AREC at Ames also claims 200+ head of cattle and is recognized as the home of the third oldest registered Aberdeen Angus herd in the nation.

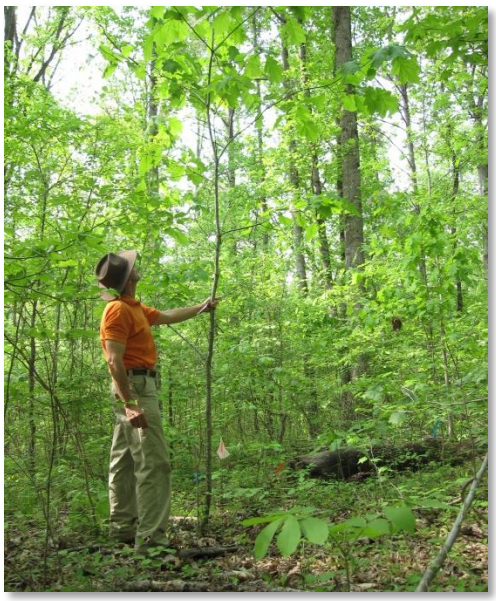
Scientists from UTIA use Ames as a site for the annual crop variety performance tests. Large scale beef cattle grazing experiments are conducted at the REC with 50 3-acre pasture, as well as, genetic research programs. The Center is largely forested with more than ~13,300 acres in bottomland and upland hardwoods and pine plantations, making it one of the premier ecological research facilities in the nation. A wide range of forest and wildlife research takes place. Wildlife research involves small mammals, quail, Cooper's hawks, coyotes, beaver, and deer. Tick and mosquito research along with their associated diseases also is underway. Forestry research includes genetic testing and development of hardwood seeds orchards; precision forestry where hardwood species are matched to micro-sites; woody biomass crops and reclamation of bottomland sites.

Angus Cattle

Ticks

In addition to the agricultural research programs, the AREC is also known for its historical and cultural value. The Ames Manor is an antebellum home that was built in 1847; and it is open for tours from April through October by special appointment. The Heritage village is home to a wonderful collection of historic structures including a 19th-century farmstead, the Stencil House (circa 1835) and a one-room schoolhouse from the early 1900's. The AREC's land base provides a unique resource for the study of a wide range of historical, archaeological and geographical issues. For more than 25 years, Ames has interfaced with a diverse audience representing all age, ethnic and socio-economic backgrounds with a message of heritage preservation through education. The AREC collaborates with Rhodes College and the University of Memphis on research programs involving archaeological studies.

Ames Manor House



Timber

For nearly 1.00 years, the AREC at Ames Plantation has been the home to the National Championship for field trialing bird dogs. Hobart Ames, a longtime president and judge of the National as well as an avid dog lover, set the field trial courses in the early 1900's and they are still largely as he placed them. Field trials are designed to test dog's hunting skills, strength and endurance. The National begins the 2nd Monday in February each year and has been held on these grounds continuously since 1915.

Bird Dog

Archaeology

Several buildings on site serve as housing for various undergraduate, graduate and professional students that spend time in our "outdoor" classroom. The "Squash Court" has 12 single beds, 2 bathrooms and a kitchen that allows students the opportunity to spend weeks in residence. The "Women Dorm" has sleeping quarters for 9 individuals, 2 bathrooms, a kitchen and washer & dryer facilities. Two RV trailers are set up near the Joe Hurdle building and have accommodations for 2 individuals each. Bryan Hall, containing a meeting/classroom, large dining area and commercial kitchen, also has barracks-style sleeping quarters, restrooms with shower facilities in the back, with room for 20 people. The Lodge is a 3-bedroom house with a bath in each room, a kitchen, living room and dining room to house guests. Some overnight stays are gratis, while others reimburse the AREC for expenses. The AREC has a building known as the Check-In Station, which is utilized by hunters during the various seasons, as a clubhouse. During the offseason it is used as a wet lab for various wildlife research projects, including the ticks.

The AREC at Ames Plantation generates 78% of its operational funds on the Center. The Foundation contributes 16% of the overall funding and UT AgResearch contributes 6%. The budget each year is totally dependent on funds generated from farming, cattle and timber sales, and hunting leases. Long term planning is extremely difficult given the many factors that influence row-crop production and timber harvest each year.

Staff located at the AREC – Ames Plantation

Name	Title UT/Ames	Education	Years of Service	Responsibilities/Duties
Ricky Carlisle	Research Center Director UT	Ph.D.	31	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, interaction with PI's, field trial mgt.
Allan Houston	Research Professor UT	Ph.D.	34	Planning/implementation for forestry/wildlife/ecological research, implementation of hunting lease programs, (or natural resource enterprising), personnel supervision, outreach events, forestry/wildlife management
Jamie Evans	Research Associate II UT	M.S	30	Research planning/implementation, row crop mgt., GIS record keeping, history & archeological research program, field plot implementation, personnel supervision field days & outreach events
Ryan Braddock	Research Associate I UT	B.S.	12	Rotational crop production, assistance with research plots & data collection, field plot implementation, record keeping, personnel supervision, field trial course mgt.

Name	Title UT/Ames	Education	Years of Service	Responsibilities/Duties
Beth Hanna	Admin. Specialist I UT	H.S	11	Receptionist, payroll, invoices, accounts receivable, data entry, field day & outreach events
James Simons	Research Associate I UT	B.S.	20	Forestry field plot mgt., data collection & harvest, frequent interaction with PI's, field days & outreach events
Ronald Wyatt	Research Associate I UT	B.S.	37	Beef Cattle Research Mgt., assistance with research plots & implementation, personnel supervision, data collection & outreach events
Chris Weatherly	Senior Carpenter UT	> B.S.	10	Maintenance & mgt. of infrastructure, equine mgt. & care, field trial assistance, outreach events
James Morrow	Farm Crew Leader UT	H.S.	35	Forestry/Wildlife field plot implementation, data collection & harvest, personnel supervision, outreach events
Matt Backus	Research Associate UT	M.S	2	Beef Cattle Research Mgt., assistance with research plots & implementation, data collection & outreach events
Larry Teague	Research Assistant Ames	B.S.	20	Forestry/Wildlife field plot implementation, data collection & harvest, outreach events
Robert Polk	Farm Labor Ames	H.S	26	Rotational Crop production, assistance with research plots, facilities & equipment maintenance
Albert Jenkins	Farm Labor Ames	H.S.	25	Rotational crop production, assistance with research plots, facilities & equipment maintenance, personnel supervision
Johnnie Jenkins	Farm Labor Ames	H.S.	6	Rotational crop production, assistance with research plots, facilities & equipment maintenance
Roberto Garza	Farm Labor UT	H.S.	6	Rotational crop production, grounds maintenance & landscaping, facilities & equipment maintenance
Mark Yearwood	Farm Labor	H.S.	2	Rotational crop production, assistance with research plots, facilities & equipment maintenance
Jonathan Luttrell	Farm Labor Ames	H.S.	4 mos.	Beef Cattle Research Mgt., assist with research plots & data collection

Infrastructure Improvements at the AREC - Ames Plantation since 2008

Item Description
Joe Hurdle Research Center – Renovate Outside of Structure – Trustee Funds
Dodge Recreation Center – Renovate Outside of Structure – Trustee Funds
Mule Barn Renovation – Complete, Inside and Outside – Trustee Funds
Brick Stable – Renovate Outside of Structure – Trustee Funds
Renovate 2 Employee Housing Structures – Trustee & Ames Funds
Relocate & Restore, Cotton Cabin, Heritage Village – Ames Funds & Cotton Council Grant via UT Cotton Specialist
New, Rhea Memorial Clubhouse, Field Trial Stables – Contributions from Rhea Family & Others, Ames made In-Kind Contributions

Equipment Purchased at the AREC - Ames Plantation since 2008

Item Description
New John Deere CX14 Heavy Duty Rotary Brush Cutter (Bushog) - UT Funds
New John Deere 455 – 30 ft. Grain Drill – Ames Funds on payments, 3 yrs.
Used John Deere 9760 STS Combine – Trustee Funds on payments, 3 yrs.
New John Deere 468 Hay Roller – Trustee Insurance Funds, replacement for burned unit
Used John Deere 7420 – 115 hp. Tractor – Ames Funds on payments, 3 yrs
New John Deere 741 Loader for 7420 Tractor – Ames Funds
Used John Deere 4955 – Trustee Funds
Used John Deere 630F Grain Header for 9760 Combine
Used John Deere Z-Track Lawn Mower – Trustee Funds
Used John Deere 825I 4x4 Gator – Trustee Funds
Used J&M 35ft. Trail Blazer Grain Header Trailer – Ames Funds
New EZ Trail Model 510 Grain Wagon – Ames Funds
New John Deere HX15 Medium Duty Rotary Brush Cutter (Bushog) - Shackelford Funds
New Trimble GeoXS Explorer – UT Funds
New Quick Draw Soil Moisture Tensionmeter – UT Funds
Aquateer Soil Moisture Meter – UT Funds
Decagon Light Meter – Shackelford Funds

Specialized research equipment located at the AREC- Ames Plantation

Item Description	
Fleet of Tractors	Utilized in the row-crop production operation, ~ 10 John Deere tractors that range in PTO horsepower from 60 to 220
Tillage Equipment	Parabolic plows, subsoiler plows, disk, do-alls, planters & grain drills
Forage Equipment	Disc mowers for hay cutting, rakes, hay rollers (capable of hay and silage rolls), square balers, silage cutter
Construction Equipment	Komatsu D-38, 1965 Caterpillar D-5, 1989 Caterpillar D-8, 1997 Kobelco 220 Track Excavator, 1963 Caterpillar 12E Motor Grader, 8 yard dirt pan, 2001 John Deere 648E Timber Skidder, 2001 Mack Tandem Axle 25 ton Dump Truck, 1997 Mack Tandem Axle Tractor with low-boy drop neck 80 ton equipment trailer ,
Center Pivot Irrigation System	Valley Irrigation that covers 105 acres of crop land in a circle.
Various ATV's	Used in research work in remote areas; 3 4-wheelers single seat models and 5 bucket seat models with beds
Fleet of Trucks	14 Pickups, 3 Bob-Trucks (5 tons) for hauling grain or silage
Harvesting Equipment	John Deere 9510 Combine, John Deere 9760 Combine, John Deere 9920 2-row plot cotton picker and a John Deere 9960 4-row cotton picker

Outreach activities at the AREC – Ames Plantation

Activity Description	
National Championship for Field Trialing Bird Dogs	First held on Ames Plantation in 1904 and has been held on Ames Plantation grounds continuously since 1915. Starts the 2nd Monday in February.
Hobart Ames Memorial Field Trial	First held on Ames Plantation in 1953. This is an open all-age event that is a qualifier for the National Championship. Starts the 2nd Monday in January.
Ames Amateur Field Trial	First held on Ames Plantation in 1978. This amateur event is one of the largest in the U.S. and starts the 1st week of January.
Amateur Quail Invitational Field Trial	Started in Como, Mississippi in 1970. It moved to the Ames Plantation in 1986 and is held the 1st week of December.
Fall Heritage Festival	First in 1997, this educational based cultural resources field day is held the 2nd Saturday in October. It brings together 120+ vendors that exhibit traditional crafts, skills and art from the 19th century.
Ames Plantation Historical Society Meetings	Four times per year the AP Historical Society meets on Ames to accomplish 2 work days in the Heritage Village, one winter meeting to discuss results of research activities during the year and once to work with the Archeological summer field school.

Activity Description	
Others	Various tours are hosted throughout the year which involves school children, FFA & 4-H club events, Historical Club meetings, in-service training for AgResearch, Extension and local agencies such as FSA, NRCS & TDF, field days involving various row-crops and livestock commodities as well as forestry/wildlife field days
Boys on Target	Disadvantaged youth (from the Children's Home) experience a 3-day camping trip learning about the out-of-doors and wildlife management

Undergraduate, Graduate and Professional Classes held at the AREC – Ames Plantation.

Class Description	
UT Senior Veterinary Students	Once during the Fall and Spring each year, the UT College of Veterinary Medicine sends a portion of their Senior Class to get hands on experience and training with the livestock on Ames Plantation in a "real" environment. Those students will spend a week in-residence and work with the staff at this location.
Fall Undergraduate Forestry Camp	Undergraduate Students from UTK will spend 2 weeks in residence on Ames Plantation receiving classroom instructions in the morning and hands-on experience in the field in the afternoon in a silvicultural class taught by our resident forester.
Thailand Exchange Students	During the first of May each year a group of exchange students from Thailand spend 1 to 2 nights on the Plantation and spend a day with staff members learning agriculture in West Tenn.
Ecology of Grazing Land Systems Forage Students	Graduate Students from UT, Missouri, Virginia Tech and Texas Tech spend 2 weeks each year touring the Southern and Mid-West Regions of the U.S. learning about various forages and grazing systems utilized in "real life" situations. Those students (~25) will stay one night at this location.
Rhodes College / University of Memphis Archeological Field School	Approximately 30 undergraduate students spend 3 weeks in residence at this location participating in an undergraduate archaeology class. Students are exposed to field and laboratory training in archaeological methodology (historic and pre-historic) as well as intense studies of supportive academic material.
Graduate Students	Students from Forestry, Wildlife & Fishery, Animal Science, Plant Science, Agricultural Engineering, Entomology & Plant Pathology, and Veterinary Medicine
Future Farmers of America	Mumford High School FFA students spend 3 days in residence with their "Officer Camp" session.

Class Description	
Boy Scouts	Boy Scouts from Troop #241 assist with the Fall Heritage Festival and spend 1 night in residence during that event. The scouts also conduct numerous "Eagle" and other service projects throughout the year which enhance various attributes of the REC.
Chancellor & Deans	These individuals stay in the Lodge during their stay to meet with the Trustees of the Foundation and attend various functions on the REC –
	Ames.
Various Faculty & Staff from UTK, MSU, Rhodes, Univ. of Memphis, Field Trial Officials and others	These various individuals will spend either a night or a couple of days and/or several weeks while working on the REC. Some pay a fee while others have included overnight lodging fees in their research projects. Those fees help to cover labor and cleaning expenses.

University of Tennessee Research Trials Underway at the AREC - AMES Plantation, 2013

Number	P.I.	Department	Nature of Study
6	Allen	Plant & Soil Science	Variety Testing – Soybeans & Corn
1	Main	Plant & Soil Science	Cotton Variety Testing
1	Keyser	Forestry, Wildlife & Fisheries	Forage Testing & Heifer Grazing
3	Trout-Fryxell	Entomology & Plant Pathology	Tick Research
2	Trout-Fryxell	Entomology & Plant Pathology	Mosquito Research
2	Harper	Forestry, Wildlife & Fisheries	Deer
6	Schlarbaum	Forestry, Wildlife & Fisheries	Forestry Genetics
3	Houston	Ames Plantation & F,W,&F	Precision Forestry & Crop Tree
2	Donald	USDA	Nematodes

Other University Research Trials Underway at the AREC - Ames Plantation, 2013

Number	P.I.	University	Nature of Study
1	Mooreland	Rhode College, Memphis	Archeology
1	Mickelson	University of Memphis	Archeology
2	Kennedy	University of Memphis	Ticks & Wildlife w/ UT
1	Romero-Severson	University of Notre Dame	Forestry Genetic Mapping
1	Carlson	Penn State University	Forestry Genetic Mapping

Faculty Located on AREC - AMES Plantation

Dr. Allan Houston - Research Professor; Forestry, Wildlife and Fisheries

Universities, Colleges, and Research Agencies Cooperating with the AREC - Ames Plantation

1. University of Tennessee AgResearch
2. University of Tennessee Martin
3. University of Memphis
4. Rhodes College, Memphis
5. Mississippi State University
6. Jackson State Community College
7. Sewanee: The University of the South
8. Union University
9. Penn State University
10. University of Notre Dame
11. Albany Game Management Project, Auburn University
12. Tall Timbers Research Station, Tallahassee, Florida
13. Quality Deer Management Association, Bogart, Georgia

Heritage Festival

Dairy AgResearch and Education Center

Mr. Kevin Thompson, Center Director

Since its inception in 1929, the Dairy AgResearch and Education Center (DREC) has been a major source of dairy research and management information for the dairy industry. The Research Center's home is Lewisburg, Tennessee located in Marshall County which historically has been a major dairy producing area of the state. The center is home to approximately 100 registered Jersey cows and approximately 85 replacement heifers. The herd has won numerous production awards throughout its rich history. Originally a USDA-ARS station, the center was jointly operated by the University of Tennessee and the USDA-ARS from 1948 until 1994. The University is now sole owner and operator of the 615 acre center.

Over the years the Dairy AgResearch and Education Center's research program has included work in all facets of dairy production. Early focus of the center concentrated on forage production for the nutritional needs of the "southern" dairy cow. Genetics and reproduction have also been areas of great focus throughout the history of the center including long term studies involving importing genetics of foreign sires verses American bloodlines. Later the focus shifted towards udder health, specifically mastitis prevention through vaccine development. Most recently, research efforts have been shifted towards animal comfort, disease vectors and low cost production inputs for heifer development.

The DREC is playing a vital role in establishing protocols associated with the organic burial of large animals. The importance of this issue arose when a longtime rendering company ceased operations; leaving cattle, sheep and horse producers without a convenient option of removing dead animals from their property. This project has proven to be an excellent example of the positive impact that AgResearch can have facilitating information to solve problems for our cliental. Also, important to note is the cooperative effort between multiple AgResearch and Education Centers and the Tennessee Department of Agriculture to accomplish this work in an efficient time frame.

Registered Jersey Herd

Headquarters building at DREC

Staff located at Dairy AgResearch and Education Center

Name	Title	Education	Years of Service	Responsibilities/Duties
Kevin Thompson	Research Center Director	M.S.	10	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's.
Hugh Moorehead	Farm Manager/ Research Associate I	M.S.	24	Daily dairying operations, herd health, Implantation of research, personnel supervision, interaction with PI's, facilities & equipment maintenance.
Frances Nichols	Admin. Specialist I	A.A.S.	14	Receptionist, payroll, invoices, accounts receivable.
David Culbertson	Farm Crew Leader	H.S.	32	Dairy operations, rotational crop production, assistance with research plots, record keeping, personnel supervision, facilities & equipment maintenance.
Vernon Pagel, Jr	Senior Farm Equipment Operator	H.S.	35	Dairy operations, rotational crop production, assistance with research plots, facilities and equipment maintenance.
Steve Witherow	Milker	H.S.	22	Dairy milk production, assistance with herd health, facilities and equipment maintenance.
Michael Fitzgerald	Milker	H.S.	10	Dairy milk production, assistance with herd health, facilities and equipment maintenance.
Jenna Murphy	Milker	A.A.S.	1	Dairy milk production, assistance with herd health, facilities and equipment maintenance.

Infrastructure improvements at DREC since 2008

Item Description	Cost
Fence for Keyser Project 1200 ft of fence	$ 6,108
Supply water lines for water fountains in Keyser Project	$3,099
Total	**$9,207**

Equipment purchased at DREC since 2008

Item Description	Cost
GPI 25' Flatbed Gooseneck Trailer	$8,930
Great Plains Drill, 10 ft' no till	$28,675
Massey Ferguson 2T 29 zero turn lawn mower	$8,400
John Deere 4055 Tractor 105 HP (used)	$36,000
Bale Wrapper 8400 Stretch-O-Matic (used)	$12,500
Ribstone Stavo Silo unloader	$9,518
New Holland 1409 disc mower/cond	$15,390
Rotary Disc Mower, Vicon CM2400	$7,450
Silage Baler Special ** out for bids*	$26,500
Total	**$153,903**

Specialized research equipment located at DREC

Item Description
Special Silage Baler **out for bids**
Great Plains Drill, 10 ft' no till
Baler Wrapper
Calan Gates -36 stalls

Outreach activities at DREC

Event Description	
Ag In the Classroom	Hosted by the Marshall County Women's Farm Bureau each year for all the fourth graders in Marshall County. Highly anticipated each year by the school children thorough out the county.
Tours	Various tours are hosted throughout the year as needed and include events such as Dairy Producers (local and abroad), Jersey enthusiasts, Breeder and Promoters, 4H and FFA groups, boy scout clubs, home-school programs, industry tours, SUDIA, DHIA training meeting.
Dairy Promotions	Supporting various consignment show/sales locally and nationally including The All American Show and Sale, KY National and the TN Jersey Cattle Club Sale.

No-till planting of Native Grass at DREC

Ag in the Class Room Day

In 2013, three principal investigators and two co-investigators currently have research projects underway at DREC and these are described below.

Research trials conducted in 2013 at DREC

PI	Department	Nature of study
Keyser	Forestry, Wildlife and Fisheries	Native Warm Grasses
Krawczel	Animal Science	Calf Study
Hawkins	Biosystems Eng & Soil Science	On-Farm Large Animal Organic Disposal
Walker	Soil Science	
McIntosh	UT Ext	

Advocacy/Advisory Groups

The Dairy Advocacy Group was formed in 2004 to embrace the vision of the Branch Experiment Stations that execute dairy research and to help achieve that vision at our center. The Dairy Advocacy Group gave birth to the Tennessee Dairy Producers Association which continues the seek a unified voice for all dairy producers in Tennessee in a manner that will expedite a consistent response to any issue that might affect the short or long range viability of the dairy industry in Tennessee.

Faculty Located on DREC

No faculty are housed at DREC; however temporary housing is available for faculty and students in the John Owen Residence for conducting research trials.

East Tennessee AgResearch and Education Center

Dr. Bobby Simpson, Center Director

The East Tennessee AgResearch and Education Center (ETREC) is comprised of six different units, four in Knox County and two in Blount County, for a total of 1,968 acres. The primary purpose of ETREC is to support and facilitate the research programs of UT AgResearch faculty. At any one time, ETREC typically has over 1.00 active research trials underway, with over 40 faculty researchers conducting those studies. Occasionally, as space and resources allow, researchers from non-UTIA departments, such as Ecology, Microbiology, Earth & Planetary Sciences, and the Center for Environmental Biotechnology also carry out studies at ETREC.

The overall agricultural research program conducted at the various ETREC units is very diverse and multi-faceted. One current program focus involves a comprehensive weed science/management research effort, where effective, economical, and environmentally-sound (the 3 E's) methods for control of invasive/pest weeds are studied. The weed science program includes efforts in row crops, turfgrass, ornamentals, and pasture/hay land

Other research emphases at ETREC include, but are not limited to, switchgrass/biofuels, turfgrass management, soybean/corn/wheat breeding, row crop and forage variety testing, organic vegetable production, grazing native warm-season perennial grasses, study of animal diseases, aquatics, and beef cattle reproduction. A relatively new program at ETREC is a comprehensive research program which investigates the 'animal agriculture x environment' interaction, in which faculty investigators study the effects of a modern dairy operation on soil, water and air quality in the environment.

ETREC is unique in its proximity to the UT campus, and thus plays a key role in the support of many of the teaching and field laboratory activities of UT's College of Agricultural Sciences and Natural Resources and College of Veterinary Medicine. In 2011, we also initiated a student housing internship program in which CASNR majors have an opportunity to live at ETREC rent-free, in exchange for 12 hours of work per week on the center.

Holston Unit (425 acres) – beef cattle, veterinary entomology, warm-season perennial grasses, switchgrass genetics, wheat breeding program, weed science.

Johnson Animal Research and Teaching Unit (JARTU; 195 acres) – poultry, swine, disease resistance, amphibians, aquatics, cattle, sheep, reproductive physiology laboratories, dog/cat surgery teaching suites (CVM), feed mill, Lindsay B. Young Beneficial Insects Laboratory (Department of EPP), used restaurant oil recycling (Southern Alliance for Clean Energy), Hydrogen Refueling Demonstration (College of Engineering), Cherokee Woodlot, composting/mulch site (Facilities Services).

Plant Sciences Unit (212 acres) – corn and soybean breeding program, turfgrass sciences, including the Center for Athletic Field Safety, weed science, switchgrass genetics, basic plant genetics, Tennessee Tree Improvement Program, forage variety testing, specialty crops research such as olive trees and hazelnuts, greenhouse strawberry production, greenhouse availability, insect quarantine facility.

Organic Crops Unit (91 acres) – organic vegetable production, high tunnel production systems, rainwater catchment for irrigation, cover crops, crop rotations for organic systems, student market garden, organic greenhouse, food safety and packinghouse best management practices.

Blount Unit (515 acres) – beef cattle management and reproduction, embryo transfer, organic burial for large animal mortalities, eastern gamagrass grazing, pasture and hay weed control, hybrid poplar field trials.

Little River Animal and Environmental Unit (530 acres) – mastitis control/immunology/milk quality, reproductive endocrinology, animal behavior/cow comfort/animal well-being, groundwater flow patterns, constructed wetlands/shallow-water treatment zones, weed control in forages, best management practices for nutrient management, monitoring of water quality in bodies of water and in strategic areas following a rain event.

Staff located at ETREC

Name	Title	Education	Years of Service	Responsibilities/Duties
ETREC Office:				
Bobby Simpson	Research Center Director	Ph.D.	19	Center administration, personnel, budget, research planning, center infrastructure
Mark Campbell	Research Center Assistant Director	Ph.D.	24	Center administration, animal care and use, cropping inputs and planning, safety, staff training, field day planning
Kim Lane	Administrative Specialist II	H.S.	22	Receptionist, support to Dir. & Asst. Dir., payroll, human resources policy, field day planning and outreach events
Christy King	Accounting Specialist II	H.S.	16	Receptionist, accounting activities, budget ledgers
Holston Unit:				
Bennie Nuchols	Farm Crew Leader	H.S.	27	Personnel supervision, assistance with research plots, interaction with PI's, facilities and equipment maintenance
Jason Guinn	Senior Field Worker	H.S.	12	Farm equipment operation, livestock handling and feeding; crop planting and harvesting
David Burnette	Senior Herd Caretaker	H.S.	8	Farm equipment operation, livestock handling and feeding; crop planting and harvesting
JARTU:				
Roger Long	Research Coordinator I	H.S.	23	Coordinate and perform technical work to support research projects, personnel supervision
Carl Sands	Field Worker	H.S.	30	Farm equipment operation, handling livestock and feeding
Tammy Howard	Senior Herd Caretaker	H.S.	17	Farm equipment operation, handling livestock and feeding
Billy Tipton	Assistant Herd Caretaker	H.S.	2	Farm equipment operation, handling livestock and feeding

Name	Title	Education	Years of Service	Responsibilities/Duties
Plant Sciences Unit:				
BJ DeLozier	Farm Manager	B.S.	3 mo.	Management of staff, research program, equipment, land resources
Derek Hopkins	Farm Crew Leader	H.S.	19	Personnel supervision, assistance with research plots, interaction with PI's, facilities and equipment maintenance
Charles Summey	Senior Field Worker	H.S.	25	Farm equipment operation, crop planting and harvesting
Brad Reagan	Light Farm Equip. Operator	H.S.	11	Farm equipment operation, crop planting and harvesting
Vasilj Bobrek	Senior Plot Caretaker	H.S.	14	Assistance with research plots, interaction with PI's, facilities and equipment maintenance
Organic Crops Unit:				
Lee Ellis	Research Associate I	B.S.	33	Field plot implementation, data collection and harvest, GIS record-keeping, interaction with PI's
Bill Lively	Farm Crew Leader	H.S.	25	Personnel supervision, assistance with research plots, interaction with PI's, facilities and equipment maintenance
Blount Unit:				
Brandon Beavers	Farm Manager	B.S.	12	Management of staff, research program, equipment, land resources
Carl Dockery	Senior Field Worker	H.S.	13	Farm equipment operation, handling livestock and feeding, crop planting and harvesting
Patrick Ray	Senior Herd Caretaker	H.S.	18	Farm equipment operation, handling livestock and feeding
Walter Ray	Senior Herd Caretaker	H.S.	17	Farm equipment operation, handling livestock and feeding

Name	Title	Education	Years of Service	Responsibilities/Duties
Little River Unit:				
Charlie Young	Farm Manager	M.S.	11	Management of staff, research program, equipment, land resources
Mark Lewis	Research Associate I	B. S.	34	Field plot implementation, data collection, nutrient management plan, GIS record-keeping, interaction with PI's
Tate Walker	Farm Crew Leader	H.S.	3	Personnel supervision, assistance with research plots, interaction with PI's, facilities and equipment maintenance
Aaron McKenry	Asst. Herd Caretaker	B.S.	2	Farm equipment operation, handling livestock and feeding, crop planting and harvesting
Luis Lara	Senior Milker	H.S.	19	Milking, feeding, livestock care, care and cleaning of equipment, assist faculty researchers
MaShawn Lane	Milker	H.S	2	Milking, feeding, livestock care, care and cleaning of equipment
Kenneth Johnson	Asst. Herd Caretaker	M.S.	14	Farm Equipment operation, handling livestock and feeding
Maintenance Shop:				
Terry Lee	Service Supervisor IV	H.S.	20	Personnel Supervision, building renovations, carpentry, plumbing and electrical, general maintenance upkeep
James Bomar	Sr. Maintenance Worker	H.S.	15	Building renovations – carpentry, plumbing and electrical, general maintenance upkeep

Infrastructure improvements at ETREC since 2008

Item description	Cost
Renovation/upgrade of residences (n = 6; Holston and Blount Units)	$70,000
Improved surface integrity of farm roads (Holston, PSU and LRAEU)	$12,000
Installation of variable-speed drives on HVAC system (JARTU)	$90,000
Construction of new turfgrass equipment storage building (PSU)	$90,000
Installation of new turfgrass irrigation pump (PSU)	$12,000
Installation of irrigation system for enhanced ornamental research (PSU)	$8,000
Renovation and conversion of insectary to insect quarantine building (PSU) (paid by Dept. of EPP)	$1.00,000
Construction of new equipment/materials storage building (OCU) (cost-share with Dept. of FWF)	$85,000
Construction of 4 new high tunnels (OCU)	$20,000
Renovation/upgrade of organic greenhouse (OCU) (cost-share with Dept. of Plant Sciences)	$55,000
Upgrade and modernization of farm's electrical sytem/capacity (OCU)	$40,000
Replacement and upgrade of electrical service wiring/lighting in beef barns (Blount; deferred maintenance project – in progress)	$60,000
Installation of new vinyl siding and shingle roofing (hail damage replacements)	Insurance claim
Design and construction of new buildings and support structures/system for the new Little River Animal & Environmental Unit (LRAEU), including milking parlor, free-stall barn, sand separation channel, solid separator and manure solids storage building, laboratory, conference/office building, calf housing area, feed preparation building, silage storage bunkers (6), hay storage sheds (2), farm shop, equipment storage, above-ground fuel tanks (2), earthen manure storage pit, above-ground liquid manure storage tank, four new residences.	$12,500,000
New fencing for pastures	$70,000
Installation of sub-surface drainage system for cropping fields (in progress)	$225,000
Total	**$13,437,000**

Equipment purchased at ETREC since 2008

Item Description	Cost
Compact SUV 4x4	$18,757
HP LJ 4730XS Color Copier	$3,300
GPS Mobile Mapper CX & Bundle	$2,376
Dell Latitude D830	$1,623
Cub Cadet Mower Model 14W-3DM-010/	$3,023
Smokey MTN Motors/Outback Trailer	$2,571
John Deere Gator HPX 4x4	$8,599
Gravely Outfront Riding Mower	$8,900
Hay Rake Caddy 10 Wheel	$3,941
6' Bushhog	$1,950
17' Hydraulic Fold Tedder	$4,800
New Holland 6030 Tractor	$55,750
New Holland Rotary Disc Mower-Conditioner	$26,002
New Holland 840 front end	$8,912
Used CM-20 Livestock Trailer	$6,500
Gravely Outfront Riding Mower	$9,350
Massey Ferguson 510 Combine (used)	$4,1.00
Dell OptiPlex 980 Interl Core i7 Quad Core	$1,585
Skid steer loader 70 hp	$33,484
John Deere XUV 620i 4x4 Gator	$8,599
New Holland T-7040 Farm Tractor with cab, 150 hp	$75,950
New Holland T-5040 Farm Tractor with cab, 70 hp	$49,950
Farm Tractor New	$13,445
Farm Tractor New Holland Workmaster 55	$43,897
NH L-175 Forage Harvester w/NH 824 Two Row Corn Head	$37,487
Hay Tedder Kuhn GF502THA	$5,847
Round Baler New Holland BR7060	$18,397
Small Square Baler New Holland BC5050	$10,487
Woods BW180HD 15' Rotary Cutter	$10,800
H7220 New Holland Discbine Disc Mower Conditioner	$14,145
Skid Steer Loader 45 hp	$17,674
Kuhn Night VSL 150 TMR Mixer	$29,487
Commercial Grade Outfront Riding Mower Gravley	$8,900
Chassis Cab DRW	$25,850
1/2T P/U 4x4 8'	$18,895
1/2T P/U Crew Cab 4x4 6'	$21,154
2011 Featherlight 8120 Livestock Trailer	$18,900
Manure Pump	$10,340

Item Description	Cost
Manure Pump	$9,952
Front End Loader New Holland 840TL	$11,700
Luck Now 330 TMR Mixer	$7,500
H&S Model 5120 Manure Spreader	$26,185
Heracell CO2 Incubator with Stainless Steel	$5,943
Sorvall Refrigerated Tabletop Centrifuge	$6,850
Isotemp -80 Ultra Low Freezer	$7,719
Biological Hood with Stand	$7,158
Ibex Pro Ultrasound Scanner with Monitor and Goggles	$11,695
2002 Kneverland Single Bale Wrapper	$8,500
82hp Skid Steer Loader New Holland L-225	$34,446
Kuhn 8 Wheel V Rake Model SR108	$4,650
Kewanee 14' Cultimulcher	$2,800
Hotsy Pressure Washer 1300 psi	$2,556
72" Extreme Duty Brush Cutter	$4,900
Tool Storage Box	$3,000
John Deere 235 Disc 17'1"	$4,995
Dell OptipPlex 990 Desktop EAP 3.4 GHz	$1,814
BellaAg Computerized System to Measure Core Body	$4,850
Rhino F9013 20' Double Fold Disc & Harrow	$4,300
JD 7000 Corn Planter	$4,900
No-Till Drill Great Plains Model 3P606NT	$11,650
Millcreek Model 406 Row Mulcher	$12,845
Kubota Compact Tractor	$11,900
John Deere Gator TH 6x4	$6,800
HE1948 FXP, Gear Drive, 19 Kawasaki 48" Fixed Deck	$4,780
Hege Research Plot Planter	$40,438
Forage Plot Harvester System	$75,220
Kifco T200L Tubine Drive Traveling Gun Irrigation (2)	$23,194
10' Spreader w/HYD Shutoff	$4,185
Side-Dresser Fertilizer Applicator	$3,452
Model SR2000 Indicator	$2,288
Latitude C840 Computer	$2,597
Dell Latitude C840	$2,485
2013 Ford 3/4 Ton 4x4 Truck	$21,642
1999 Ford 1 Ton 4x4 Truck (used)	$9,400
2008 Ford 3/4 Ton Utility Truck (used)	$11,000
TOTAL	**$1,066,019**

Specialized research equipment located at ETREC

Item Description
Carter Forage Harvester
ALMACO Research Plot Combine (2-row harvest; 4-wheel drive)
ALMACO Research Plot Combine (on order; 2-row harvest; 4-wheel drive)
ALMACO Plot Thrasher Model LPR UT561171
HEGE 1.000 Plot Planter
First Products Fertilizer Spreader/ Side Dresser
T200L Kifco Water Reels (2)
B140 Kifco Water Reels (2)
Great Plains Grain Drill Model 3P606NT-0975
Imants Spading Machine 35FE180RH
John Deere 5225 Tractor
Alamo Flail Mower SHD74
Curtis TMA180 Model 180C
I & J Mfg, 10 ft Roller Crimper
Kubota B7510, UT581703
GPS Mobile Mapper CX & Bundle
H&S Model 5120 Manure Spreader
Heracell CO2 Incubator with Stainless Steel
Sorvall Refrigerated Tabletop Centrifuge
Isotemp -80 Ultra Low Freezer
Biological Hood with Stand
Ibex Pro Ultrasound Scanner with Monitor and Goggles
BellaAg Computerized System to Measure Core Body
Trimble ProXRS GPS Receiver, with ESRI ArcGIS Desktop software (mapping)
Portable Dell Latitude 10-ST2 Tablet with WiFi broadband connectivity

Outreach activities at ETREC

Event	Description
Beef and Forage Field Day	This event, in its current format, was first held in 1997, and is a collaborative effort between ETREC and the UT Extension – Eastern Region. The program typically combines research reports and general education presentations on best management practices for beef and forage producers. Beginning in 2014, we will implement a new plan and rotation for holding site-specific field days at the ETREC-Blount Unit and ETREC-Little River Animal and Environmental Unit, geared for beef and dairy producers, respectively.
Organic Crops Field Tour	First held in 2009, this growing event features a first-hand look at active research projects at the ETREC-Organic Crops Unit.
Turf and Ornamental Field Day	First held in 2008, we recently expanded this popular event to include presentations on ornamental horticulture. A serious and enthusiastic crowd attends this field day, ranging from golf course superintendents, athletic field managers, landscapers, sod producers, industry representatives and homeowners.
Blount County Farm Tour	This event is held in collaboration with the Blount County Farm Bureau Women organization. Over 400 4th-graders will visit the ETREC-Blount Unit to learn about agriculture and how/where their food is produced.
Twilight Forage Tour	This late afternoon/early evening outreach event focuses on current research being conducted in the area of summer grazing.
Others	ETREC hosts a variety of other events throughout any given year. These events include UT Extension Eastern Region – 4-H Livestock Judging Contest, UT Extension Eastern Region – 4-H and FFA Land Judging Contest, UT Extension Eastern Region – 4-H Wildlife Judging Contest and the State 4-H Forestry Judging Contest. ETREC also regularly hosts a variety of tour groups.

Research trials conducted in 2013 at ETREC

PI	Department	Nature of Study
Allen	Plant Sciences	Corn (grain and silage), soybeans, wheat, strawberries
Bhandari	Plant Sciences	Switchgrass genetics
Brosnan	Plant Sciences	Turfgrass weed science
Buckley	FWF	Control of exotic invasive plant species in woodland
Butler	Plant Sciences	Organic management practices
Cheema	Food Science	Dairy / milk proteins
Davis	Engineering	Hydrogen refueling demonstration
Deyton	Plant Sciences	Strawberry production
Godkin	Animal Science	Early embryonic survival in sheep
Gray	FWF	Amphibians / ranaviruses
Hanning	Food Science	Probiotics/antimicrobials
Hawkins	BESS	Field borders – best management practices; Organic burial for large animal mortalities
Horvath	Plant Sciences	Turfgrass diseases
Keyser	FWF	Native warm-season grasses
Klingeman	Plant Sciences	Monitoring insect pests of trees/ornamentals
Kojima	Animal Science	Swine – drug delivery system
Krawczel	Animal Science	Animal well-being, animal behavior, cow comfort
Leib	BESS	Rainwater catchment for irrigation
Lin	Animal Science	Bacteriology in poultry
McIntosh	Plant Science	Forages
McKay	EPS	Groundwater flow patterns
Mueller	Plant Science	Row crop weed science
Mulliniks	Animal Science	Beef cattle nutrition
Ownley	EPP	Evaluation of specialty crops
Prado	Animal Science	Presence of bacteria on dairy farms
Rhodes	Plant Sciences	Weed science in pasture and hay land
Rials	CRC	Hybrid poplar tree field trials
Rogers	Plant Sciences	Organic vegetable practices and study of stink bugs
Sams	Plant Sciences	Strawberry production
Schlarbaum	FWF	Tree genetics and improvement
Skinner	EPP	Apiculture; wildflowers for attraction of native pollinators
Sorochan	Plant Sciences	Turfgrass management and Athletic Field Safety
Stewart, S.	EPP	Kudzu bugs and stink bugs

PI	Department	Nature of Study
Stewart, N.	Plant Sciences	Switchgrass genetics
Tanco	Small Animal	Bovine endocrinology
Trout-Fryxell	EPP	Study of mosquitoes and ticks
Vargas	Plant Sciences	Ornamental weed science
Voy	Animal Science	Poultry adipose tissue
Waller	Animal Science	Steer nutrition
West	Plant Sciences	Corn and wheat breeding
Whitlock	CVM – LACS	Animal reproduction and endocrinology
Wiggins	EPP	Beneficial insects
Wilson	FWF	Fisheries (sturgeon, spot-fin chubs)
Wszelaki	Plant Sciences	Organic vegetable management systems and food safety

Faculty Located on ETREC

No faculty are housed at ETREC; however, over 40 principal investigators and numerous graduate students currently have research underway at ETREC.

Advocacy/Advisory Groups

ETREC works jointly with MTREC and DREC to interact with the AgResearch Dairy Advocacy Group. We meet two times a year, rotating among the three centers with dairy cattle. This group was instrumental in obtaining funding from the state legislature for the construction of the ETREC-Little River Animal and Environmental Unit.

We also have plans to organize an advocacy group from Blount County that will focus on the activities and advancement of the ETREC-Blount Unit and ETREC-Little River Animal and Environmental Unit.

Cooperating Agencies Located at ETREC

The Tennessee Department of Agriculture leases a building from ETREC. A staff of at least 5 people work out of this office, serving in a regulatory and pest monitoring/control role. One staff member of the USDA-Animal and Plant Health Inspection Service is also housed in this building.

ETREC also cooperates with, and provides facilities/resources for, UT Facilities Services, UT College of Engineering, UT Department of Earth & Planetary Sciences, the Southern Alliance for Clean Energy, and the National Oceanic and Atmospheric Administration.

UT Forest Resources AgResearch and Education Center

Dr. Kevin Hoyt, Center Director

Established in 1964, the UT Forest Resources AgResearch and Education Center (FRREC) is headquartered in Oak Ridge, Tennessee, with remote branch units located in the Cumberland Mountains, and on the Highland Rim. During the past 50 years, the Center has initiated over 150 long-term research projects in the broad areas of forest management, wildlife science, plant sciences, entomology and plant pathology, social sciences, and ecology. The center is comprised of 11,500 acres of primarily oak-hickory forest type. The FRREC maintains manager residences, offices, and associated farm equipment shops on all three units. The Cumberland Forest and Highland Rim Forest sites have fully equipped bunkhouses for onsite student quarters during field data collection activities. The headquarters site also contains the 250-acre UT Arboretum, which is designated for public access, research, education and community outreach. It features more than 2,500 woody plant specimens, public gardens, demonstration projects, and over 7 miles of walking trails.

The FRREC has been instrumental in developing some of the earliest research on strip mine reclamation, prescribed fire in hardwood “barrens”, tree improvement, and Appalachian hardwood silviculture. Recent research projects have been focused on Dogwood breeding, herbaceous herbicide control, artificial oak regeneration, hardwood silviculture, migratory song birds, best management practices for storm water, and integrated forest pest management.

The UT Forest Resources AgResearch and Education Center mission is to: (1) provide the land and supporting resources necessary for conducting modern and effective forestry, wildlife, and associated social, biological and ecological research programs; (2) demonstrate the application of optimal forest and wildlife management technologies; and (3) assist with transfer of new technology to forest land owners and industries.

Strip Mine

Prescibed Burn

Staff located at FRREC

Name	Title	Education	Years of Service	Responsibilities
Kevin P. Hoyt	Center Director	Ph.D.	2	Research planning, implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's.
Lynne Lucas	Admin. Specialist I	B.S.	18	Receptionist, payroll, invoices, accounts receivable, field day and event planning.
Jimmie Duncan	Sr. Farm Equipment Operator	H.S.	26	Research plot maintenance, grounds keeping, and equipment operation and maintenance.
Howard Garner	Forest Manager Assistant	H.S.	3	General farm/forest operations task and research project maintenance.
Todd Hamby	Sr. Fieldworker	H.S.	13	General farm/forest operations task and research project maintenance.
Yvonne Hitchcock	Sr. Fieldworker	H.S.	30	General farm/forest operations task and research project maintenance.
Randall Maden	Sr. Fieldworker	H.S.	2	General farm/forest operations task and research project maintenance.
Martin R. Schubert	Forest Manager	M.S.	15	Management of the Cumberland Forest, field plot implementation, data collection, frequent interaction with PI's.
Michael Trammell	Farm Crew Leader	H.S.	25	Research plot maintenance, record keeping, personnel supervision, facilities & equipment maintenance.

Infrastructure improvements at the FRREC since 2008

Item Description	Cost
Parking lot expansion project at the UT Arboretum	$180,000
Remodel of the Oak Ridge Forest Director's Residence	$31,953
Roof replacement at the Highland Rim Manager's House	$6,685
HVAC system replacement at the Cumberland Forest Manager's House	$6,350
Shop roof repair project at the Cumberland Forest	$4,864
Heat pump replacement at the Highland Rim Forest Manager's House	$4,250
Cement project at the UT Arboretum	$2,650
Parking lot lighting project at the UT Arboretum	$2,021
New guttering installed at the Cumberland Forest Manager's House	$1,761
New carpeting installed in the Highland Rim Manager's House	$951
System forest road maintenance, improvement, construction projects (estimate)	$10,000
Total	**$251,484**

Equipment purchased at FRREC since 2008

Item Description	Cost
Kubota Tractor and Farm Implements	$37,167
Ford Explorer	$21,936
Polaris Ranger ATV	$9,633
Snapper Riding Mower (2)	$9,095
Case Tractor Hydraulic Lift and Bucket Assembly	$7,600
FARMI Logging Winch	$4,994
Firewood Log Splitter	$2,387
Dell Desktop Computer (2)	$2,169
ATV Trailer	$1,229
Gravely Commercial Push Mower	$960
Joystick V for Tractor Arm	$826
Total	**$97,996**

Specialized research/operations equipment located at FRREC

Equipment Description
Tree planting tractor implement
Bull dozer fire plow unit and associated Chevrolet hauling unit
Tractor PTO auger set for research plot preparation
Tractor bedding harrow and plow unit
Enclosed bird containment aviaries (4)
HP Map Plotter
Computer hardware and software for mapping, timber inventory, and data manipulation

Outreach activities at FRREC

Event	Description
Woods and Wildlife Field Day	Forestry-related field days were initiated in the 1970's, and have been hosted annually since then. The annual event was renamed as "Woods and Wildlife" in 2012 in keeping with the main research and education emphasis of the Center.
Tennessee Healthy Hardwoods	This event is co-sponsored by UT Extension and the Tennessee Division of Forestry and is held at various locations around the state. The Center has hosted the event at different field units when asked to participate.
Tennessee Master Logger Training	This continuing education program for loggers is sponsored by the Tennessee Forestry Association and held around at various locations around the state. The Center has hosted several sessions through the years and has become a regular host location since 2012.
Tennessee Tree Farm Field Day Program (future)	The Center is looking is planning to build a partnership with the American Tree Farm System to provide education, outreach, and research project opportunities for small family forest landowners.
UT Arboretum Plant Sales	The Center works directly with the UT Arboretum Society in hosting the spring and fall plant sales at the Oak Ridge location. These two events are the main volunteer fundraising activities for the Center.
UT Arboretum Lecture Series	These educational events are hosted throughout the year at the Oak Ridge Roane Sate College campus. They are focused on science and technology topics of interest related to FRREC research/operations. UT Scientists and resource professionals are invited in as the topic speakers.
Others	Other events are hosted throughout the year as needed and include training seminars for allied resource professionals, community outreach events, UT Arboretum/UT Society educational events (i.e. Mother's Night Out, Butterflies and Insects, Owl Prowl, Gardening Workshops, Geocaching Workshops, etc.).

Research projects initiated in 2012/13 at FRREC

ID#	PI	Department	Nature of Study
1001	Graham Hickling	FWF	Questing behavior of ticks
1005	Bob Trigiano	EPP	Evaluation of F2 Population of Flowering Dogwood (Cornus florida)
1027	Bill Klingeman	Plant Sciences	Field Monitoring for Walnut Twig Beetle in Walnuts and East TN Field Sites
1129	Scott Schlarbaum	FWF	Artificial regeneration of oaks in even and uneven-aged systems
1138	Jennifer Franklin	FWF	Carbon Partitioning in Trees and Soils #2
1162	Daniel Yoder	BESS	Forest Access Road Demonstration and Sediment Monitoring Project Site
1164	Daniel Yoder	BESS	Converting On-Site Waste Biomass into Biochar for Rapid Genesis of Topsoil
1166	Phillip Wadl	EPP	Evaluation of Ornamental Traits of Ruth's Golden Aster (Pityopsis ruthii)
1193	Wayne Clatterbuck	FWF	Stratification of forest classifications to increase the accuracy of growth and yield models
1223	Phillip Wadl	EPP	Evaluation of F1 Hybrids of Kousa Dogwood
1226	Timothy Rials	CRC	Populus Clone and Spacing Trial
1254	Javi Vargas	Plant Sciences	Cut Stump: Aminocyclopyrachlor evaluations for control on Russian olive
1255	Javi Vargas	Plant Sciences	Evaluation of aminocyclopyrachlor blends for control of Japanese stiltgrass
1256	Javi Vargas	Plant Sciences	Programs for Annual Grasses and Broadleaves Control in right-of-ways
1258	Jennifer Franklin	FWF	Ground covers for reforestation
1263	Javi Vargas	Plant Sciences	Roadside Vegetation Management / Esplanade
1273	Jenn DeBruyn	BESS	Feral Hog Carcass Composting Demonstration
1282	Charles Kwit	FWF	Spatiotemporal role of seed-dispersing ants on soil nutrient enhancement and directed dispersal
1287	David Buckley	FWF	Intercropping Oak and Pine
1302	Javi Vargas	Plant Sciences	Evaluation of Ready To Use mixtures for industrial brush control for invasive weeds in pasture/forested sites.

FRREC Advocacy/Advisory Groups

The University of Tennessee Arboretum Society (UTAS) is a non-profit organization of volunteers from throughout Tennessee, dedicated to furthering the objectives and programs of the Forest Resources Research and Education Center's Arboretum Project in Oak Ridge, Tennessee. Chartered in 1965, the Arboretum Society has assisted the Arboretum by providing support and funding for such projects as expanding plant collections, constructing facilities to enhance the public's use and enjoyment of the Arboretum, and informing the public of the unique value and importance of the Arboretum to the area.

Faculty Located on FRREC

No faculty are currently housed at the FRREC; however, 18 principal investigators and several co-investigators (UTK departments and outside collaborating agencies) currently have research underway at the FRREC.

Cooperating Agencies Located on FRREC

The UT Institute for Public Service – UT Forensic Academy has a field based crime scene investigation unit on the Oak Ridge site. The Oak Ridge National Lab (ORNL) has completed research project work on the Oak Ridge site, and is anticipated to do so in the future. The US Forest Service – Forest Inventory Analysis Unit has installed a forest inventory demonstration plot on the Oak Ridge site and holds personnel training and client outreach at the plot site.

Fall Plant Sale

FRREC Entrance

AgResearch and Education Center at Greeneville

Mr. Rob Ellis, Center Director

Founded in 1932 and originally known as UT's Tobacco Experiment Station, the facility's name was changed to the AgResearch and education Center at Greeneville (AREC-Greeneville) to more accurately reflect the center's mission to meet the agricultural research and information needs of upper East Tennessee. The center includes 500 acres plus additional land that is locally leased to meet the scientists' requirements.

Tobacco remains a significant and profitable commodity for the region's farmers, and the center remains committed to researching production improvements. Varieties developed through the facility's breeding program accounted for better than 75 percent of the 2011 U.S. burley crop.

Beef is among Tennessee's top commodities. Some 42,000 producers sell more than $545 million in cattle and calves annually. Greene County is among the most productive beef cattle counties in the state, with other East Tennessee counties contributing heavily to the total.

Efforts to help cattle producers include evaluation of replacement heifers and reproductive efficiency the health and development of weaned calves.

Forage evaluations also rank high among the center's priorities. Scientists conduct an extensive annual forage variety testing program to provide area producers with up-to-date information on forage quality and effects on livestock fertility and weight gain.

AREC Entrance

Agronomic Plots with Facilities in the background

Staff located at AREC-Greeneville

Name	Title	Education	Years of Service	Responsibilities/Duties
Rob Ellis	Research Center Director	M.S.	20	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's.
Amelia Rader	Admin. Specialist I	H.S.	28	Receptionist, payroll, invoices, accounts receivable, field trial assistance.
Charles Click	Research Associate I	M.S.	29	Field plot implementation, plot maintenance, data collection and harvest, data manipulation, frequent interaction with PI's.
Richard Hensley	Research Associate I	B.S.	29	Field plot implementation, plot maintenance, data collection & harvest, data manipulation, frequent interaction with PI's.
Wayne Gibson	Research Technician III	H.S.	20	Field plot implementation, plot maintenance, Pesticide application and records.
John P. Sane	Senior Farm Crew Leader	H.S.	27	Personnel management, record keeping, research plot assistance, facilities and equipment maintenance
Charles Ricker	Plot Caretaker	H.S.	35	Assistance with research plots, record keeping, facilities and equipment maintenance
Dale Gregg	Senior Farm Equipment Operator	H.S.	19	Assistance with research plots, record keeping, facilities and equipment maintenance, equipment operation
Lynn Ottinger	Senior Field Worker	H.S.	13	Assistance with research plots, record keeping, facilities and equipment maintenance
Allen Grubbs	Senior Field Worker	H.S.	13	Assistance with research plots, record keeping, facilities and equipment maintenance
Jeff Neas	Field Worker	H.S.	5	Assistance with research plots, record keeping, facilities and equipment maintenance

Infrastructure improvements at AREC-Greeneville since 2008

Item Description	Cost
Tobacco Transplant Greenhouse 35'x96'	$31,000
Dark Tobacco Barn	$24,000
Replace Metal Roof on 3 Barns	$28,470
Seal Driveway and Parking Areas	$5,000
Total	**$88,470**

Equipment purchased at AREC- Greeneville since 2008

Item Description	Cost
Stoll 20' Stock Trailer	$7,340
John Deere 458 Round Baler	$23,814
Carter Forage Harvester	$75,220
Bush Hog 3210 10' Rotary Cutter	$6,700
Kuhn EL92 Rotary Tiller	$7,267
MF 2625 Tractor	$16,476
Lee Hi-Trac Sprayer	$98,784
3 Large Burley Tobacco Balers	$18,000
Case Farmall 85U Tractor	$29,830
Kuhn GMD 600 Disc Mower X 2	$14,790
New Holland BC5070 Square Baler	$18,766
Total	**$316,987**

Specialized research equipment located at AREC- Greeneville

Equipment Description
Carter Forage Harvester
Lee Hi-Trac Sprayer
Great Plains 6' No-till Drill with Native Grass Attachment
3 Large, Burley Tobacco Balers

Outreach activities at AREC- Greeneville

Event	Description
Tobacco and Forage Production Field Day	Held biennial during different times of growing season. Address new developments in tobacco and forage production
Northeast Tennessee Beef Expo	Held annually in October for over 20 years. Address new developments in beef production.
Northeast Tennessee Career Day	Held annually in conjunction with Northeast Tennessee Beef Expo. Invite high school juniors and seniors interested in a career in agriculture along with colleges with agriculture programs.
Kids' Day on the Farm	Host 600-700 third graders from Greene county and Greeneville City Schools. Program educates these students on agriculture and how it affects their daily lives.
Others	Various tours are hosted throughout the year as needed and include commodity groups, industry tours, local school groups, Camp Explore, etc.

Tobacco Research Plots

Ag in the Classroom

Research trials conducted in 2013 at Greeneville

PI	Project Title
Miller	Commercial Variety Trial
	Regional Variety Trial
	Regional Preliminary Trial
	Parental Breeding Lines
	TN 90 Di-Haploid Test
	E3 Commercial Test
	Variety/Harvest/Management Interaction Study
	Topping Management Trial
	Race 0 Black Shank Nursery
	Race 1 Black Shank Nursery
	Blue Mold / Black Shank Nursery
	Blue Mold Nursery
	Non-Black Shank Pollen Nursery
	Dark Fire-Cured Race 0 Black Shank Variety Trial
	Dark Fire-Cured Race 1 Black Shank Variety Trial
Beeler	QGU42 Black Shank Trial
	Regional Sucker Control
	Pesticide Residue Trial
Keyser	Estimation of Biologically Fixed N into Switchgrass-Legume Intercropped
McIntosh	Cool Season Annual Grass Variety Trial
	Red Clover Variety Trial
	Orchard Grass Variety Trial
	Persist Orchard Grass Selection Through Mowing Pressure
Rhinehart	Supplemental Phosphorus and Vitamin B12 to Improve Fertility to AI in Cattle
Fryxell	Monitoring Tick and Fly Diversity on Tennessee Cattle
Klingeman	Field Monitoring for Walnut Twig Beetle and Scolytid Beetles in Walnut Trees

Advocacy/Advisory Groups

Advocacy group developed in 2004 consisting of local and regional individuals.

Faculty Located on AREC- Greeneville

Dr. Robert Miller, Plant Science Department

Highland Rim AgResearch and Education Center

Dr. Barry Sims, Center Director

The Highland Rim AgResearch and Education Center, (AREC-Highland Rim) located in Robertson County, near Springfield was established in 1943. The AREC-Highland Rim sits near the center of the Highland Rim and Pennyroyal major land resource area. AREC-Highland Rim owns 615 acres of land and leases 81 acres from neighbors. Robertson County agriculture is composed of several of the ranking agricultural commodities, including beef and dairy cattle, tobacco, wheat, corn, soybeans, and forages. Research projects conducted at the AREC-Highland Rim closely mirror the agriculture in the county, conducting over 1.00 projects annually.

AREC-Highland Rim administration building was built in 1956. The administrations building contains offices, a small conference room and larger conference room upstairs, a meeting/work room downstairs, a small processing lab for spinning blood; 11 on-farm residences, farm shop and machinery buildings, 13 dark fired curing barns (6 research curing structures), three air curing barns, five outdoor curing structures, five cattle working facilities (three covered), 18 pen feed floor, a three-bay-commodity storage building, and a forage dryer. The center has a linear irrigation system for the variety development and evaluation research. Additional irrigation equipment includes two small plot sand media filters and two 10-acre sand media filters for trickle irrigation and a hard hose traveler.

AREC-Highland Rim is known for its research in beef and forage production management, dark-fired, dark-air-cured, and burley tobacco production efficiency, and crop variety development research.

Several of the top burley varieties in the US and internationally were partially developed at this location. Some of the most disease resistant and highest yielding dark and burley varieties were partially field developed at AREC-Highland Rim, this includes the first burley and dark hybrid varieties ever developed

AREC-Highland Rim is one the sites for crop variety development and evaluation, and soybean breeding research. A few of the soybean program objectives include developing increased yield, tolerance to

Beef cattle grazing

Field day presentation

plant diseases, environmental stresses, enhanced protein quality and concentration, and modified fatty acid composition for improved human and animal nutrition. Additional crop and forage research focuses on fertilizer rates and sources, forage and biofuel-crop establishment and production, and pest management.

Previous beef research has involved understanding both male and female production challenges while grazing endophyte infected tall fescue, reproduction efficiency, stocker grazing and management, and steers grazing warm season grasses. Current beef cattle research relates to fetal programming, reproductive improvement, and improving profitability of beef cattle production.

The Center is the site of 4-H and Extension meetings, cattle and tobacco industry meetings, and public field days.

Staff located at AREC-Highland Rim

Name	Title	Education	Years of Service	Responsibilities/Duties
Barry D. Sims	Research Center Director	Ph.D.	15	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's
Rita J. Hall	Admin. Specialist I	H.S.	23	Receptionist, payroll, HR, invoices, accounts receivable, field trial assistance.
Brad S. Fisher	Research Associate I	B. S.	8	Crops and forages field plot implementation, plot maintenance, data collection & harvest, data manipulation, GIS record-keeping, frequent interaction with PI's
William D. Pitt	Research Associate I	M. S.	22	Tobacco field plot implementation, plot maintenance, data collection and harvest, data manipulation, GIS record-keeping, frequent interaction with PI's
Perry K. Pratt	Research Associate I	B. S.	4	Beef Cattle research implementation, herd production and management, cooperate with forage research personnel; record keeping and data manipulation, frequent interaction with PI's
Roy L. Biggs, Jr.	Senior Farm Crew Leader	H. S.	27	Rotational crop production, assistance with research plots, record keeping, personnel supervision, facilities & equipment maintenance, frequent interaction with RA's and PI's

Name	Title	Education	Years of Service	Responsibilities/Duties
Christopher Adcock	Sr. Farm Equip Operator	H. S.	21	Operation and maintenance farm/research equipment, assist with research plots, rotational crop production, record keeping, facilities maintenance
Justin Dorris	Sr. Farm Equip Operator	H. S.	12	Operation and maintenance farm/research equipment, assist with research plots, rotational crop production, record keeping, facilities maintenance
Mac Edwards	Sr. Herd Caretaker	H. S.	8	Provides assistance and support to beef research operations, performs agricultural duties including livestock care, farm labor, and equipment/machinery operation
Eric Rudisill	Sr. Field Worker	H. S.	18	Field plot maintenance, assist with research plots, and grounds maintenance
Robert Russell	Sr. Field Worker	H.S.	12	Field plot maintenance, assists with research, and grounds maintenance
Donald Spivey	Sr. Farm Equip Operator	H.S.	18	Operation and maintenance farm/research equipment, assist with research plots, rotational crop production, record keeping, facilities maintenance
Mary A. Adcock	Custodian	H.S.	14	Cleans office facilities and other responsibilities as necessary

Infrastructure improvements at AREC-Highland Rim since 2008

Item Description	Cost
Shade Roof added to west side of Feed Floor	$7,490
House 13 addition	$12,227
Tobacco Storage Building	$2,000
Fuel Facility Roof	$891
Metal siding added to DFC tobacco barn 12	$3,257
House 1 razed	$4,000
Cypress tree project terminated and removed to make way for linear movement	$3,945
Tobacco Float bed III addition	$10,237
Cattle Gap installed in Pasture 38	$1,593

Item Description	Cost
Roof added to Feed Lot Working Facility	$1,289
Irrigation pond in pasture 51 expanded 1.5 acres	$7,800
Irrigation well drilled	$7,918
Culverts installed for Linear irrigation system to cross drain ditch	$3,287
Total	**$65,934**

Equipment purchased at AREC-Highland Rim since 2008

Item Description	Cost
Carter Forage Harvester Trailer	$12,500
Burley Tobacco Hydraulic Baler	$6,250
Burley Tobacco Hydraulic Baler	$6,000
John Deere 7330 Tractor	$72,292
Kuhn Disc Mower	$8,500
Almaco SPC 40 Plot Combine	$214,000
Trium carousel transplanter	$12,670
Gooseneck flatbed trailer	$8,150
Gooseneck dump trailer	$7,300
E-Z Boom Application System and Cables	2,007
Rovatti T3-110E irrigation pump	$6,970
Gandy 3 pt hitch fertilizer spreader	$4,991
Linear Move Irrigation system	$55,414
Burley Hydraulic Baler	$6,500
RJ Two row transplanter	$8,266
CFX 750 Auto Steer unit	$8,897
Linear Irrigation Pump	$7,375
John Deere running gear for wagon	$2,600
Multivator, 2 row – conservation tillage tobacco	$7,250
One ton flatbed truck	$29,800
Total	**$487,732**

Specialized research equipment located at AREC-Highland Rim

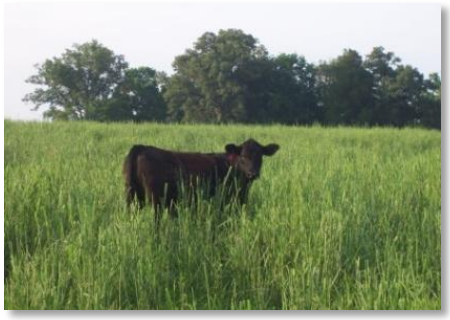
Equipment Description
4-row air-vacuum Wintersteiger Plot King planter
Hege 1.000 plot drill – 5', 7-row, 7" spacing
Almaco 4-row cone planter
Carter Flail Forage Harvester
3 Gandy Drop Spreaders – 10', one 3-pt hitch
Broadcast sprayers – 10 ' 55 gal(also equipped with CO2 capabilities)and 30' trailer 300 gallon
Hi Cycle sprayer – 60 ' 420 gallon
Air blast orchard sprayer
4-row Wilmar hooded sprayer
One linear irrigation system
Almaco plot combine with corn and grain heads
Gehl 425 Feed Grinder Mixer with load bars
Jay-Lor 2425 Feeder Mixer Wagon with load bar cells
New Holland 780 Round Baler
Tubeline bale wrapper
CFX 750 Auto Steer unit fits several tractors
Hydraulic Cattle Squeeze Chute w load cells
KMC Strip Tillage Unit
Two row multivator for conservation till tobacco
DAP Computer hardware and software for various harvest data manipulations
ArcMap v.10
Forage dryer
Willmar Super 500 Fertilizer Buggy
New Holland Forage Harvester
Bobcat 883 Skid Loader, bucket, pallet forks, and post hole digger
Sand Media Filters for trickle irrigation, 2 small plot and 2 ten acre units
Hard hose traveler irrigation unit

Outreach activities at AREC-Highland Rim

Event	Description
Tobacco Beef and More Field Day	Annual field day held on the forth Thursday in June, attracts about 225 attendees annually.
Tennessee Cow/Calf Conference	Initially called the Kentucky/Tennessee Cow Calf Conference, now known as the Tennessee Cow/Calf Conference; cooperative event with local county extension.
Neighbor Night on the Farm	First annual event held in July 2013, neighbors (the general public invited to tour and learn about current research.
Ag In The Classroom	Annual event in cooperation with Farm Bureau Women, 3rd graders from across the county attend.
Leadership Robertson County	Robertson County Adult and Youth Leadership Classes tour HRREC
Leadership Middle Tennessee	Leadership Class from 10 county area including and surrounding Metro-Davidson County tours and/or meets at HRREC.
Periodic Tours	Upon request, various groups tour the Research & Education facilities to learn about current research.

Dark tobacco topping

Soybean breeding research



Steer grazing warm season grasses

In 2013, 20 principal investigators and six co-investigators had more than 1.00 research projects at AREC-Highland Rim, see below.

Research trials conducted in 2013 at AREC-Highland Rim.

Number	PI	Department	Nature of study
1 - 29	Allen	Plant Sciences	Variety Trials (corn, soybean, wheat)
30 - 31	Bates	Plant Sciences	Forage Variety Trials (alfalfa, Bermuda)
32 - 36	Bost	EPP	Vegetable Diseases
37 - 41	Keyser	FWF	Native grass establishment and production
42- 43	Lockwood	Plant Sciences	Blueberry and Grapes (currently demos)
44	Mueller	Plant Sciences	Canola Herbicide Evaluation
45 - 65	Pantalone	Plant Sciences	Soybean Breeding and Genetics
66 - 73	Savoy	BESS	Crop Fertility
74	Sims/DuPont	HRREC	Wheat/Soybean Weed Control and Crop Tolerance
75 - 77	Smith	DuPont	Soybean and Pasture Weed Control
78	TSU Staff	TSU	Hybrid Walnut Trees
79	Dzantor/Tyler	TSU/UT BESS	Switchgrass/Gammagrass Cover Crops and Fertility
80 - 82	West	Plant Sciences	Wheat and Corn Breeding , Canola Variety Trial
83	Yin	Plant Sciences	Wheat Fertility
84 - 87	Denton	Plant Sciences	Burley Tobacco Production
88 - 94	Bailey	Plant Sciences	Dark Tobacco Production and Pest Control
95 - 96	Miller	Plant Sciences	Dark Tobacco Breeding and Variety Evaluation
97 - 101	Miller	Plant Sciences	Burley Tobacco Breeding and Variety Evaluation
102	Rhodes	Plant Sciences	Burley Tobacco Herbicide Tolerance
103	Rhinehart	Animal Science	Beef Fetal Programming
104	Schrick/Roper	Animal Science	Beef Reproduction/Uterine pH Sensor
105	Trout-Fryxell	EPP	Beef Tick Diversity on TN Cattle

HRREC Advocacy Group

An Advocacy group was formed in 2005. Biannual meetings were held the first few years; the group has been meeting once in December the past few years. A project leader is invited to discuss current research and/or a UT Development person is invited to speak. The first annual Biscuit Breakfast was held June 27 prior to field day this in 2013.

Faculty Located on AREC-Highland Rim

Faculty are not housed at AREC-Highland Rim; however, 20 principal investigators and nine co-investigators currently have research at Highland Rim REC.

Middle Tennessee AgResearch and Education Center

Mr. Kevin Thompson, Center Director

Located in the rolling hills of the central region of Tennessee, the Middle Tennessee AgResearch and Education Center (MTREC) is one of ten research centers in the University of Tennessee Institute of Agriculture system. Although the Center is now situated in Spring Hill, it had its beginnings in Columbia, south of its present location.

The original Middle Tennessee AgResearch and Education Center was established in 1917 on the outskirts of Columbia. It consisted of 652 acres between Hampshire Pike and Mt. Pleasant Pike. By 1950, the Center was being overtaken by residential and commercial growth, so the University decided to move the Center out of the city. A 593-acre farm was purchased from W.A. Haynes across from the Haynes Haven Plantation outside of Spring Hill for its rich soils which made it highly suitable for its research capabilities.

In 1954, the University purchased a nearby farm of 285 acres on Nashville Highway across from the Rippavilla Plantation. Most of that land was being mined for phosphate by Monsanto Chemical Company, one of numerous phosphorous companies located in Maury County, which at the time was known as the "Phosphorous Capital of the World". After mining was completed, research was conducted on the land to see how the soils "survived" the mining process. The farm became known as the "Reclamation Farm" since the University was trying to reclaim the soils. In late 1959, another 275-acre farm was purchased next to this site. Then in 1966, the Reclamation Farm was traded for a 400-acre tract of land next to the main Center making all of the property adjoining on the same side of Highway 31 and culminating in the present 1,268 acres.

Its location in Spring Hill makes it easily accessible to our agriculture counterparts at the Tennessee Farm Bureau in Columbia and the Tennessee Department of Agriculture in Nashville.

MTREC Entrance

MTREC Administration Building

Staff located at MTREC

Name	Title	Education	Years of Service	Responsibilities/Duties
Kevin Thompson	Research Center Director	M.S.	10	Direct all functions of Center including research planning and implementation, general crop and animal production, and accomplishment of mission statement; implement all decisions concerning budgets, personnel, infrastructure, research, etc; plan and coordinate field days and outreach events; maintain frequent interaction with research project PI's
Cyndi Petty	Admin. Specialist I	A.A.S.	26	Perform day-to-day administrative and clerical office procedures including payroll, accounts payable, accounts receivable, travel, correspondence; serve as first contact with public via telephone and in person; manage/schedule meeting room use; provide benefits assistance to employees; procure supplies and materials for Center operation; assist Center Director with planning and coordinating field days and outreach events
David Johnson	Research Associate I	B.S.	23	Manage day-to-day operation of dairy program including general production and research projects; supervise dairy personnel; implement and facilitate research protocol for dairy program; interact with research project PI's; collect research data and maintain records
Joe David Plunk	Research Associate I	B.S.	7	Implement and facilitate research protocol for beef and equine programs; interact with research project PI's; collect research data and maintain records; coordinate and enforce IAACUC and AALAC protocol; maintain IAACUC and AALAC records
Scott Helgren	Senior Farm Crew Leader	H.S.	35	Oversee day-to-day work activities of farm crew personnel; supervise farm crew personnel; assist Center Director with crop production and farm management Decisions
Johnny Glenn	Senior Field Worker	H.S.	35	Plant, cultivate and harvest crops; operate, repair and maintain farm equipment; assist with care & feeding of cattle; assist with facilities maintenance

Name	Title	Education	Years of Service	Responsibilities/Duties
Marty Clark	Senior Farm Equipment Operator	H.S.	24	Operate, repair and maintain farm equipment; plant, cultivate and harvest crops; assist with facilities maintenance; assist with implementation and data collection of agronomy research plots
Steve Hickman	Senior Research Technician	H.S.	9	Maintain records of chemical use; assist with planting, cultivating and harvesting crops; assist with equipment and facilities maintenance
Ronald Cates	Senior Plot Caretaker	H.S.	9	Perform facilities and grounds maintenance; observe operation of physical plant and makes necessary electrical, plumbing and structural repairs; operate, repair and maintain grounds keeping equipment; assist in repair of farm equipment
Jeff Helgren	Senior Herd Caretaker	H.S.	30	Manage day-to-day operation of UT Bull Testing Program including feeding, health care and record keeping; provide care, feeding and handling of beef cattle; assist with implementation of and data collection for research projects; assist with equipment and facilities maintenance
Edwin Couch	Senior Milker	H.S.	12	Perform daily milking procedures including sanitary preparation of animal, equipment and facility; assist with care, feeding and handling of dairy cattle; assist with data collection for research projects
Larry Moore	Herd Caretaker	H.S.	5	Perform daily milking procedures including sanitary preparation of animal, equipment and facility; assist with care, feeding and handling of dairy cattle; assist with data collection for research projects
Wesley Gilliam	Senior Herd Caretaker	H.S.	1	Perform daily milking procedures including sanitary preparation of animal, equipment and facility; assist with care, feeding and handling of dairy cattle; assist with data collection for research projects

Infrastructure improvements at MTREC since 2008

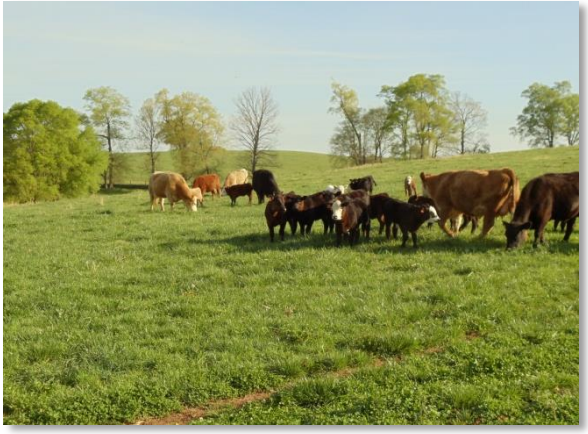
Item Description	Cost
Repainted roofs and/or exteriors of: New Shop, Conference Room, Dairy Milking Parlor, Vet Building, Old Shop, Dairy Loafing Barn, Dairy Feeding Barn, Dairy Working Barn, Grain Bin	$12,185
Equine Research Center (sponsored project)	$46,940
Reproductive Training Program site (sponsored project)	$15,035
Total	**$74,160**

Equipment purchased at MTREC since 2008

Item Description	Cost
Ag-Bag G6070 Silage Bagger	$ 33,220
John Deere Hay Pickup Attachment	$ 3,500
Kuhn/Knight Side-Discharge Manure Spreader	$ 27,823
John Deere 3260 Skid Steer Loader with bucket	$ 33,790
2013 Ford F250 4x4 Pickup Truck	$ 25,266
Total	**$123,599**

Specialized research facilities located at MTREC

Item Descriptions
Beef Unit facilities and pastures
Dairy Unit facilities and laboratory
24 three-acre Beef Grazing Paddocks
UT Bull Test Station and Sale Barn
UT Equine Extension and Research Center
Land for small Agronomy Research Plots
Reproductive Training Program site and laboratory
Conference Room



Beef Cattle

Dairy Milking Parlor

Attendance at Bull Sale

Equine Center

Agronomy Plots

Conference Room

Outreach activities at MTREC

Event	Description
Fruits of the Backyard Field Day	Started in 2007 and held every June, this field day is designed to address issues facing both homeowners and commercial producers in their fruit orchards, garden spaces, and backyards.
Country Classroom	Maury County third-grade classes are invited to spend the day learning about all aspects of agriculture at this October event sponsored by the Maury County Farm Bureau Women.
UT Bull Test Station Open House	Addresses current issue within the beef industry. Held in late fall.
UT Senior and Junior Bull Sales	Held in January and March of each year, sale of performance-tested bulls provides source of excellent and informative interaction between UTIA and both commercial and purebred seed stock producers. This program has provided measurable economic benefit for over 30 years to the University's clientele.
UT Equine Extension and Research Center Open House & Field Day	The newest program of research and education located at MTREC. Started in 2012, this unique facility provides great benefit to a group that has been somewhat neglected in the past. Events held in late fall and early spring.

Event	Description
Reproductive Management Program and AI Training & Certification	This program is available due to a partnership between Southeast Select Sires, UT Animal Science Department and the Middle TN Research Center. Its purpose is to signify the added value to cattle production through improved reproductive management. AI training and certification classes are held in the spring and fall.
Middle TN Spring Forage Tour	Held in conjunction with the lower middle Tennessee Extension offices in late spring, this tour allows university and industry personnel along with producers and consultants to view the latest weed control technologies, grazing demonstrations, forage management techniques, and livestock/forage interaction.
Middle TN Farm Pond Management Field Day	Focuses on a specific clientele with unique questions in regards to agriculture.
UT Dairy Advocacy Meeting	Annual meeting designed to seek input from and share information with our state's dairy producers.
Small Ruminant Workshop	Hosted in conjunction with TSU to provide hands-on learning opportunities for the state's sheep and goat producers.
Columbia State Community College Animal and Plant Sciences Students Visits	Organized class visits to help college students develop a better understanding of production agriculture through hands-on training. Also provides opportunity to educate students on the role of agricultural research.
Columbia State Veterinary Technology Clinical Program	Experiential learning opportunity and course credit for students seeking a degree in veterinary technology at Columbia State Community College.
TWRA Youth Dove Hunt	Sponsored by TWRA, this September event gives young hunters an opportunity to practice their gun safety and shooting skills in a controlled environment under adult supervision. Event functions as a community outreach opportunity.
Leadership Maury	Annual event hosted by MTREC designed to interact with business and industry leaders within Maury County and to expose them to the benefits of UTIA and AgResearch.
Columbia Area Beekeepers Association Meetings & Workshop	Local area beekeepers gather monthly onsite for educational training and industry advancement programs. Conduct annual workshop in February.
Middle Tennessee Goat Association Meetings	Area goat producers meet every other month onsite to conduct educational sessions for novice and practiced farmers interested in goat production.
Others:	Various events and tours are hosted throughout the year as needed and include groups such as dairy producers, beef cattle associations, Tennessee Farm Bureau Federation, etc.

Research trials conducted in 2013 at MTREC

Number	PI	Department	Nature of study
1303	Henry Kattesh	Animal Science/Beef	Effect of temperature on endocrine, reproductive and immune parameters of performance tested bulls
1286	Becky Trout Fryxell	Entomology	Tick and Fly Diversity on Tennessee Cattle
1291	Fred Allen	Plant Science	Corn Hybrids for Silage Production
1288	David McIntosh	Plant Science	Improved Tifton 85 Bermudagrass for cold tolerance
1278	Peter Krawczel	Animal Science/Dairy	Effects of tail hair trimming on udder hygiene of lactating dairy cows
1197	Travis Mulliniks	Animal Science/Beef	Stockpiled forage and supplementation strategy on beef heifer performance
1196	Bridgett McIntosh	Animal Science/Equine	Horse farm management and water quality
1189	Fred Allen	Plant Science	Wheat varieties for adaptation to TN
1161	Justin Rhinehart	Animal Science/Beef	3rd trimester nutritional supplementation on postnatal offspring performance
1157	Peter Krawczel	Animal Science/Dairy	Bedding surface on the welfare of pre-weaned dairy calves
1158	Becky Trout Fryxell	Entomology	Bedding surfaces on fly population
1130	Neil Rhodes	Plant Science	MAT activity on pasture weeds
644	Fred Allen	Plant Science	Switchgrass experimental lines
>>>>	Fred Allen	Plant Science	Cropping systems

Advocacy/Advisory Groups:

Middle Tennessee's Dairy Advocacy Group; Tennessee Beef Improvement Federation board.

Faculty located on MTREC:

Justin Rhinehart, State Beef Specialist; and Bridget McIntosh, State Equine Specialist.

Cooperating Agencies located on MTREC:

UT Center for Profitable Agriculture.

AgResearch and Education Center at Milan

Dr. Blake Brown, Center Director

Established in 1962, the AgResearch and Education Center at Milan (AREC-Milan) is situated in the heart of the state's row crop production area and facilitates more than 150 research projects annually on Tennessee's leading row crops (corn, cotton, soybeans and wheat). The center is composed of 884 acres of both upland and bottomland soils, similar to those found across West Tennessee. AREC-Milan owns 496 acres and leases an additional 388 acres from the Milan Army Ammunition Plant. AREC-Milan has a new headquarters building with a reception area, offices, a conference room, and a sample processing lab; one on-farm residence, and shop and farm machinery storage buildings. In addition, the West Tennessee Ag Museum is located at AREC-Milan. The center has two center pivot irrigation systems and one linear system that provides overhead irrigation on approximately 125 acres.
AREC-Milan is known as the birthplace of Tennessee No-Till. Prior to the adoption of no-till, West Tennessee had the highest rates of soil erosion in the nation. Many fields were losing 30-40 tons of topsoil/acre/year to soil erosion. AREC-Milan was instrumental in the early research and development of the no-till crop production system that led to tremendous soil savings. In 2012, 74.8% of the row crop acres in Tennessee were farmed using a no-till system, with an additional 15% utilizing some form of conservation tillage.

Research at AREC-Milan focuses on no-till crop production with an emphasis on integrating new agricultural technologies into a no-till system. Current studies involve cropping systems; fertilizer sources, rates and timings; crop variety breeding and development; pest control (weed, insect, disease) and precision agriculture. Studies have also been conducted to evaluate the establishment and production of switchgrass for use as a biofuel crop.

No Till cotton

New headquarters building at AREC-Milan

Staff located at AREC-Milan

Name	Title	Education	Years of Service	Responsibilities/Duties
Blake Brown	Research Center Director	Ph.D.	15	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's
Allie Wagster	Admin. Specialist I	H.S.	28	Receptionist, payroll, invoices, accounts receivable, field trial assistance
Debra Campbell	Admin. Specialist I	H.S.	22	Receptionist, field day planning and outreach events, data entry
Jimmy McClure	Research Associate I	M.S.	23	Field plot implementation, plot maintenance, data collection & harvest, data manipulation, GIS record-keeping, frequent interaction with PI's
Jason Williams	Research Associate I	M.S.	17	Field plot implementation, plot maintenance, data collection and harvest, data manipulation, GIS record-keeping, frequent interaction with PI's
Chris Bridges	Research Associate I	M.S.	1	Field plot implementation, plot maintenance, data collection and harvest, data manipulation, GIS record-keeping, frequent interaction with PI's
Darol Copley	Senior Farm Crew Leader	H.S.	36	Rotational crop production, assistance with research plots, record keeping, personnel supervision, facilities & equipment maintenance, frequent interaction with PI's
Mark Coffman	Senior Plot Caretaker	H.S.	28	Rotational crop production, assistance with research plots, record keeping, facilities and equipment maintenance
Chad Hicks	Senior Plot Caretaker	B.S.	12	Rotational crop production, assistance with research plots, record keeping, facilities and equipment maintenance
Terry Ferrell	Senior Plot Caretaker	H.S.	3	Rotational crop production, assistance with research plots, record keeping, facilities and equipment maintenance
Delle Rhue Burgess	Museum Guide	B.S.	11	Museum tours, museum facility and grounds maintenance, meeting scheduling and setup
Judy Grimes	Museum Guide	H.S.	11	Museum tours, museum facility and grounds maintenance, meeting scheduling and setup

Infrastructure improvements at AREC-Milan since 2008

Item Description	Cost
Headquarters Building	$625,000
3 Equipment Sheds 50’ x 99’	$102,516
Chain link fence at 4-H Camp	$12,230
Replaced 80’ x 48” culvert in S-4	$4,624
Carport cover over fuel tanks	$1,445
New water tap for South Tract	$1,000
Total	**$746,815**

Equipment purchased at AREC-Milan since 2008

Item Description	Cost
John Deere 7630 Tractor & Kubota M6040 Tractor	$110,680
Hesston 2170 Big Square Baler	$87,900
Spra-Coupe (used)	$81,000
2012 Ford F-250 Super Crew 4x4 pickup & 2011 Dodge Crew Cab 4x4 pickup	$47,077
Turbo-Till – 18’	$33,400
Caterpillar Backhoe (used) & Chevy grain truck (used)	$33,500
Auto steer for JD 7600 & 7630 tractors	$28,860
2 Wilmar Hooded Sprayer	$22,238
4-row 30” John Deere planter	$21,041
Video camera, 4 computers, copier, mobile radios, ice machine, plasma cutter	$20,467
Boll buggy (used) & Module builder (used)	$17,495
Newton Crouch Variable Rate Fertilizer Spreader	$16,989
KBH 8/11 row liquid fertilizer applicator	$13,645
Woods 15’ Batwing rotary cutter	$12,750
Insight Monitor & EZ Guide Lightbar	$11,754
24’ Tour Trailer (with seats, Shurloc tarp, sound system)	$7,940
Trailer – Hydraulic Dump	$6,530
Gandy Fertilizer Spreader – 10’	$4,960
Irrigation Pump Motor – center pivots	$3,200
Total	**$581,426**

Specialized research equipment located at AREC-Milan

Equipment Description
Three 4-row vacuum planters
Almaco plot drill – 10-row, 7.5” spacing
Newton Crouch variable-rate dry fertilizer spreader
Variable-rate liquid nitrogen applicator – 4 row
3 Gandy Drop Spreaders – 5’, 10’ and 12’
Broadcast sprayers – 10’, 20’ and 40’
4-row 30” Wilmar hooded sprayer
Two center pivot irrigation systems & One linear irrigation system
Three plot combines with corn and grain headers
Two 2-row cotton pickers with load cells & sacking attachment
Case IH 2344 Combine with yield monitor
John Deere 9976 4-row cotton picker with yield monitor
John Deere 7600 & 7630 tractors with Auto Steer
Computer hardware, firmware and software for various harvest data manipulations
ArcMap v.10

Outreach activities at AREC-Milan

Event	Description
Milan No-Till Field Day	First held in 1981, now hosted in even numbered years on the fourth Thursday in July. This is the nation’s largest field day dedicated to conservation tillage research.
Fall Folklore Jamboree - Preview	School classes are invited on the Friday before to get a preview of the Fall Folklore Jamboree
Fall Folklore Jamboree	First held in 1999, this traditional skills event attracts thousands to the West TN Ag Museum on the third Saturday in October
Farmers vs. Hunger	Held at 2012 Milan No-Till Field Day, this event utilized volunteers to pack over 17,000 soy-protein fortified macaroni and cheese meals for needy people in the local community.
Weed Tour	Held in conjunction with Weed Tour at WTREC, this tour allows university and industry personnel along with producers and consultants to view the latest weed control technologies.
Soybean Field Day	Usually held in September in odd-numbered years to update producers and extension agents on the latest innovations in soybean production.
Others	Various tours are hosted throughout the year as needed and include events such as soybean scout schools, Cotton Incorporated State Support Committee, Cotton Inc. Producers Information Exchange, commodity groups, industry tours, etc.

Milan No-Till Field Day

No-till planting at AREC-Milan

Soybean Tour

West Tennessee Agriculture Museum

In 2013, 19 principal investigators and seven co-investigators currently had over 175 research projects underway at AREC-Milan and these are described below.

Research trials conducted in 2013 at AREC-Milan

Number	PI	Department	Nature of study
1 - 30	Allen	Plant Sciences	Variety Trials (corn, soybean, wheat)
31 - 35	Arelli	USDA-ARS	Soybean breeding, SCN resistance
36 - 38	Brown	AREC-Milan	Multiple crops/sulfur
39	Burwick	USG	Soybean growout
40	Buschermohle	BESS	Multiple seeding rates
41 - 42	Gibson	BESS	Cotton nitrogen rate
43	Gwathmey	Plant Sciences	Cotton variety trials
44 - 75	Kelly	EPP	Corn & soybean diseases
76 - 87	McClure	Plant Sciences	Corn/soybean production
88 - 95	Mengistu	USDA ARS	Soybean breeding
96 - 126	Pantalone	Plant Sciences	Soybean breeding & genetics
127 - 137	Savoy	BESS	Crop fertility
138 - 150	Steckel	Plant Sciences	Corn/soybean/cotton weed research
151 - 165	Stewart	EPP	Corn/soybean/cotton pest research
166 - 168	Tyler	BESS	Soil fertility
169 - 171	Verbree	Plant Sciences	Drought tolerance
172	Walker	BESS	Corn biosolids
173 - 174	West	Plant Sciences	Wheat breeding
175 - 177	Yin	Plant Sciences	Crop nutrients

Advocacy/Advisory Groups

The West Tennessee Agricultural Museum Association was formed in the early 1980's to raise funds to build the West Tennessee Agricultural Museum at our center. The museum was built and the association continues to meet on an annual basis.

Faculty Located on AREC-Milan

No faculty are housed at AREC-Milan; however, 19 principal investigators and seven co-investigators currently have research underway at Milan.

Cooperating Agencies Located on AREC-Milan

USDA-ARS Crop Genetics Research Unit based at WTREC in Jackson, TN currently have two scientists conducting research at AREC-Milan.

Cotton

Sunflower field

Field Day

Plateau AgResearch and Education Center

Mr. Walt Hitch, Center Director

Established in 1943, the Plateau AgResearch and Education Center at Crossville (PREC) is situated on top of the Cumberland Plateau facilitates research projects annually on beef, fruit and vegetable, and ornamental production. The center is composed of approximately 21.00 acres located on three tracts. PREC has newly renovated shop and storage buildings incorporating a sample processing bay complete with drying units. The center welcomed two new faculty members in the past 12 months. Dr. Travis Mulliniks joined UT in October 2012 with a focus in animal nutrition. In March 2013, Dr. Renata Nave joined the team with a concentration in forages. Renovations are in process to improve our beef nutrition resources with the addition of "grow safe" feeding units. PREC has over 10,000 square feet of heated greenhouse space along with 10 acres of plot space to support vegetable research. The center has seven on-farm residences with one residence used for student/guest housing.
Some of the Center's most notable works are of blueberries, strawberries, tomatoes, green beans, pumpkins, and apples. Today, trials are ongoing with new varieties as well as studies on herbicides for weed control and insecticides for insect control. With two locations in the Crossville area with beef cattle (70N and Grassland Units), the center is used for intensive beef cattle research. As one of the largest Centers in terms of cattle numbers, the beef herd is composed of Angus and Gelbvieh genetics. The cattle at the center are used routinely for nutrition, embryo transfer, and artificial insemination studies. Offspring from these breeding projects are used in forage grazing and nutrition studies. Production data including carcass ultrasound measurements are collected routinely on this herd with some calves sent to the feedlots for additional information.

The most recent addition to the research portfolio is in the area of ornamentals. The Plateau region provides a unique and challenging climate for many of the plants we enjoy. Finding varieties with disease resistance and cold tolerance is the primary objective of the research. These selections occur in crops such as roses, hydrangeas, crepe myrtles, azaleas, redbuds, dogwoods, and ornamental grasses. Working with the Cumberland County Master Gardeners, the Center hosts the Plateau Discovery Gardens. The Plateau Discovery Gardens have been designed to educate community members of the unique gardening conditions and opportunities of the Cumberland Plateau. These gardens have recently been recognized as part of the UT Gardens and the official Tennessee state botanical gardens.

The Plateau AgResearch and Education Center strives to develop technology which will enhance the efficiency of agricultural, forest and ornamental industries, improve the quality of rural life, and conserve rural environmental resources of soil, water, air and wildlife. The center holds an annual Steak & Potatoes Field Day at the 70N facility the first Tuesday of each August to report current research findings and topics. In addition, the public is invited to a Fall Gardeners' Festival in late August.

Plateau REC Aerial Plots

Greenhouse Complex

Staff located at PREC - Crossville

Name	Title	Education	Years of Service	Responsibilities/Duties
Walt Hitch	Research Center Director	M.B.A.	19	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's
Glenda Wisdom	Admin. Specialist I	H.S.	36	Receptionist, payroll, invoices, accounts receivable, field day planning.
Ann Moore	Research Specialist II	B.S.	7	Greenhouse research trials. Coordinates planting, harvest, records, and fertility in the greenhouse complex
Dereck Corbin	Research Coordinator	B.S.	2	Field plot implementation, plot maintenance, data collection & harvest. Coordinates ornamental plot establishment and manages pesticide applications for all plots
Jeff Dowlen	Research Associate I	B.S.	15	Beef herd research at the 70N unit. Responsible for all genetic mating and heifer/bull development. Frequent interaction with PI's
Steve Smith	Research Associate I	B.S.	8	Beef herd research at the Grassland unit. Responsible for production and administration of all protocols at the Grassland unit

Name	Title	Education	Years of Service	Responsibilities/Duties
Greg Blaylock	Senior Farm Crew Leader	H.S.	32	Responsible for all crop production as well as variety test planting and harvest. Oversees daily management of farm crew
Sam Simmons	Senior Heavy Equipment Operator	H.S.	39	Crop and plot production, record keeping, facilities and equipment maintenance
Archie Barnes	Senior Field Worker	H.S	37	Vegetable crop production, assistance with research plots, record keeping, facilities and equipment maintenance
Edsel Tanner	Senior Herd Caretaker	H.S.	21	Beef production, assistance with research protocols, facilities and equipment maintenance
Payton Miller	Field Worker	H.S.	1	Beef production, assistance with research protocols, facilities and equipment maintenance
David Olson	Herd Caretaker	H.S.	6	Beef production, assistance with research protocols, facilities and equipment maintenance

Infrastructure improvements at PREC - Crossville since 2008

Item Description	Cost
Shop Building Renovation	$200,000
1 Equipment Shed 50’ x 96’	$35,000
Office renovation for new faculty	$8,000
Feeding floor renovation for “grow safe” units (in process)	$125,000
Installation of “grow safe” feeding units	$1.00,000
Total	**$468,000**

Equipment purchased at PREC - Crossville since 2008

Item Description	Cost
Kubota 2920 Tractor and loader	$15,250
2012 Ford F-250 Super Crew 4X4 pickup Truck	$24,024
2 - 2013 Dodge Crew Cab 4x4 pickup (for new faculty)	$48,000
New Holland Round Bale Silage Baler	$25,000
Vermeer Tedder w/ Hyd tilt and fold	$6,950
2 – 24’ SI Hay Feeders	$9,990
T200S Irrigation Unit	$7,725
Dixie Chopper Mower	$8,499
9’ 4 ring bulk feed tank	$5,400
Silencer Hydraulic Squeeze Chute	$14,164
Total	**$164,984**

Specialized research equipment located at PREC - Crossville

Equipment Description
Almaco 4 row plot planter
Hege plot drill – 7-row, 7.0” spacing
10,000 sq. ft greenhouse space (2 – 32’ x 96’, 1 – 48’ x 96’)
Grading shed with vegetable grading lines
Walk-in cooler with vegetable grading line
Broadcast sprayers – 10’, 20’ and 40’
2 Gandy Drop Spreaders – 3’ and 10’
2.75 acre irrigation lake with 1 mile buried line to small plot areas
Plot combine with corn and grain headers
Carter Forage Harvester
Silencer Hydraulic Cattle Chute
6 sets of Electronic Cattle Scales and Cattle Working Chutes
Crop Sample Dryer
T200S Travelling Gun Irrigation Unit
Vegetable bedder and plastic layer

Outreach activities at PREC - Crossville

Event	Description
Steak and Potatoes Field Day	Annual field day focusing on beef and vegetable/fruit production. Attendance of 425 in 2013
Fall Gardeners' Festival	Annual Festival focusing on Ornamentals. 2012 attendance was 750.
Ag In The Classroom	Held in September for all 3rd graders in Cumberland County. Cooperating with Farm Bureau and Farm Bureau Women
UT Gardens – Plateau Discovery Gardens	Open to the public year round. A cooperative project with the Cumberland County Master Gardeners. The gardens incorporate demonstration/educational plots along with research trials.
Master Gardener Education Classes	A series of classes established each year to educate the public in areas such as pruning, beginning gardening, etc. A new program "From Garden to Plate" has just begun featuring a local chef.
Others	Various tours are hosted throughout the year as needed.

Roses

Beef Heifer

Hydrangea

Research trials conducted in 2013 at PREC - Crossville

PI	Department	Nature of study
Allen	Plant Sciences	Performance Tests of Corn Hybrids for Silage Production in Tennessee
Allen	Plant Sciences	Performance Tests of Wheat Varieties for Adaptation to TN
Allen	Plant Sciences	Evaluation of F1 Full-sibs of Switchgrass from Diallel Crosses for Breeding Purposes
Allen	Plant Sciences	Comparison of Drilled Plots vs. Spaced Plants for Determining Yield and Agronomic Characteristics of Switchgrass Varieties & Experimental Lines
Ashworth	Plant Sciences	Renovating Switchgrass Stands
Bhandari	Plant Sciences	Cultivar breeding and genetic research on switchgrass for bioenergy feedstock
Butler	Plant Sciences	Evaluation of amendment C:N ratio on effectiveness of anaerobic soil disinfestation as a MeBr/fumigant alternative
Butler	Plant Sciences	Fumigants for cut flowers
Critzer/Wszelaki/ Buchanan	Food Science and Technology	Transfer and survival of organisms to produce from surface irrigation water
Fryxell	Forestry Wildlife and Fisheries	Monitoring Tick and Fly Diversity on Tennessee Cattle
Hawkins	Biosystems Engineering and Soil Science	Yield and forage quality of tall fescue amended with EQ biosolids, broiler litter, and chemical fertilizers
Keyser/Waller	Forestry/Animal Science	Native Grass Grazing Demonstration
Keyser/Waller	Forestry/Animal Science	Rotationally Grazing NWSG with Beef Heifers
Klingeman	Forestry, Wildlife and Fisheries	Field Monitoring for Walnut Twig Beetle and Scolytid Beetles in Walnut Trees at Crossville TN REC
Lockwood	Plant Sciences	Blackberry Fertility – Timing on N application
Lockwood	Plant Sciences	Peach – Pruning and Training Systems
Lockwood	Plant Sciences	Apple – Timing of N application
Ludwig	Biosystems Engineering and Soil Science	Smart Garden - Rain Garden
Mulliniks	Animal Science	Nutritive value of switchgrass ensiled with differing feedstuffs in small silos
Mulliniks	Animal Science	Effect of rumen protected arginine supplementation and endophyte infected fescue on nitrogen metabolism and reproductive competence in beef heifers

PI	Department	Nature of study
Nave	Plant Sciences	Date and Nitrogen Rate Effects on Yield and Nutritive Value of Stockpiled Tall-Fescue Under Grazing
Nave	Plant Sciences	Herbage Accumulation Rate and Forage Nutritive Value of Warm-Season Grasses as Influenced by Forage Management
Rhinehart	Animal Science	Effects of third trimester nutritional supplementation on postnatal offspring performance
Rhodes	Plant Sciences	Influence of Rejuvra herbicide for tall fescue seedhead suppression, yield, quality and ergot alkaloid content
Schrick	Animal Science	Effects of high versus low uterine pH on pregnancy of embryo transfer recipients
Tyler/Roberts	Plant Sciences/Agricultural and Resource Economics	Evaluation of switchgrass and corn productivity with varying nitrogen rates on marginal land
Windham	Entomology and Plant Pathology	Disease Resistance in Ornamental Grasses
Windham	Entomology and Plant Pathology	Winter Hardiness in New Ornamentals for the Mid-South
Windham	Entomology and Plant Pathology	No Spray Rose Trial II - Climbing Roses
Windham	Entomology and Plant Pathology	No Spray Rose Trial I
Windham	Entomology and Plant Pathology	Hydrangea resistance to Cercospora leaf spot
Windham	Entomology and Plant Pathology	Cold Hardiness in Crepe Myrtle

Pumpkin

Crops

Traveling Gun

Advocacy/Advisory Groups

Local Ag and community leaders participate in events to learn of UT activities. Most recently, a breakfast was held prior to the Steak and Potatoes Field Day with approximately 40 attendees.

Faculty Located on PREC

Crossville. Two faculty are currently located at PREC:

Dr. Travis Mulliniks – Animal Science – Travis has a 100% Research appointment in the area of Animal Nutrition. He has been employed since October 2012.

Dr. Renata Nave – Plant Sciences – Renata has a 100% Research appointment in the area of Forages. She has been employed since March 2013.

West Tennessee AgResearch and Education Center

Dr. Bob Hayes, Center Director

Established in 1907, the West Tennessee AgResearch and Education Center at Jackson (WTREC) - is situated in the heart of the state's row crop production area and facilitates more than 40 research projects annually on Tennessee's leading row crops (corn, cotton, soybeans and wheat, in addition to forestry, turf grass and ornamentals). The center is composed of 647 acres of both upland and bottomland soils, similar to those found across West Tennessee. WTREC's headquarters building was completed in March 1989 with a reception area, 68 offices, five conference rooms, and four laboratories; six on-farm residences, shop and six farm machinery storage buildings. In addition, WTREC is the home of the UT Western Region Extension office, UT Institute of Public Service offices, and offices, labs and machinery storage for two USDA-ARS scientists. The center has one single-span center pivot irrigation system, two two-tower linear systems that provide overhead irrigation access to approximately 30 acres, three acres of sub-surface drip irrigation and about 10 acres with access to either surface drip or traveling boom irrigation. WTREC has about 3 acres of established warm-season turf grass with pop-up irrigation.

The UT Gardens Jackson, located on the grounds of WTREC, is a part of the state botanical garden. The UT Gardens consists of a level II Arboretum and several plant collections. The All-American Annuals trial is conducted each year and the results of these are provided to local greenhouses and nurseries to guide their production plans.

Research at WTREC focuses on pest management, cultivar evaluation and production technology, including evaluation of genetically modified traits. USDA scientists located at WTREC focus is on soybeans, especially soybean cyst nematodes and charcoal rot. The larger research programs at WTREC are weed, disease and insect management. Three long-term studies (Cotton tillage, cover crop and N-rates; soybean tillage vs. no-till double cropped; and a corn C sequestration) are located on the center.

WTREC has 235 acres of woodlands consisting of five difference stands comprised 16 tree species plus a natural wetland area with four tree species. About 20 acres are in native warm-season grasses enrolled in the CRP.

Aerial view of WTREC

UT Gardens at Jackson

Staff located at WTREC

Name	Title	Education	Yrs of Service	Responsibilities/Duties
Robert Hayes	Research Center Director	Ph.D.	35	Research planning/implementation, infrastructure, personnel, budgets, field days and outreach events, frequent interaction with PI's, advancement and public relations
Nancy van Tol	Research Associate I	M.S.	23	Receptionist, procurement, payroll, invoices, accounts receivable, meeting room scheduling and billing
Angie Thorne	Admin. Support Asst. III	H.S.	9	Receptionist, phones, HR paperwork, time entry, field day signs and poster, and data entry.
Patricia Brawley	Research Associate I	B.S.	24	Field plot implementation, plot maintenance, data collection & harvest, data manipulation, & student supervision
Jason Reeves	Research Associate I	M.S.	11	Annual trial planning & implementation, UT Gardens curator, data collection, ornamental greenhouse manager & supervisor of students and volunteers
Randi Dunagan	Research Associate I	B.S.	5	Field plot implementation, plot maintenance, data collection and harvest, data manipulation, Weather Station, Safety officer, phones, & interaction with UTK-based PI's
Steve Gibson	Craft Supervisor I	Technol. Cert.	4	Physical plant operation and maintenance, equipment maintenance, troubleshooting, field day preparations
Jon McGowan	Research Specialist III	A.S.	3	Assistance with turf grass research plots, grounds maintenance, record keeping, facilities and equipment operations & maintenance
Ernest Merriweather	Senior Plot Caretaker	H.S.	32	Assistance with weed management research plots, record keeping, facilities and equipment maintenance
Sam Norment	Senior Maintenance Worker	H.S.	7	Assists with physical plant operations & maintenance, Security, facilities and equipment maintenance
Matt Ross	Research Specialist II	B.S.	6	Assistance with cotton research , record keeping, facilities and equipment maintenance
Andrew Wood	Research Coordinator I	B.S.	4	Supervises grounds maintenance personnel, temporary employees, Plans and implements rotation crops, keeps inventory and records, fabrication & maintains equipment and inventory

Infrastructure improvements at WTREC since 2008

Improvement	
ADA Door Openers Main Bldg	$8,775
Repair Irrigation Well	$9,727
New Roof Bldg 5531	$5,210
Cotton Storage Bldg	$145,406
Repair Main Bldg Roof	$23,172
3T HVAC Heat Pump	$6,300
Emergency Well Repair	$9,000
Gin building renovation	$44,949
Carpet Residence	$4,230
Linoleum Residence	$2,699
Horticulture Cold Frame	$10,000
Total	**$269,468**

Equipment purchased at WTREC since 2008

Equipment Description	
EPT23C8 Liquid N Applicator	$ 9,547
TurboTill TT1200	$18,088
Delta 12 ft Dump Trailer	$6,740
M6040F Kubota 2wd tractor	$18,500
Cotton Seed Vacuum System	$6,000
Woods HS106 Hydraulic Cutter	$7,1.00
Module Builder	$5,000
Kincaid Plot Combine	$173,590
Station Car	$17,000
JD 7430 with GPS	$131,675
RTV900 Kubota Utility Vehicle	$11,375
Kubota Front End Loader	$6,650
Rebuild JD 4455	$11,064
Case 580SL Backhoe (used)	$23,500
JD HPX Diesel Utility Vehicle	$7,900
Ford F150 pickup	$25,000
Total	**$478,729**

Specialized research equipment located at WTREC

Equipment Description
Three 4-row vacuum planters
Almaco plot drill – 10-row, 7.5” spacing
10 saw and 20 saw cotton gin
Liquid nitrogen applicator – 4 row
3 Gandy Drop Spreaders – 5’, 10’ and 12’
Broadcast sprayers – 10’, 20’ and 40’
4-row 30” Wilmar hooded sprayer
1 linear 2 span irrigation system; 1 one-span center pivot irrigation system
Two plot combines with corn and grain headers
Two 2-row cotton pickers with load cells & sacking attachment
Case IH 2144 Combine with yield monitor and corn and grain headers
Pixall Snap bean harvester
John Deere 7630 tractors with Auto Steer
Irrigation travelers with 60 ft boom
ArcMap v.10
Liquid Manure spreader
Disc mower, Hay Rake, and Baler
Various lawn mowers

Outreach activities at WTREC

Event	Description
Summer Celebration Lawn & Garden Field Day	First held in 1989 and is on the Thursday of the week following the 4th of July. Summer Celebration is the Mid-South’s largest field day of its kind with an attendance of 2000 to 3000
UT Weed Tour	Educational tour of weed management research trials targeted toward agent, consultants, producers and industry personnel with and annual attendance of between 125 and 150
Pumpkin Field Day	Educational event with an attendance of 1.00 to 125 pumpkin producers.
Cotton Tour	Educational tour of cotton research for agents, consultants, producers and industry personnel with an attendance of 100 to 150
FFA & 4-H Contests	Soil judging, Forestry, and Meat Cookery
Cotton Focus	Seminar typically attended by 200 to 250 cotton producers, agents, consultants and producers
Others	Tours & events are hosted throughout the year and include students, producers, visitors, commodity & industry groups, etc.

Research trials conducted in 2013 at WTREC

No.	PI	Department	Nature of Study
1	Allen	PS	Performance test for Wheat Varieties
4	Arelli	USDA - PS	Soybean SCN Breeding and Regional Yield Test
5	Canaday	EPP	Snap bean/Soybean Seedling Disease Control
2	Kelly	EPP	Wheat foliar disease & Cotton Seedling Disease
1	Leib	BESS	Deficit Irrigation of Cotton
2	McClure	PS	Early planted Soybean Production & Weed Control
5	Mengistu	USDA-EPP	Managing Charcoal Rot in Soybeans
4	Steckel	PS	Weed Management in corn, cotton, wheat & soybeans
4	Stewart	EPP	Insect Management in corn, cotton, wheat & Soybeans
2	Tyler	BESS	Tillage, N-rate, Cover crops in cotton & soybeans
3	Verbree	PS	Irrigation, fertility, and forage peas
1	West	PS	Yield trial of experimental wheat lines
2	Yin	PS	Biofertilizers & C-sequestration
2	Schlarbaum	FWF	Oak seedling Comparison and Bald cypress Seed Orchard
1	Hamilton	PS	Annual and Perennial flower trials
2	Windham	EPP	Redbud cultivar adaptation & roses disease resistance
41 total			

Palmer Pigweed Research Plots

Summer Celebration

Insect Management Discussion

Faculty Located at WTREC

PI			Department
Arelli, Prakash	USDA	Adjunct	PS
Canaday, Craig	UT	1.00R	EPP
Gwathmey, Owen	UT	1.00R Emeritus	PS
Kelly, Heather	UT	70E;30R	EPP
Lentz, Gary	UT	1.00R Emeritus	EPP
Mengistu, Alemu	USDA	Adjunct	EPP
McClure, Angela	UT	1.00E	PS
Mercker, David	UT	1.00E	FWF
Newman, Melvin	UT	1.00E Emeritus	EPP
Steckel, Larry	UT	25R; 75E	PS
Stewart, Scott	UT	1.00E	EPP
Tyler, Don	UT	1.00R	BESS
Verbree, David	UT	75R; 25E	PS
Yin, Frank	UT	1.00R	PS

Advocacy/Advisory Groups

The Cotton State Support Committee, Tennessee Soybean Association, area grain and cotton producers, industry cooperators, and the Madison County Master Gardeners provide advocacy, guidance on needs, and financial support for WTREC research and outreach.

Cooperating Agencies Located on WTREC

USDA-ARS Crop Genetics Research Unit based at WTREC in Jackson, TN with two scientists and support personnel have offices, laboratories, greenhouses and equipment storage building at WTREC. WTREC also provides offices and facilities for UT Institute of Public Service and UT Extension Western Region offices and a location for agent training, conferences, workshops, 4-H meetings and contests.

AgResearch Key Outcomes & Administration's Guiding Principles

Key Outcomes

The strength of the nation's land grant system rests in its mission of service for the public good. This philosophy drives research programs of the Tennessee Agricultural Experiment Station (UT AgResearch), with the ultimate objective of developing new knowledge having the potential to enhance people's lives either in the near- or long-term. Bolstering this mission-driven approach is a unique federal-state-county partnership linkage to the land grant system which provides base or capacity funding ensuring the stability needed to maintain focused programs.

As we compare and contrast Agricultural Experiment Stations across the country, the base resources provided (state and federal appropriations) and strategic hand dealt to institutions which enjoy high national regard (when adjusted for basic infrastructure needs and differences in number of research faculty FTE) are not materially different, and in some cases are less, than that at other institutions. These highly regarded institutions do not have a greater level of know-how or faculty expertise than other institutions. High achieving institutions do more with the hand they are dealt. They have developed a strong culture of productivity and accountability with the resources provided to them, and they are very successful at leveraging their state and federal appropriated resources to obtain extramural sources of funding from a wide range of sponsors and partners. These institutions have been successful in institutionalizing a culture of high productivity in a consistent manner across all their programs. They are better at execution; they are better at reducing inconsistency; they are more consistent in productivity measures across their entire faculty.

In order to achieve and sustain superior research performance, which addresses the wide array of clientele needs, capacity funding from state and federal sources must be as large as possible to support basic infrastructure, allowing adherence to the land grant mission and providing support for faculty to be competitive for extramural funding. Providing significant program support and instilling a culture of excellence form the framework for assisting UT AgResearch in producing four key outcomes:

- ***Achieve sustained superior performance in both the short- and long-term.*** A key to UT AgResearch success in serving our clientele and advancing our national stature is to achieve predictable and positive research output in a consistent manner over time. We must deliver superior performance and make a distinctive impact over a long period of time. To do this, faculty and staff must be empowered to institutionalize a set of common values, shared goals and heightened skills, and must be supported by administration at all levels of UTIA. High levels of research performance leading to the development of new knowledge which is unique and valuable to our clientele and science adds value and reputation to our programs, thus providing a competitive advantage relative to our peers. We must separate inputs from outputs and hold ourselves accountable for progress in the outputs relative to how effectively we deliver on our mission and track our trajectory with rigor. We must also share a commitment to sustaining these programs in the short- and long-term.

- ***Engage and maintain a loyal clientele; earn not only satisfaction but loyalty.*** As a land grant institution, UTIA has a mission of service for the public good. Our clientele are quite varied from the agricultural producer, to the homeowner, to state and federal agencies and to science itself. UT AgResearch must be the first choice among our clientele as the provider of research-based information to meet their needs. We must develop a history of positive relationships and a culture of partnership with clientele so that they have faith, trust and security in knowing that the benefits of our service will meet their needs. The following principles engage interactions with those we serve and attain their loyalty:
    - Develop a holistic understanding of our clientele's needs
    - Deliver flawless results
    - Act in a non-biased manner in the best interests of the clientele
    - Deliver progressively valuable solutions to our clientele's challenges

- ***Attain a winning culture of highly engaged and loyal faculty and staff with a passion for high performance.*** Success of UT AgResearch programs lies in its people. The reputation of UT AgResearch faculty, staff and programs is the reputation of UT AgResearch. We must recruit the highest quality faculty and staff available and provide a professional and personal environment for them to succeed and instill a desire to commit their career to UT AgResearch.
    - Faculty and staff must have a deep passion for their work and the core values associated with the land grant mission.
    - We must understand our strengths and capitalize on opportunities where we have a unique position and advantage to provide public service.
    - Our focus must also center on the resource engine which drives our operations and institutional reputation.

  Our environment for success must engage a commitment to excellence which fosters risk taking and innovation through the engagement of people's minds and passion. This commitment to excellence must be based on a culture and scoreboard of accountability; responsibility for achieving excellence must be embraced by all. Rewarding the accomplishments of our world class faculty and staff in a proactive manner will help us keep the best talent.

- ***Fulfill a unique mission that sets us apart from other institutions both within Tennessee and across the nation.*** UTIA AgResearch programs are not focused on research for the sake of pure research. Our research programs are driven by the philosophy of making a difference; to support our mission of enhancing the lives of citizens of Tennessee and the world. To do this, we must develop meaningful, long-term relationships with clientele which allows us to integrate with their operations to observe their problems over time, so they believe us when we say that we can develop solutions to their problems. The value that our programs bring to our clientele must not be matched by any other institution, inside or outside of Tennessee. We must develop a brand reputation among our clientele and the public, based on tangible superior results, that UTIA is the best and preferred source of information for problems and challenges they are facing.

Guiding Principles of UT AgResearch Administration

The AgResearch, Dean for Research office is committed to strong support of highly-productive, faculty-driven programs in a manner which leads to achieving the four key outcomes described above. Actions and activities of the Dean for Research office shall be guided by the following principles:

- ***Inspire trust at all levels of the institution, among clientele and stakeholders.*** The Dean for Research office is committed to honest, open dialogue with faculty, staff, clientele and stakeholders regarding all programs, facilities and budget administered by UT AgResearch. To obtain a high level of credibility in the minds of faculty, staff, clientele and stakeholders, staff within the Dean for Research office as well as those in the departments and AgResearch and Education Centers will operate with character and competence as guiding principles. We will share information in a timely manner and follow through on our commitments unless outside forces dictate otherwise. The Dean for Research office respects diverse opinions and will work with faculty, staff, clientele and stakeholders as equal partners toward a forward-looking vision which serves the people of Tennessee and the world.

- ***Align systems and work processes so that they facilitate rather than hinder achievement.*** Through their range of administrative offices with differing goals and objectives, land grant institutions have a great deal of variation in their systems, core work processes, people, technologies and policies. To successfully meet our mission, all administrative units within UTIA must work together in a coordinated and consistent manner to streamline these systems and work processes in support of faculty programs. Core work processes must be aligned to achieve our highest priorities. The Dean for Research office will work to institutionalize core work systems and processes so that obstacles for success are removed, allowing faculty and staff to concentrate on their programs. As new internal and external operational mechanisms are implemented, faculty, staff and administration must develop new skills and tools to adjust and respond to new ways of doing business.

- ***Develop a clear and compelling vision of why goals are established and how individuals contribute to these goals.*** As a public, land-grant institution, UT AgResearch has a mission of service for the public good. To accomplish this mission, we must understand our clientele's needs and goals. Our goals must be specific and clear, linked to mission, measurable and deadline-driven. Faculty-driven programs within UT AgResearch must focus their efforts on the most important goals which will fulfill their purpose and mission.
    - UTIA AgResearch programs will be guided by truly creative research endeavors that result in the discovery of new knowledge.
    - We will innovate these discoveries into new products and processes and collaborate with the extension service in their application for the improvement of agricultural and natural resource industries which generate economic, societal, and environmental benefits at the state and national levels.
    - As Tennessee's flagship research university, AgResearch will integrate discovery science and applied research and technology into undergraduate and graduate teaching programs to enhance the student experience.

- ***Empower faculty and staff to accomplish world-class research results.*** One, if not the, most important roles of the Dean for Research office is to ensure that the highest quality faculty and staff are hired and an environment is established for their success. The Dean for Research office will place a high degree of trust in faculty-driven programs and support their capacity with the expectation of delivering high quality results.
    - UTIA AgResearch will aggressively pursue targeted strategies to increase extramural research including federal and non-federal competitive funding as well as federal/state agencies and the development of private company partnerships.
    - We will provide state-of-the-art facilities and equipment to increase our capacity for cutting-edge science.
    - We will work to develop inter- and multi-disciplinary research teams, facilities and resources within UTIA and with other universities, agencies and private corporations.

Defining Research Excellence

A highly productive and relevant university is one that delivers superior performance and makes a distinctive impact consistently over long periods of time. For UTIA AgResearch, the logical measure of performance is the effectiveness to which we deliver on our mission of service for the public good; developing solutions for problems facing agricultural and food producers, natural resource managers and industries, and the public. The critical question for us to ask ourselves is how effectively we deliver on our mission, relative to the resources we receive (both appropriated and extramural).

To best accomplish our mission with high levels of productivity, we must attain a clear vision and understanding of what UT AgResearch is passionate about, what services we can be the best at providing to the public, and what drives our resource engine to accomplish these passions and goals. We must recruit highly qualified and passionate faculty and staff who embrace the core values of what UT AgResearch stands for and its mission. An environment must be provided for faculty and staff to succeed professionally and an understanding of an individual's personal needs and desires must be embraced to instill a desire for them to commit their career to UT AgResearch. We must have a clear understanding of the contributions that UT AgResearch is uniquely and competitively situated to deliver, and maintain a sharp focus on providing these services to those we serve in a way that no other institution can accomplish. Our resource engine is tied directly to the ability of our faculty and staff to deliver these unique contributions, establishing a UT AgResearch "brand" in the eyes of those we serve. Building the UT AgResearch brand as a result of tangible, relevant results and an emotional connection will ensure that those we serve believe not only in our mission but in our capacity to deliver on that mission. We must rely on high quality science, political skill, public support, personal relationships and an emotional connection across those who support our programs including state and federal government, agency and business awards and fundraising efforts.

A faculty committee was established to identify the indicators of excellence and measures of research productivity which will lead UT AgResearch to fully deliver on its mission of enhancing the lives of

citizens of Tennessee and the world, to raise our stature as a public land grant institution, to increase our competitiveness, and to increase the importance and reputation of UTIA. The committee was composed of two members from each of the seven departments. Members were purposefully selected to represent the range of appointments, (teaching, research, extension appointments), locations (campus and off-campus) and nature of research (fundamental and applied). The committee included:

Daniel De La Torre Ugarte Agricultural and Resource Economics	Dan McLemore Agricultural and Resource Economics
Lannett Edwards Animal Science	John Waller Animal Science
Mark Radosevich Biosystems Engineering and Soil Science	Daniel Yoder Biosystems Engineering and Soil Science
Scott Stewart Entomology and Plant Pathology	Mark Windham Entomology and Plant Pathology
Federico Harte Food Science and Technology	Lana Zivanovic Food Science and Technology
Matt Gray Forestry, Wildlife and Fisheries	Allan Houston Forestry, Wildlife and Fisheries
Dean Kopsell Plant Sciences (replaced Owen Gwathmey)	Neal Stewart Plant Sciences

AgResearch

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Research Excellence

Achieving the AgResearch Mission

Seeking Excellence: Introduction

The ultimate goal of the University of Tennessee, Institute of Agriculture is to excel in fulfilling the land-grant mission that sets it apart from other institutions within Tennessee and across the nation. Within that framework, our goal as UTIA AgResearch is to use our resources effectively to deliver service for the public good through solutions to problems facing agricultural producers and businesses, natural resource managers and industries, and the public.

Achieving this goal begins with a clear, shared vision of the AgResearch values and mission, the services we excel at providing, and the resources we need to provide those services. We recruit and retain highly qualified and passionate faculty and staff who embrace AgResearch's core values and mission, and we provide the environment and resources to enable their successes. We develop a clear understanding of the contributions AgResearch is uniquely positioned to deliver, and we maintain a sharp focus on providing those services to our clients. Our long-term success is linked directly to the ability of our exceptionally skilled and highly valued faculty and staff to deliver these unique contributions, establishing a valuable AgResearch "brand" for our clients. Building that brand as a result of tangible, relevant, objective results and an emotional connection ensures that our clients believe not only in our commitment but in our capacity to deliver. To this end, we rely on high-quality objective science, political skill, public support, personal relationships and an emotional connection with all those who need our programs.

We envision that this document may ultimately serve as the framework for assessment of AgResearch productivity, allowing us (faculty and administrators) to determine our standing in relation to our personal target of research excellence, the path we must take to achieve that goal, and the progress we are making toward that end. Each of us has a unique combination of talents, research area(s), potential clientele and corporate responsibilities, which will be reflected in the indicators (see below) that demonstrate AgResearch excellence. This document does not supplant Section 3.8 (Faculty Review and Evaluation) of the UT Faculty Handbook nor corresponding bylaws, but rather provides a framework on which to base such evaluations.

This document is primarily intended to serve as a set of guiding principles for how we achieve the AgResearch mission. It describes the successful mission **outcomes**, the **elements** critical to achieving those outcomes, and **indicators** we can use to determine our success in incorporating those elements. This document is divided into two general sections, describing respectively the essential commitments of faculty and administration to research excellence. With a program outline clearly in focus, we can be certain of our success in enhancing the lives of Tennesseans and others in the world, raising our stature as a public land-grant institution, increasing our competitiveness, and enhancing UTIA AgResearch's importance and reputation.

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Excellence Defined: Key Outcomes for Research, Critical Components and Indicators for AgResearch Faculty

AgResearch is successful when we, as a collective, achieve the three key **outcomes** listed in this document. An excellent individual research program will similarly achieve each of these **outcomes**, incorporating all of its associated **elements** (A, B, C, etc. below), as demonstrated by one or more of the listed indicators (bulleted items). These **indicators** are in first-person form to emphasize that only with the personal commitment of every AgResearch team member will we achieve our mission.

Outcome 1. We achieve sustained, superior short- and long-term scientific research performance.
As an AgResearch faculty member, I ensure that my research program contains each of the following five **elements,** as demonstrated by one or more of the listed **indicators:**

A. ***I have a unique, independent research program based on high-quality, state-of-the-art science.***
- My research team (students, postdocs, research associates, etc.) and I produce peer-reviewed publications, and I can show a measure of their impact, though that measure may vary by discipline and individual.
- Where appropriate, I develop, protect and extend my intellectual property into the commercial sector.

B. ***My program has peer recognition at the state, regional, national and/or international levels.***
- My research team and I play significant roles in professional societies, regional research groups, etc., including leadership, organizational and peer review responsibilities.
- I provide invited service in international research activities.
- I serve on institutional and/or proposal review panels.
- My graduate students and postdocs are successful in obtaining significant positions.

C. ***My program evolves to address changing or emerging scientific needs and issues.***
- My program has ongoing linkage to priority needs as established by recognized state, regional, national or international groups or organizations.
- My program has support from end-user communities (industry, field professionals, etc.) or citizen groups to address critical issues.
- I seek professional development opportunities (from seminars to sabbaticals) that advance my knowledge of my field of study and of new opportunities.
- My program has ongoing linkage to priority needs as established by recognized state, regional, national or international groups or organizations.
- My program has support from end-user communities (industry, field professionals, etc.) or citizen groups to address critical issues.

D. ***Scientific, agency or end-user communities support my program with their resources.***
- My program is supported by funding from the scientific community through competitive grants.
- My program is supported by directed funding from government agencies, end-user communities, alumni or citizen groups.

E. ***I provide collaborative support for the high-quality science programs of colleagues and peers, within or outside my discipline and the institute.***
- I play a significant supportive role in peer-reviewed publications resulting from my collaboration.
- I actively participate in seeking support for that work from the scientific community and others.
- I support colleagues' programs through service on graduate committees and other roles.

Outcome 2. We engage and maintain a satisfied and loyal clientele.

As an AgResearch faculty member, I ensure that my program contains each of the following two **elements**, as demonstrated by one or more of the listed **indicators**:

A. ***My research program addresses the needs of—and is linked to—a significant state, regional, national or international end-user community.***
   - My program addresses the expressed needs of a significant state, regional, national or international end-user community.
   - My program supports an active Extension and/or teaching program.
   - My program is supported by directed funding from agencies, end-user communities or citizen groups to address specific questions.

B. ***I actively provide mechanisms for knowledge or technology transfer to the end-user community.***
   - I provide wide access to my science through publications including books, conference proceedings, abstracts and the full range of clientele-base publications.
   - My research supports an active Extension and/or teaching program in the area.
   - I participate in the development of portfolios, fact sheets, public media releases, recommendations, etc.
   - I participate in the development and support of software, Web pages and other electronic distributions of my science.
   - I participate in direct presentation of my work to end-user communities through field days, commodity meetings, etc.

Outcome 3. We attain a culture of highly engaged and loyal faculty, staff and students with a passion for high performance.

As an AgResearch faculty member, I ensure that my program contains each of the following three **elements**, as demonstrated by one or more of the listed **indicators**:

A. ***I support other faculty members in their programs.***
   - I participate in a supporting role in the research programs of others, including material support, time, equipment, etc.
   - I support an active Extension and/or teaching program in my area of expertise.

B. ***I include other faculty members in support of my program.***
   - I incorporate other faculty members in my research program as appropriate.
   - I support an active Extension and/or teaching program in the area.

C. ***I actively support the education of graduate and undergraduate students through involvement in research.***
   - I am active in advising graduate students or serving on graduate committees.
   - I provide opportunities for undergraduate research.

D. ***I help build and maintain the infrastructure required for a successful department and institute.***
   - I provide mentorship and support to junior faculty.
   - I actively serve on core long-term committees, groups, etc.
   - I participate fully in the hiring, tenure and promotion process.
   - I serve on short-term ad hoc groups to meet special needs.
   - I take part in special public outreach events.
   - I participate in a professional manner as a good citizen in the daily life of the department and institute.
   - I seek professional development opportunities that allow me to better carry out service roles within my department and the institute.

In summary, a faculty member with an excellent research program in a land-grant institution demonstrably performs independent high-quality research (**outcome 1**) that ultimately addresses meaningful problems (**outcome 2**) while being a good citizen and team member (**outcome 3**), as displayed by one or more **indicators** for every **element** within each **outcome**.

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Excellence Enabled: Key Outcomes for Research, Critical Components and Indicators for AgResearch Administration

Achieving AgResearch's mission requires not only the commitment of faculty members to the excellence of their research programs, but also active participation of the AgResearch administration in achieving each of the key **outcomes**. What follows is a description of administration's role in enabling the excellence of faculty programs, again detailed in terms of each of the three **outcomes** by incorporating all of its associated **elements**, as demonstrated by one or more of the listed **indicators** (bulleted items).
These criteria are in first-person form to emphasize that only with the personal commitment of every AgResearch administrator will we achieve our mission.

Outcome 1. We achieve sustained, superior short- and long-term scientific research performance.

As an AgResearch administrator, I enable high-quality research by providing each of the following five **elements**, as demonstrated by the listed **indicators**:

A. I provide the best possible facilities and services, including:

- Sound office infrastructure with trained, dedicated support staff.
- Access to state-of-the-art technology and associated support.
- Grants and contracts development and management support.

B. I provide the best possible research resources, including:

- Expertise, land, animal and equipment resources at the AgResearch and Education Centers.
- Support in the form of laboratories, major instrumentation, graduate students, postdocs, technical staff, publication fees, etc., with special support for new faculty and for those evolving new, promising research directions.
- Stabilizing fill-in support for shared research resources, including instrumentation, technical staff, etc.
- Assistance in developing intellectual property.

C. I work to provide support that actively fosters new outstanding research by:

- Actively helping faculty identify new research opportunities and directions commensurate with their competence and expertise.
- Assisting researchers in identifying new and ongoing funding opportunities.
- Working directly with scientific funding agencies and other groups to determine their needs, point out direct connections to AgResearch programs, and request funding.
- Interacting with local, state and federal agencies and elected officials to seek support for ongoing or new research programs.

D. I help faculty achieve their full potential through professional development activities, including:

- Helping identify needs for training and development.
- Supporting professional development opportunities (from seminars to sabbaticals), especially for faculty members interested in evolving their research direction.
- Presenting or supporting participation in workshops and training activities, especially those designed to provide new skills.
- Providing development and training opportunities for graduate students, postdocs and technical staff.

E. I provide and support opportunities for scientific collaboration through:

- Actively seeking to establish contacts between complementary researchers.
- Providing special support to collaborative efforts within AgResearch and the university.

Outcome 2. We engage and maintain a satisfied and loyal clientele.

As an AgResearch administrator, I ensure strong linkages to significant clientele groups by providing each of the following two elements, as demonstrated by the listed indicators:

A. ***I establish and nurture linkages with potential clientele groups and extend those to include the faculty by:***
   - Serving a liaison role with clientele groups, meeting regularly with them, understanding their needs, involving faculty in meeting those needs, and requesting support for those efforts.
   - Establishing similar contacts with advocacy and citizen groups.
   - Supporting faculty participation in field days and similar researcher-clientele interactions.
   - Pursuing and nurturing development opportunities to support centers, research programs, endowed chairs or other long-term support.
   - Supporting joint efforts of research, Extension and teaching faculty.

B. ***I provide mechanisms for faculty to disseminate knowledge or technology to the end-user community by:***
   - Seeking opportunities for faculty to "tell their story" to non-technical clientele, and providing the expertise and technology to present technical information to a non-technical audience in the most attractive and informative way.
   - Supporting efforts to translate research results and activities into the university's undergraduate educational programs.
   - Supporting research faculty efforts in the production of Extension publications and other clientele-based forms of communication.

Outcome 3. We attain a culture of highly engaged and loyal faculty, staff and students with a passion for high performance.

As an AgResearch administrator, I ensure a culture of respect, loyalty and commitment by providing each of the following four **elements**, as demonstrated by the listed **indicators**:

A. ***I acknowledge recruiting, hiring and retaining excellent faculty and staff as a top priority.***
   - I provide the resources necessary to examine the best possible candidate pool.
   - I insist on consideration of all three mission outcomes (research excellence, addressing meaningful clientele issues, good citizenship) in judging a faculty candidate.
   - I support continued searching if an excellent candidate is not found.

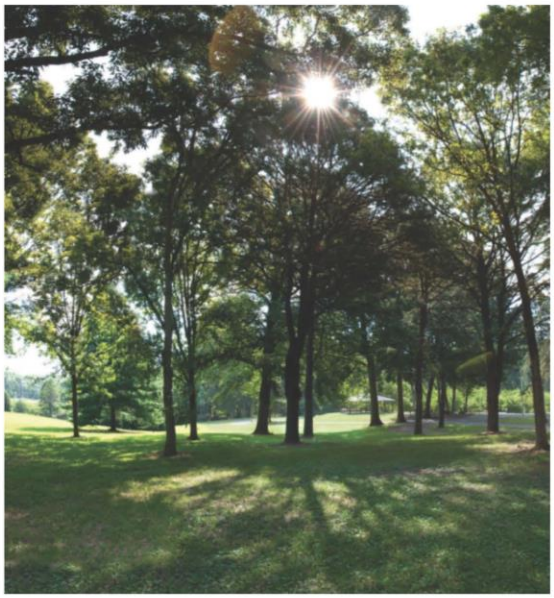
B. ***I recognize both improvement and excellence.***
   - I strive to provide faculty financial compensation commensurate with their contributions to the three outcomes of the AgResearch mission.
   - I provide additional awards and recognition for exemplary service of all types.
   - I actively seek out and support nomination of the faculty for national and international awards.

C. ***I actively support the education of graduate and undergraduate students through involvement in research.***
   - I support graduate assistantships and development activities for graduate students.
   - I provide support for undergraduate research and encourage faculty to provide such opportunities.

D. ***I actively include faculty members in decisions regarding AgResearch mission, directions and faculty issues.***
   - I take very seriously the counsel of advisory councils and other formal and ad hoc groups.
   - I informally seek feedback from a diverse range of faculty members on the current status and future directions of our efforts.

E. ***I provide mission-driven departmental leadership.***
   - I acknowledge and support the importance of all three outcomes.
   - I foster senior faculty leadership and involve those faculty members in significant decisions.
   - I provide timely information on the status of shared resources and ensure that those are distributed transparently.
   - I insist on respect and professionalism among all departmental personnel.
   - I protect the faculty from unreasonable bureaucratic demands and obstacles.
   - I provide a trained and cooperative staff to maximize faculty efficiency.

In summary, an excellent research administration program in a land-grant institution demonstrably supports independent high-quality research (**outcome 1**) and builds linkages to and support from the broadest possible clientele (**outcome 2**), while creating an environment that rewards and maximizes contributions to the mission (**outcome 3**) as displayed by one or more **indicators** of each **element** within each of the **outcomes**.



Excellence Displayed: The Importance of Quantifiable Measures

Relevant for individual research and administrative programs, the aforementioned indicators provide measures of both productivity and quality. They also serve as tools for faculty members and AgResearch administrators to gauge themselves relative to their past performance and to their peers, answering questions such as: Am I improving? Am I competitive in the field? Is AgResearch making progress? Identifying measures of research productivity and administrative effectiveness and tracking their progress also facilitates benchmarking UTIA AgResearch relative to peer units at other institutions, helping us understand AgResearch's strengths and weaknesses while justifying requests for additional support.

The land-grant research mission conceived in the 1800s continues to evolve, both shaping the research mission and being shaped by it. The trends in our measures can therefore be vital in understanding and foreseeing that evolution. For example, a declining measure associated with a specific aspect of an individual research or administrative program may indicate that it should aim in a new direction to meet evolving needs. Today's issue is to accurately view current challenges and especially to anticipate future challenges, so that our research can address those. Specific quantifiable measures should be useful to both researcher and administrator in understanding our effectiveness in addressing the challenges, the breadth and depth of our impact, and ultimately whether we are fulfilling our mission of meeting the needs of current and future clients.

Excellence Achieved: Summary

It is not difficult to define the AgResearch mission in general and rather philosophical terms, as in the introduction of this document. What is more difficult is to gauge our success
at achieving that mission. Only through such gauging can we celebrate our strengths and address our weaknesses.
The purpose of this document is to establish an ideal target based on the **outcomes** required to demonstrate that we have achieved our mission, the necessary **elements** that must be in place to reach each of those **outcomes,** and some **indicators** that demonstrate each **element.**

With this ideal target in place and using appropriate individualized quantifiable measures, we can individually and as a group determine where we are successful and where we are falling short or missing the mark. Such frank assessment is essential not to drive rewards and punishments, but to enable us as individuals and jointly as AgResearch to reach our potential and as fully as possible achieve our mission.

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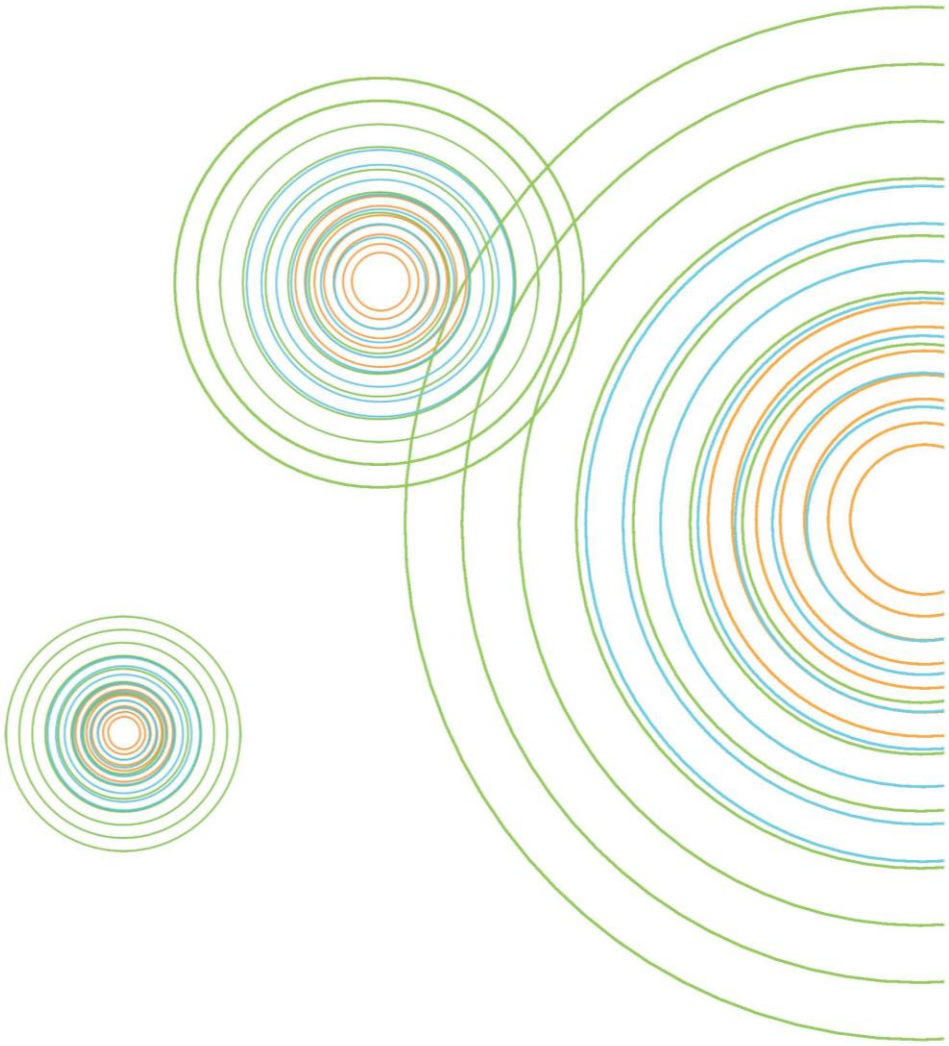


THE UNIVERSITY of TENNESSEE
INSTITUTE of AGRICULTURE

E11-0115-00-002-12 12-0007 08/11-50

Research Productivity

Based on the above document, the following measures have been identified as research productivity metrics that AgResearch will track over time. Many of these measures are also used in the UT System Administration Strategic Plan and Dashboard, available at **http://president.tennessee.edu/strategicplan**. Where data exists, we seek to compare UT AgResearch to other Agricultural Experiment Stations across the country, realizing that faculty FTE and discipline departments vary across Experiment Stations.

	2007	2008	2009	2010	2011	2012
Refereed publications, Actual year	245	244	303	266	326	317
Refereed publications, 3-year rolling average			264	271	298	303
Scientific presentations, Actual year	337	407	386	406	404	400
Scientific presentations, 3-year rolling average			377	400	399	403
Grant expenditures, $M	21.2	21.3	24.7	27.4	30.3	33.8
Grant awards, $ M	38.9	46.7	46.9	48.3	46.0	46.6
Grant proposals, $M	90.7	107.6	107.0	129.5	232.7	185.3
Invention Disclosures	11	43	18	25	22	60
Patents Filed	7	11	13	17	10	9
Patents Issued	0	5	2	5	3	3
License & Options	3	2	4	2	10	3
Other Agreements	11	17	6	16	31	38
Startup Companies	0	0	1	0	2	2

Facilitating Faculty Success

Aligning UTIA Sponsored Programs

Consolidating Pre-Award Functions

Prior to 2008, UTIA had four Dun & Bradstreet Numbers (DUNS Number), with grant proposals and receivable contracts (pre-award activities) being processed through individual UTIA function offices (Academic Programs, Research, Extension, and College of Veterinary Medicine). This process was adequate with single-function projects, although inefficiencies certainly existed. As sponsored projects became more cross-function, multi-disciplinary and multi-institutional, this approach became very confusing, inefficient and inconsistent for faculty and UTIA. Discussions began in early-2009 regarding the possibility of consolidating pre-award functions into a central UTIA Sponsored Programs office. Post-award sponsored programs functions were already consolidated across all functions of UTIA. At

that time, some UTIA offices decided to consolidate pre-award functions, with a few offices, whose sponsored program activity tended to be single-function, making the decision to continue processing grant proposals and receivable contracts through their respective Dean's offices. Beginning in 2011 and 2012, these offices made the decision to consolidate with the UTIA Sponsored Programs office. Currently, all UTIA mission areas (Academic Programs, Research, Extension, and College of Veterinary Medicine) contribute financially to support the UTIA Sponsored Programs office.

Pre-Award Grant Coordinators

Prior to 2008, UTIA faculty were largely responsible for development of their own grant proposals. The departmental Business Manager or Accounting Specialist provided limited assistance, which varied widely across departments. At that time, the individual Dean's offices provided some assistance; however, a great deal of individualized help was not available due to limited staff. In 2007, UTIA faculty submitted only $90.7 M in proposals (see Table below). As proposal submission became electronic and much more complicated, some faculty who did not have a long history of proposal submission experience and grantsmanship success became intimidated with the process.

In late-2008 and early-2009, we observed that the Accounting Specialist (Ms. Cathy Creswell) in the Center for Renewable Carbon (CRC) was providing a great deal of assistance to the Center's faculty in the preparation of their grant proposals. The Center had a Business Manager and an Accounting Specialist, which allowed time for Ms. Creswell to help their faculty in proposal development; we heard very positive comments from the Center's faculty. At some point in 2009, we asked the CRC Director (Dr. Tim Rials) if Ms. Creswell could work in the Sponsored Programs office for six months in a pilot program where she would help all UTIA faculty with proposal development. The program was very successful and in late-2009 we "stole" Ms. Creswell from the CRC to become the first Pre-Award Coordinator. We quickly hired additional Coordinators and currently there are seven Pre-Award Coordinators in the UTIA Sponsored Programs Office.

The Coordinator's role is to take the lead (under the faculty member's direction) on all aspects of the grant proposal with the exception of the summary and narrative. The goal is to allow the faculty member to concentrate on science, with support from the Coordinator on all other components of the proposal. The Coordinator works with the faculty member to set milestones, ensuring completion of the proposal prior to the deadline. The Coordinator completes all forms, works with the faculty member's collaborators to incorporate CVs, Conflict of Interest and Current and Pending forms and prepares all aspects of the budget under instructions from the faculty member.

This model has had a positive impact on UTIA's grantsmanship success. Submissions have increased significantly with awards and expenditures increasing over time.

	2007	2008	2009	2010	2011	2012
Grant & contract submissions in millions	$90.7	$107.6	$107.0	$129.5	$232.7	$185.3
Grant & contract awards in millions	$38.9	$46.7	$46.9	$48.3	$46.0	$46.6
Grant &contract expenditures in millions	$21.2	$21.3	$24.7	$27.4	$30.3	$33.8
Includes teaching, research and Extension						

Grantsmanship Workshops

Consistent with many institutions, UT AgResearch has provided funding for faculty to attend various grantsmanship workshops conducted by federal agencies (primarily USDA/NIFA) and private grant writing companies. Additionally, we have conducted many internal programs including presentations by UTIA faculty who are grant active and successful on topics related to proposal preparation, grant panel perspectives on proposal review and other areas. We have organized meetings focused on building teams of faculty from UTIA and University of Tennessee, Knoxville in response to specific "Requests for Applications" from various agencies.

In 2012, we worked with Grant Writers' Seminar and Workshops LLC (http://www.grantcentral.com/) to support a grantsmanship training for UTIA faculty. One of the company's consultants presented the full-day "Write Winning Grants" seminar, which was attended by approximately 150 UTIA faculty. Following the seminar, 23 UTIA faculty worked one-on-one with the company's consultant during the preparation and submission of a federal grant proposal. Faculty spoke very highly of this program and we plan to continue it in the future. We have discussed briefly with other institutions about the possibility of joint participation in this program to assist in the development of multi-institutional faculty teams.

UTIA "Orange Team" Grant Proposal Review

The goal of this program is to provide constructive faculty-based, peer-review feedback of grant proposals prior to submission to granting agencies. The outcome will be higher quality proposals being submitted to granting agencies thus enhancing the probability of funding success. "Orange Team" program information:

Voluntary Program. The "Orange Team" grant proposal review program will be administered by the UTIA Office of Sponsored Programs (OSP) on a voluntary basis, both on the part of grant proposers and faculty reviewers.

Types of Review. Proposals will be reviewed by an "Orange Team" which will consist of The University of Tennessee, Institute of Agriculture scientists and/or other UTK or external reviewers when deemed necessary. The "Orange Team" will consist of three reviewers and the peer-review process will be confidential and expeditious.

Three types of review will be available: (1) review of the Letter of Intent only, (2) review of the Project Summary/Narrative, or 3) review of both the Letter of Intent and the Project Summary/Narrative.

Review of the Letter of Intent. Many funding agencies are now requiring a Letter of Intent as a condition of proposal submission. Letters of Intent are agency specific; are generally limited to one or two pages; and include names of PI's and co-PI's; professional titles, department, and institution of all collaborating investigators; a descriptive title, rationale, overall hypothesis or goal; specific objectives; approach; potential impact and expected outcomes. Letters of Intent are reviewed by scientific program staff of the agency in order to plan for appropriate expertise for peer-review panels and to ensure that the proposed project fits appropriately within the Program Area Priorities of the agency. Thus, the Letter of Intent is a critical document and preparation of an effective Letter of Intent is becoming increasingly important and one of the first steps in the preparation of a grant proposal. The objective of this review is to provide a forum for faculty discussion and input into the proposed idea. Discussion surrounding research/extension/teaching integration, expression of outcomes, other re-enforcing programmatic avenues, and other factors can assist in shaping the narrative. This review/discussion should take place very early in the process; in most cases before a significant portion of the narrative has been developed.

"Orange Team Review" of Letters of Intent will occur as follows. Once the PI has contacted the UTIA OSP via aggrant@utk.edu indicating an interest in submitting a proposal in response to a specific request for proposals (RFP), a pre-award coordinator from the UTIA OSP will contact the PI and inquire if an "Orange Team Review" of the Letter of Intent and/or Project Narrative is requested. If requested, the UTIA OSP pre-award coordinator will contact the UTIA "Orange Team" Grant Proposal Review Coordinator and this will trigger the formation of an "Orange Team". Where needed, the UTIA "Orange Team" Grant Proposal Review Coordinator will communicate with the Deans offices for Extension, College of Agricultural Sciences and Natural Resources, AgResearch, and the College of Veterinary Medicine during formation of the "Orange Team". The Letter of Intent and RFP should be submitted to the UTIA "Orange Team" Grant Proposal Review Coordinator at least 28 days before the deadline for submission to the granting agency. Once the Letter of Intent and RFP are received by the UTIA "Orange Team" Grant Proposal Review Coordinator, they will be sent electronically to the "Orange Team" for review. Members of the "Orange Team Review" will have seven days to review the Letter of Intent, make suggestions for improvement, and return comments to the PI. The PI and/or co-PI's will meet with the "Orange Team" to discuss comments regarding the Letter of Intent within seven days of receiving written comments. This timeline should allow adequate time for the proposal team to make the necessary changes and meet deadlines for submission.

Review of the Project Narrative. Project Narratives are agency specific and have a defined length with VERY SPECIFIC instructions and generally include the following:

Response to Previous Review (if applicable)

Introduction

Rationale & Significance

Approach (Objectives)

- Methods to be used in carrying out the proposed project
- Expected outcomes
- Means by which results will be analyzed, assessed, or interpreted
- How results or products will be used
- Pitfalls that may be encountered
- Limitations to proposed procedures
- Timeline for attainment of objectives, deliverables and measurable outcomes.

"Orange Team Review" of Project Narratives will occur as follows. Once the PI has contacted the UTIA OSP via aggrant@utk.edu indicating an interest in submitting a proposal in response to a specific RFP, a pre-award coordinator from the UTIA OSP will contact the PI and inquire if an "Orange Team Review" is requested. If requested, the UTIA OSP pre-award coordinator will contact the UTIA "Orange Team" Grant Proposal Review Coordinator and this will trigger the formation of an "Orange Team". The Project Narrative and RFP should be submitted to the UTIA "Orange Team" Grant Proposal Review Coordinator at least 28 days before the deadline for submission to the granting agency. Once the Project Narrative and RFP are received by the UTIA "Orange Team" Grant Proposal Review Coordinator, they will be sent electronically to the "Orange Team" for review. Members of the "Orange Team Review" will have seven days to review the Project Narrative, make suggestions for improvement, and return comments to the PI. The PI and/or co-PI's will meet with the "Orange Team" to discuss comments regarding the Project Narrative within seven days of receiving written comments. This should allow adequate time for the proposal team to make the necessary changes and meet deadlines for submission.

Review of the Letter of Intent and Project Narrative. The PI can choose to have both the Letter of Intent and Project Narrative reviewed. The review process will be conducted as described above.

Selection of Reviewers. UTIA faculty submitting proposals are encouraged to provide a list of potential reviewers as well as individuals they do not want to be involved in the review process. Reviewers should be faculty members that have an established record of securing extramural grants. Reviewers for grants to be submitted to a particular agency might be selected from faculty who have previously obtained funding from that agency or program. Reviewers will be required to sign confidentiality agreements and indicate that they have no conflict of interest with the PI and/or co-PI's. PI's and members of the proposal team should also provide a list of reviewers with competing interests or a conflict of interest with the proposal.

Proposal Dollar Request. The threshold to qualify for the "Orange Team Review" will be approximately $300,000 **unless** the PI is a new investigator. New investigators are encouraged to participate in the "Orange Team Review" when submitting competitive proposals to federal granting agencies.

Timeline. The Letter of Intent, RFP, and/or Project Narrative for "Orange Team Review" should be submitted to the UTIA "Orange Team" Grant Proposal Review Coordinator 28 days before the deadline for submission to the granting agency. This should allow adequate time for review and for the proposal team to make the necessary changes to meet deadlines for submission. PI's should understand that the earlier they can submit their Letter of Intent and Project Narrative for "Orange Team Review", the more likely substantive changes can be incorporated into the proposal to improve the proposal and enhance potential funding.

Faculty Development Fellows Program

The UT AgResearch Faculty Development Fellows Program **is an initiative to assist pre-tenure faculty**:

- in their orientation to The University of Tennessee, Institute of Agriculture,
- in their development toward a successful and rewarding professional and personal career at The University of Tennessee,
- to increase their competitiveness in seeking and obtaining extramural funding.

Program goals are to help early career faculty to:

- Clearly understand the roles and responsibility of a tenure-track faculty member
- Enhance proposal development skills to be grant competitive. Fellows are expected to submit an application to an external funding agency by the end of the program.

Three main components comprise the program:

Learning Activities

A combination of monthly formal sessions and informal interactions will address issues of importance to developing a successful career as a faculty member, as well as developing a foundation for grantsmanship success. Sessions describe policies, procedures, facilities, faculty expectations, tenure/promotion procedures and other items of importance to success as a UTIA faculty member.

Mentoring

One of the key elements of the program is a mentoring experience through which each participating Fellow is paired with a senior faculty Mentor who has developed a strong program and who has a track record of securing external grant funding. Mentors will be selected by the Fellow with the help of the AgResearch office. The advice of senior faculty Mentors can prove invaluable in helping Fellows more rapidly achieve funding success. Initially, Mentors will help Fellows assess preliminary data, conceptualize appropriate project goals and objectives, and review proposal drafts. Over time, Mentors

can be instrumental in helping to review manuscripts submitted for publication or working with Fellows to develop new, productive research collaborations.

Consultation

Group learning sessions will be complemented by one-on-one consultations with staff from the UTIA Office of Sponsored Programs, who will provide advice and expertise as fellows develop grant proposals for submission. UTIA administration will provide the services of an external consultant to review final proposals and will sponsor travel for Fellows to visit program officers in Washington, D.C. or at other sponsor workshops as needed.

UT AgResearch Faculty Development Fellows Program Calendar		
Month	**Presenter**	**Topic**
	Solicit applications: mid-June	
	Applications due: Monday, July 23, 2012; send materials to Micki Heatherly at (mheather@utk.edu) Applicant notification: Friday, August 3, 2012	
August 15 2012	Program kick-off event Meet and greet with all Fellows, Deans, Department Heads, Center Directors, UTIA Office of Sponsored Programs • Time & Location: 5:00 pm; August 15, 2012; PBB 156/157	
August 30 2012	Session for UT AgResearch Faculty Development Fellows only Time & Location: 1:00 to 5:00 pm; PBB 156/157	
	Delton Gerloff	Annual Review; Enhanced Retention Review; Tenure/Promotion Process
	Joel Lown	Online faculty reporting
	Steve Oliver Rick Carlisle	General overview of facilities
		• Campus: greenhouses, HUB Lab
	Rob Ellis	• Space, greenhouse and PBB committees; Campus Master Plan • Research & Education Centers; workplans
	Faculty Panel Pat Keyser Lannett Edwards Doris D'Souza	Managing the joint appointment; work/life balance
	Open Discussion	Roundtable Discussion including all presenters
September 10, 2012	Mentorship discussion with Fellows and Mentors Time & Location: Noon to 3:00 pm; PBB 156/157	
September 21, 2012	Session for UT AgResearch Faculty Development Fellows only Time & Location: 1:00 to 5:00 pm; PBB 156/157	
	Bill Brown, Dean AgResearch	Expectations of a research appointment ; Research Excellence Report; Faculty support services: internal, equipment & travel grants
	Melinda Jones	Budget/Funding overview; CRIS/Hatch project system; Faculty Incentive Program

UT AgResearch Faculty Development Fellows Program Calendar		
	UTIA Office of Sponsored Programs • Proposal development and submission • Working with your Grant Coordinator • Involving Research & Education Center(s) • What is F&A and why • What is cost share and why • What is effort certification and why • Budgeting, matching • Non-exchange transactions, gifts • Faculty responsibilities in post-award; account set-up; ledgers • TERA/PAMS • Contracting • A21: cost accounting principals • Subcontracts • Budget revisions/no cost extensions	
October 23, 2012	Session for all UTIA faculty Location: Hollingsworth Auditorium; 8:00 am to 5:00 pm	
	Write Winning Grants Seminar presented by Grant Writers' Seminar and Workshops LLC (http://www.grantcentral.com/)	
November 13, 2012	Session for UT AgResearch Faculty Development Fellows only Time & Location: 8:00 am to Noon; PBB 156/157	
	Fellows and Mentors prepare for visits to federal agency offices in Washington	
	Steve Oliver	Orange Team Review of Grant Proposals
	NIFA NPLs	Interactive Video With NPLs From USDA NIFA
	Faculty Panel	Presentations and discussion from faculty who have served on agency peer review panels • Mike Davidson, Department Head Food Science & Technology • Kim Jensen, Professor Agriculture and Natural Resource Economics • Kurt Lamour, Professor Entomology & Plant Pathology
December 14, 2012	Session for UT AgResearch Faculty Development Fellows only Time & Location: 9:00 am to 4:00 pm; bus transportation to various site.	
	Tour of the East Tennessee Research & Education Center Kevin Hoyt (Forestry REC) & Rob Ellis (Greeneville REC) participate • Plant Sciences Unit Joe Johnson Animal Research & • Blount Unit Teaching Unit (JARTU) • Organic Crops Unit • Little River Animal & Environmental Unit Holston Unit	
January 17, 2013	Session for UT AgResearch Faculty Development Fellows only Time & Location: 1:00 pm to 5:00 pm; PBB 156/157	

UT AgResearch Faculty Development Fellows Program Calendar		
	David Washburn, Nghia Chiem, Maha Krishnamurthy, Mary Ann Russell UTRF	University of Tennessee Research Foundation: invention disclosures, intellectual property, patents, commercialization, start-up companies; conflict of interest
	Keith Barber	UT Foundation, gifts
	Whitney Fair	Human Resources
	Jane Burns Susan Fiscor Brian Ranger IACUC Chair	Research compliance, export control, responsible conduct of research, biosafety, IACUC, human subjects, radiation safety
	Lela Young	Ethics & professional integrity
February 14, 2013	Time & Location: 1:00 pm to 5:00 pm; PBB 156/157	
	UT System Human Resource	• Leadership; Personnel Management • TEAM Dimensions
April 17 to 18, 2013	Session for UT AgResearch Faculty Development Fellows only	
	Overnight trip to AgResearch and Education Centers & County Extension Offices • Day 1: Leave Knoxville 8 am EST; arrive Plateau REC 8:30 am CST Leave Plateau REC 11:00 am CST; arrive West TN REC 4:00 pm CST Box lunch on bus Rick Carlisle (Ames REC) participates at West TN REC Tour and dinner at West TN REC; overnight in Jackson Involve county office discussion at West TN REC • Day 2: Leave Jackson, travel to Milan REC, arrive 9:00 am CST Leave Milan REC at 11:00 am; arrive Middle TN REC 3:00 pm Box lunch on bus Barry Sims (Highland Rim REC) participates at Middle TN REC Leave Middle TN REC 5:00 pm; arrive Knoxville 9:00 pm	

UT AgResearch Innovation Grants Program

Every 12 to 18 months for the last five years, an internal grants program has been offered to assist faculty in enhancing their competitiveness in securing extramural funding. Over $1.5 million dollars has been awarded to faculty for the three most recent UT AgResearch Innovation Grants Programs. The following is an example of the most recent request for proposals.

UT AgResearch requests proposals for funding from the AgResearch Innovation Grants Program. The following types of proposals will be considered for funding:

(1) **Planning Grants** of up to $10,000 to fund planning of large multi-disciplinary multi-institutional proposals such as USDA AFRI integrated proposals, USDA AFRI Coordinated Agricultural Project or

similar types of proposals to federal agencies or other sponsors. Multi-disciplinary projects are defined as those in which investigators from two or more disciplines collaborate closely to address a common problem. These collaborations, where appropriate, may integrate the biological, physical, chemical, or social sciences. Funds are primarily to support travel and meeting expenses for the multi-institutional partners to facilitate proposal development.

(2) **Individual Investigator Proposals** of up to $25,000 to fund projects to enable the PI to collect preliminary data or perform other activities in response to previously submitted proposals or applying for future grants to federal granting agencies. Individual Investigator proposals are not intended to fund stand-alone projects, but rather projects that will lead to further work applicable to an external funding agency.

(3) **Commercialization Proposals** of up to $20,000 to support continued development of existing UTIA-developed technology based on a filed invention/creation disclosure. Projects should result in new data or further demonstrate the technology to increase its commercial readiness. Proposals should describe the technology, provide an assessment of the commercial opportunities for the technology, how funding of the proposal will advance the technology for possible commercialization, and identify potential commercialization partners.

(4) **Multi-Investigator/Multi-Disciplinary/Multi-Departmental Proposals** up to $35,000 to provide funds for collaborative proposals to enable investigators to collect preliminary data or perform other preliminary activities in preparation for applying for future grants to federal granting agencies. Multi-Investigator/multi-disciplinary/multi-departmental grants are not intended to fund stand-alone projects, but rather projects that will lead to further work applicable to an external funding agency.

One year grants will be awarded and funds must be expended during the one year granting period. PI's must be a UTIA faculty member with an AgResearch appointment eligible to submit a proposal to an external funding agency, and **MUST** have an approved Hatch, Multi-State or McIntire Stennis project to be considered for funding. A faculty member may be the PI on only one submitted grant. *Multi-investigator/multi-disciplinary/multi-departmental collaborative proposals are encouraged.*

UT AgResearch Innovation Grants Program				
	2010	**2012**	**2013**	**Total**
Number of proposals submitted	37	44	41	122
Amount requested	$1,228,682	$1,706,212	$1,065,191	$4,000,085
Number of proposals funded	21	27	24	72
Amount funded	$349,450	$638,622	$534,728	$1,522,800

Funding For Purchase of Scientific and Farm Equipment

A call for proposals to support equipment purchases is released approximately every 18 months. This program is designed for purchase of larger, more significant pieces of scientific and farm equipment to enhance our research programs. The program is open to Departments, Multi-Disciplinary Centers and AgResearch and Education Centers. Program details include:

- Each Unit is invited to submit a prioritized list of equipment needs for no more than three items. A brief description, justification/use and approximate cost for each item should be provided.
- Please indicate whether sharing of expenses (including amount) is possible for each item. Priority will be given to items where a cost-share is possible, although we understand that cost-sharing may not be possible in some cases.
- For department requests, indicate whether the equipment might be placed in a communal equipment environment or have potential use by a wide range of faculty.

Funding was provided in 2009 and 2011. A call was released in 2013 but was placed on hold due to the federal sequestration. Results from the 2011 program are shown in the table below.

Funding for Purchase of Scientific and Farm Equipment, 2011		
Department	**Priority 1**	**Amount Funded**
Ag & Resource Economics	IMPLAN	$52,000
Forestry, Wildlife, Fisheries	ASD FieldSpec Pro FR NIR Spectrometer	$75,347
Genomics Hub	EVOS Fluorescent inverted microscope	$40,000
BESS	Gradient Ion Chromatograph	$63,000
Food Science	Anaerobic Hood + Tri-Gas Incubator (AnSci)	$35,100
Plant Science	Freeze Dryer (locate in Hub)	$50,856
Genomics Hub	Ion Torrent (locate in Hub)	$55,000
EPP	Microscope	$70,183
Animal Science	LECO nitrogen analyzer	$49,500
Center for Renewable Carbon	Fiber Spinning Extruder	$40,000
		$530,986
Research & Education Center		
Greeneville	55-60 hp tractor	$36,000
East TN	Traveling Gun Irrigation + No-Till Grain Drill	$24,000
Dairy REC	No-Till Drill	$24,500
Middle TN REC	Manure Spreader	$29,000
Highland Rim	Tractor 130 hp	$72,000
Plateau REC	Carter Forage Harvester	$76,500
		$262,000
	Grand Total	**$792, 986**

Travel Support for Paper Presentation at Professional Meetings with Abstract

A measure of research productivity identified in the report "Research Excellence: Achieving the AgResearch Mission" is the presentation of research results at professional society meetings with abstract. This is a component of the faculty annual report and we track this measure as an indicator of our research programs.

In 2012 and 2013, UT AgResearch provided a limited number of travel support awards to assist in the presentation of research papers at professional society meetings with abstract. We offered $1,500 travel grants to support presentations at professional society meetings with abstract. The presentations can be made by a faculty member, their graduate students or post-docs. The meeting can be a regional or national meeting of a professional society.

In 2012, $66,520 was distributed and in 2013, $87,500 was distributed across the departments to support this program. The table below provides detail on the 2013 program.

2013 AgResearch Travel Grant Program Funding for Paper Presentation as Professional Meeting With Abstract						
Presenter	**Faculty Responsible**	**Department**	**Date**	**2013**	**Funding**	**Dept. Total**
Edward Yu	Edward Yu	AgEcon	8/4/2013	1500	Y	
Taeyoung Kim	Seon-Hoon Cho	AgEcon	8/4/2013	1500	Y	
Steven Yen	Steven Yen	AgEcon	8/4/2013	1500	Y	**$4,500**
Bo Ji	Brynn Voy	AS	4/20/2013	1500	Y	
Bryan Bastin	Cheryl Kojima	AS	7/8/2013	1500	Y	
Kristine Ely	Cheryl Kojima	AS	7/8/2013	1500	Y	
Gina Pighetti	Gina Pighetti	AS	10/20/2013	1500	Y	
Lindsay Jones	Jun Lin	AS	5/18/2013	1500	Y	
Ximin Zeng	Jun Lin	AS	5/18/2013	1500	Y	
Peter Krawczel	Peter Krawczel	AS	6/2/2013	1500	Y	
O. Kerro Dego	Raul Almeida	AS	12/6/2013	1500	Y	
Raul Almeida	Raul Almeida	AS	12/6/2013	1500	Y	**$13,500**
Douglas Hayes	Douglas Hayes	BESS	4/28/2013	1500	Y	
Jaehoon Lee	Jaehoon Lee	BESS	11/3/2013	1500	Y	
Kelly Cobaugh	Jennifer DeBruyn	BESS	11/3/2013	1500	Y	
Robert Freeland	Robert Freeland	BESS	3/17/2013	1500	Y	**$6,000**

Presenter	Faculty Responsible	Department	Date	2013	Funding	Dept. Total
Bob Trigiano	Bob Trigiano	EPP	7/22/2013	1500	Y	
Bonnie Ownley	Bonnie Ownley	EPP	8/10/2013	1500	Y	
Deborah Dean	Deborah Dean	EPP	7/22/2013	1500	Y	
Denita Hadziabdic	Denita Hadziabdic	EPP	8/10/2013	1500	Y	
Jerreme Jackson	Juan Luis Jurat-Fuentes	EPP	8/11/2013	1500	Y	
Phillip Wadl	Phillip Wadl	EPP	7/22/2013	1500	Y	
Reza Hajimorad	Reza Hajimorad	EPP	8/10/2013	1500	Y	**$10,500**
Cong Cao	Doris D'Souza	FST	7/13/2013	1500	$5K	
Doris D'Souza	Doris D'Souza	FST	5/18/2013	1500		
Snehal Joshi	Doris D'Souza	FST	5/18/2013	1500		
Snehal Joshi	Doris D'Souza	FST	5/18/2013	1500		
Anthony Cicco	Doris D'Souza	FST	7/28/2013	1500		
Laurel Gann	Faith Critzer	FST	7/13/2013	1500	Y	
Maneesha Mohan	Federico Harte	FST	7/8/2013	1500	$5K	
Manpreet Cheema	Federico Harte	FST	7/13/2013	1500		
Ran Ye	Federico Harte	FST	7/13/2013	1500		
Vinay Mannam	Federico Harte	FST	7/13/2013	1500		
Virginia Artegoita	Federico Harte	FST	7/8/2013	1500		
Ana Andino Dubon	Irene Hanning	FST	7/22/2013	1500	$5K	
Francisco Gonzalez-Gil	Irene Hanning	FST	5/18/2013	1500		
Nan Zhang	Irene Hanning	FST	7/28/2013	1500		
Sandra Diaz-Sanchez	Irene Hanning	FST	5/18/2013	1500		
Sean Pendleton	Irene Hanning	FST	5/18/2013	1500		
A Beavers	Jennifer Richards	FST	7/13/2013	1500	Y	
Bai Qu	Qixin Zhong	FST	7/13/2013	1500	$8K	
Gang Liu	Qixin Zhong	FST	7/13/2013	1500		
Huaiqiong Chen	Qixin Zhong	FST	7/13/2013	1500		

Presenter	Faculty Responsible	Department	Date	2013	Funding	Dept. Total
Jia Xue	Qixin Zhong	FST	7/13/2013	1500		
Kang Pan	Qixin Zhong	FST	7/13/2013	1500		
Linhan Zhang	Qixin Zhong	FST	7/13/2013	1500		
Qiumin Ma	Qixin Zhong	FST	7/13/2013	1500		
Qixin Zhong	Qixin Zhong	FST	7/13/2013	1500		
Wan Wang	Qixin Zhong	FST	7/13/2013	1500		
Xueqian Shi	Qixin Zhong	FST	7/13/2013	1500		
Yue Zhang	Qixin Zhong	FST	7/13/2013	1500		
Svetlana Zivanovic	Svetlana Zivanovic	FST	5/30/2013	1500	Y	
Emefa Monu	Mike Davidson	FST	7/28/2013	1500	Y	
Hajriue Bozkurt	Mike Davidson	FST	7/28/2013	1500	Y	**$30,500**
Adam Willcox	Adam Willcox	FWF	10/5/2013	1500	Y	
David Buehler	David Buehler	FWF	8/13/2013	1500	Y	
Don Hodges	Don Hodges	FWF	5/15/2013	1500	Y	
Emma Willcox	Emma Willcox	FWF	10/5/2013	1500	Y	
Jennifer Franklin	Jennifer Franklin	FWF	6/1/2013	1500	Y	
Ben Keck	Richard Strange	FWF	9/8/2013	1500	Y	
Richard Strange	Richard Strange	FWF	9/8/2013	1500	Y	
Timothy Young	Timothy Young	FWF	6/25/2013	1500	Y	
Siqun Wang	Siqun Wang	FWF	6/24/2013	1500	Y	**$13,500**
Diana Cochran	Amy Fulcher	PS	7/22/2012	1500	Y	
Feng Chen	Feng Chen	PS	12/4/2013	1500	Y	
Neal Stewart	Neal Stewart	PS	5/15/2013	1500	Y	
Tomas Mueller	Thomas Mueller	PS	2/4/2013	1500	Y	
David Butler	David Butler	PS	11/4/2013	1500	Y	
Casey Barickman	Carl Sams	PS	7/22/2013	1500	Y	**$9,000**
			Total distributed			**$87,500**

AgResearch Deferred Maintenance Program at the AgResearch and Education Centers

Due to the UTIA funding model, budget responsibility for all ten AgResearch and Education Centers rests with UT AgResearch. Beginning in 2013, UT AgResearch implemented a deferred maintenance program for infrastructure repair at the AgResearch and Education Centers. Results of the 2013 program are shown in the table below.

Research and Education Center	Amount	Cost Share	Project
Plateau	$110,000	0	GrowSafe Barn
East Tennessee	$60,000	0	Renovate Barns 4A & 4B
East Tennessee	$42,000	0	Demolish Barn at Holston
West Tennessee	$120,000	$25,000	Replace Bridge
Forest Resources	$10,000	0	Roof Replacement
Greeneville	$14,700	0	Metal Siding on Buildings

AgResearch Awards for Faculty and Staff

B. R. Thompson, Sr. Outstanding Faculty Performance Award in the UT Institute of Agriculture
Earnings from the $100,000 Thompson Faculty Endowment will annually be awarded to faculty of the Institute of Agriculture who have distinguished themselves by their exceptional performance. The award will rotate among the four divisions of the Institute of Agriculture and the rotation will begin based on the year of the establishment of the Institute's four divisions which is as follows: The College of Agricultural Sciences and Natural Resources, Tennessee Agricultural Experiment Station, UT Extension Service, and the College of Veterinary Medicine. CASNR will receive the award in 1990, Experiment Station in 1991, UT Extension in 1992, and the College of Veterinary Medicine in 1993 and the annual awards shall continue in subsequent years in that order *of* rotation.

The purpose of the award is to allow each division over a four year period to select one faculty member who has demonstrated truly exceptional accomplishment in the assignment of his or her duties. The criteria shall include but not be limited to the following: exceptional accomplishment in teaching, research, and extension, leadership, initiative, competence, planning, implementation, professionalism, reliability, dedication, communication ability, and record of exceptional performance and contribution to the University of Tennessee.

Research Impact Award
Presented to a UT AgResearch faculty or professional staff member whose efforts have had a profound effect on improving efficiency, sustainability and/or economic viability of the food and fiber industry or rural areas in Tennessee. Emphasis is on the impact that an employee's efforts in research and technology development have had on UT AgResearch clients. Additional evidence of this effect may include:

- Leadership of team research
- Consolidation of multi-disciplinary research into meaningful systems
- Innovative individual research
- Effective communication of research to clients
- Implementation/adoption of research findings by clients

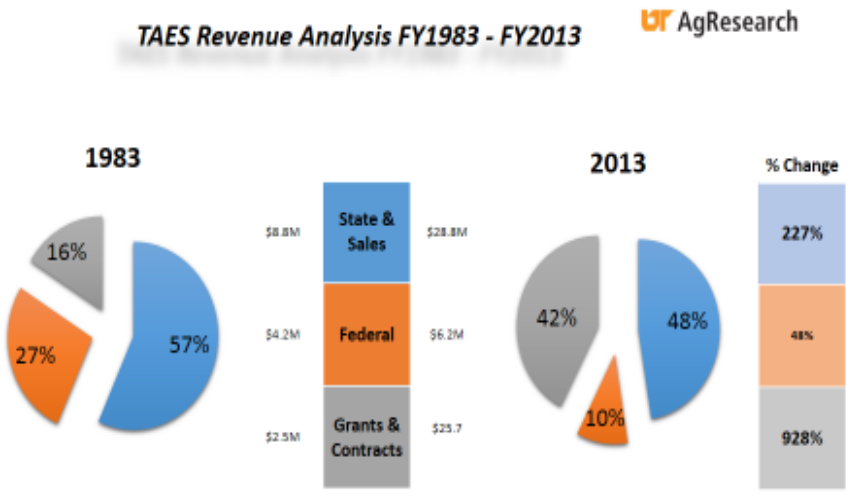
T. J. Whatley Distinguished Young Scientist Award
Presented to a young scientist who possesses the aptitude, judgment, drive, and interpersonal skills to have an outstanding and productive career as an agricultural scientist. Factors considered are:

- Productivity as a teacher as evidenced by the views of peers and students
- Productivity as evidenced by publication record
- That he/she addressed varied clientele of UT AgResearch by publishing not only peer-reviewed journal articles, but also addresses agricultural and general public audiences via UT AgResearch publications, popular press, field day presentations, etc.
- Quality of scientific effort
- That he/she has interpersonal skills to assist in formulating and fostering departmental programs.

REC Directors Award
Presented to professional and technical staff members for their outstanding service accomplishments in support of the AgResearch and Education Centers' mission. Criteria for selecting professional staff members include: leadership, initiative, and professionalism. Criteria for selecting technical/support staff members include: reliability, initiative, and productivity.

Advancing Research Faculty FTE in a Declining Budget Environment

Past and Current Budget



Historically, most Agricultural Experiment Stations in the United States were funded primarily through state appropriations, with USDA capacity funds and various amounts of extramural funding adding to the overall budget. Over the past five years,

state funding has been reduced dramatically at many experiment stations and although the absolute dollar amount of federal capacity funding has increased, as a percentage of the total budget it has declined. The largest increase in the Experiment Station budget has come from extramural funding. In some cases, this presents a formidable challenge as we strive to maintain our mission of service for the public good.

The AgResearch budget for FY 2013 is shown in the following tables. In 2013, state appropriation to the Tennessee Agricultural Experiment Station was $25,612,386; Federal Capacity Funding was $6,152,876; and sales from products produced at the AgResearch and Education Centers was $3,227,443. This resulted in a total "hard funded" budget of $34,992,705.

Data in the table below represents distribution of our "hard funding" including state and federal capacity funding. The total in this table is greater than the total hard funding indicated in the paragraph above due to the use of approximately $2 million in carry-forward funding from the previous year. The almost 12% of the budget expended on "Centralized Services" may appear high but is due to the UTIA funding model which includes assessments from the UTIA Chancellor and The University of Tennessee System. Salary and benefits (faculty and staff) make up approximately 63% of the budget with a little more than 25% devoted to operating and graduate student support. Budget categories are very flexible and funds can easily be switched among categories.

Distribution of AgResearch Budget, FY 2013		
Centralized Services Includes AgResearch, UTIA, UT System	$4,350,228	11.8%
Salary Benefits Total Salary + Benefits	$16,710,582 $6,450,807 $23,161,389	45.3% 17.5% 62.8%
Operating	$8,870,656	24.0%
Graduate Student Support	$510,576	1.4%
Total	**$36,892,849**	**100%**

Faculty salary and benefits remain within the AgResearch Dean's office. As faculty members retire or resign, faculty salary returns to the Dean's office; benefits are paid centrally and are not fully funded, anticipating open positions. Approximately $12.2 M were budgeted for faculty salary and benefits in FY 2013. Approximately one-third of the AgResearch hard funding budget is utilized on faculty salary and benefits.

AgResearch Faculty Salary and Benefits, FY 2013	
Faculty Salary + Benefits	$12,229,371

AgResearch provides flexibility to the departments in terms of funding distribution among staff, operating and graduate student/post-doctoral support. Wide variation exists among the departments concerning the distribution of AgResearch funding across these categories. Approximately $7 M was budgeted to the departments in FY 2012-13.

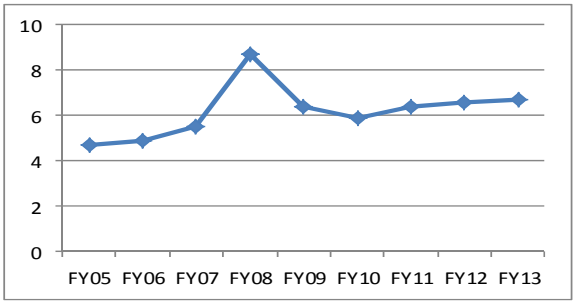
AgResearch Department Budgets, FY 2013		
Professional/Technical Staff Salary + Benefits	$3,980,387	57.3%
Operating	$2,449,696	35.3%
Graduate Student Support	$510,576	7.4%
Total	**$6,940,659**	**100%**

The majority of budget support for the AgResearch and Education Centers comes from AgResearch; nominal, to no support, is provided by CASNR, Extension or the College of Veterinary Medicine. Additionally, the AgResearch and Education Centers are not fully funded. A portion of the Center's budget is derived from "hard funds" from AgResearch and a portion from revenue obtained from the sale of commodities or goods produced at the Center. The ratio of hard funds to revenue varies widely from Center to Center based on commodities produced and nature of work conducted at the particular Center. Over $10 M was budgeted at the AgResearch and Education Centers in 2012-13, with almost $7.5 M coming from hard funding and over $3.0 M coming from revenue.

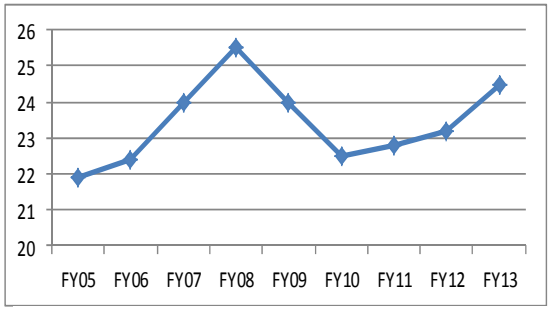
This funding model has advantages and challenges. Advantages are that UTIA has ten (10) AgResearch and Education Centers across Tennessee to address geographic and climate differences which impact our clientele. Another advantage is that until recently, as a result of budget reductions, the Centers had operating funds to assist the faculty in their work. This flexibility in the Center's budget has been greatly reduced as a result of budget reductions beginning in 2008. A challenge of this funding model is that it makes us look larger than we really are. As commodity prices decline and input costs increase, meeting budget commitments become more difficult. Another challenge is that budget reductions from state and federal sources are magnified. With this funding model, we must never allow a faculty member's request to conduct work to be influenced by loss of revenue from sale of the commodity.

AgResearch Research & Education Center Budget, FY 2013		
Salary + Benefits	$6,951,631	64.0%
Operating	$3,687,356	36.0%
Total	**$10,638,987 ***	**100%**
** Hard funded = $7,411,544; Sales = $3,227,443*		

Budget Reductions & Increases



Federal, $M



State, $M

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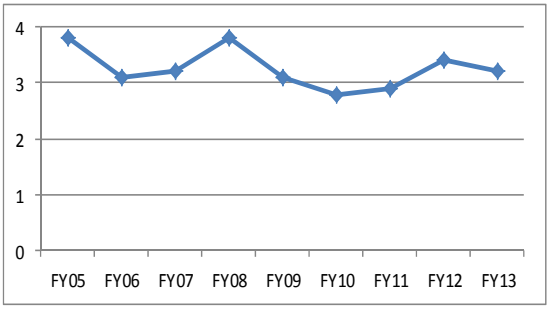
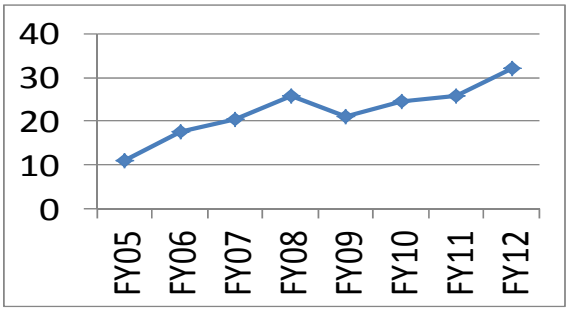


Product Sales, $M



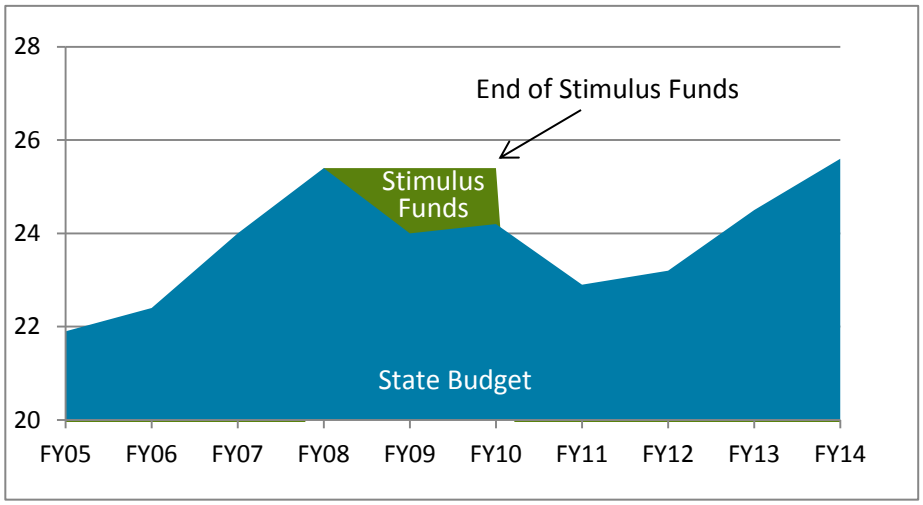
Grants & Contracts, $M

Tennessee's state budget is highly dependent on tax revenues, particularly sales tax. As the economic downturn began in 2007 and 2008, the state's budget was immediately influenced and state budget reductions occurred quickly. As the economy began to improve beginning in 2011, Tennessee's state revenue has improved and modest budget increases have been forthcoming. Therefore, UT AgResearch (as well as other components of the UT System) experienced budget reductions early in the downturn and have recovered sooner than some other institutions across the country.

The state budget allocated to UT AgResearch was reduced by over $3.5M on a recurring basis from 2008 through 2010. The state legislature allocated to us federal stimulus money on a non-recurring basis in an amount equal to the 2008 and 2009 reductions. These funds were available for our use until 2010 (see figure below), realizing that a "fiscal cliff" would occur in 2010 if the economy and budget did not improve. Therefore, two years were available to prepare for the recurring budget reduction. The following actions were taken during 2008 through 2010 to prepare for budget reductions (all reductions below were from recurring funds):

- Reductions in central administration

- Two incentivized retirement programs for faculty and staff
- Elimination of some vacant positions
- Reduction in operating dollars within the departments and AgResearch & Education Centers
- Reductions in graduate student support
- Shift in technical support salary from state to extramural funding
- Non-recurring reductions in equipment replacement funding



As we have experienced state budget increases in FY11, FY12 and FY13, it is important to understand that these increases have only supported salary increases for faculty and staff. Although we are grateful for pay raises for faculty and staff, we have not grown on a programmatic basis as the economy begins to improve.

Peer Analysis of Research Faculty FTE

In 2008, it was apparent that research faculty FTE was limiting the ability of AgResearch to effectively meet its mission. Many program areas were represented by 1.0 research faculty FTE (or less), limiting our ability to address new research areas and needs. We questioned whether or not we had the optimum number of research faculty FTE relative to our appropriated budget and whether we were providing the proper amount of support per research faculty FTE. To address these questions, we entered into an evaluation of our internal budget allocation and expenditures along with an evaluation of our capacity and appropriated budget as compared to peers in the southern region.

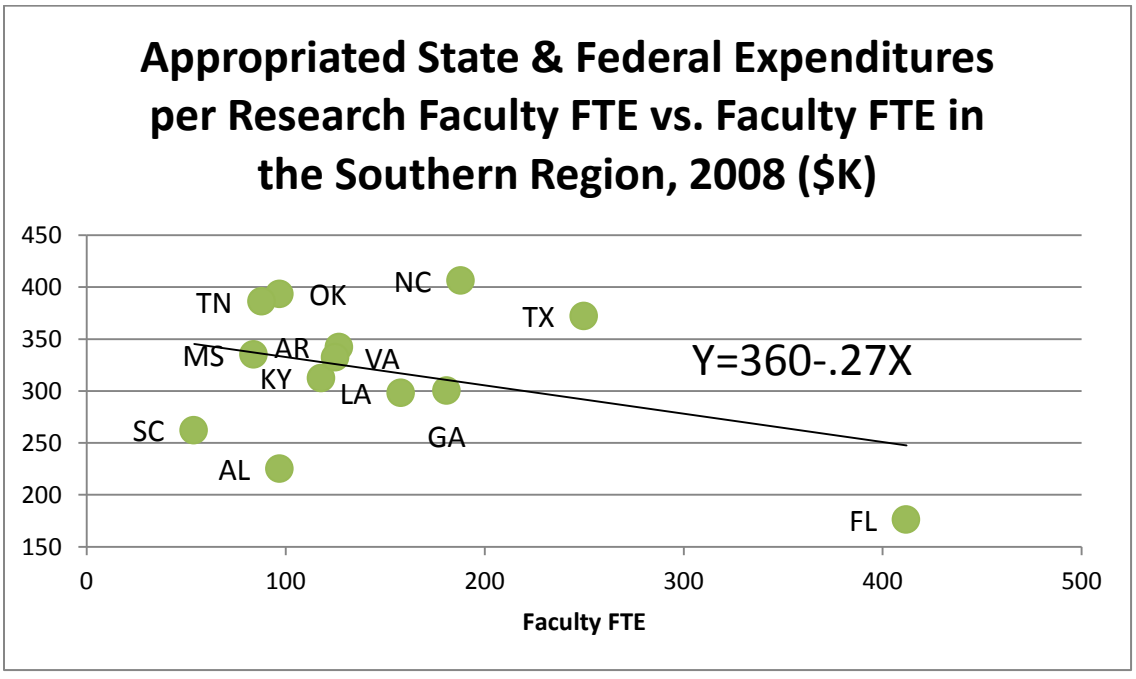
Economies of scale exist in the university structure, with a minimum level of base resources required to support infrastructure needs such as laboratory and field facilities, independent of the number of

departments or faculty at the institution. Institutions with low base resources must spend a higher percentage of their state and federal capacity funds on basic infrastructure needs, impacting their ability to build excellence into their programs. As an example, in 2008 the University of Georgia Agricultural Experiment Station, with 180 research faculty FTE, reported expenditures of state and federal appropriated funds of $300,000 per research faculty FTE, while the University of Tennessee AgResearch with fewer research faculty FTE (88 FTE), reported expenditures of $386,000 per research faculty FTE (see Table below). Because the Georgia Agricultural Experiment Station receives a larger state + federal capacity appropriation ($54.2M in 2008) than UT AgResearch ($33.8M in 2008), basic infrastructure support at Georgia was distributed across a larger number of research faculty resulting in lower expenditures when expressed on a per FTE basis as compared to Tennessee. Therefore, making a direct comparison of $300,000 per research faculty FTE at Georgia vs. 386,000 per research faculty FTE at Tennessee is not a completely fair comparison.

To adjust for differences in research faculty FTE and infrastructure needs, state and federal appropriated expenditures per research faculty FTE were regressed against research faculty FTE (see Figure below). The slope of this relationship is negative indicating that expenditures per research faculty FTE decline as research faculty FTE increases (demonstrating economies of scale), although Florida data has a large impact on the relationship. We then solved the equation for each Agricultural Experiment Station using their research faculty FTE. This provided an estimate of adjusted state and federal appropriations based on a weighted average of all institutions in the region. We then took the difference between this number and actual expenditures to suggest whether an Agricultural Experiment Station had a positive or negative funding model relative to its peers.

When adjusted for differences in research faculty FTE and requirements for basic infrastructure support, UT AgResearch for its size, was funded much better on a per research faculty basis than the vast majority of Agricultural Experiment Stations in the southern region in 2008. In the Georgia-Tennessee comparison above, when adjustments for funding required to support basic infrastructure and differences in faculty FTE were made, UT AgResearch had a positive $50,000 per faculty FTE funding model compared to southern region peers. Based on the size of its research faculty, Georgia should be funded at approximately $310,000 per faculty FTE suggesting that its funding model was slightly negative relative to southern region institutions. Only Texas A&M and Oklahoma State University had a funding model that was more positive than Tennessee, with Tennessee ranked 3rd in the southern region.

State and Federal Allocations and Research Faculty FTE for Agricultural Experiment Stations in the Southern Region, FY 2008					
State	**Faculty FTE**	**State + Federal**	**State + Federal per faculty FTE**	**Regression State + Federal per Faculty FTE**	**Positive/ Negative Funding Model per faculty FTE**
				Y=360-.27X	
AL	97	$21.8M	$225K	$334K	-$109K
AR	127	$43.3M	$342K	$326K	+$16K
FL	412	$72.6M	$176K	$249K	-$73K
GA	181	$54.2M	$300K	$310K	-$10K
KY	118	$36.9M	$312K	$328K	-$16K
LA	158	$47.1M	$298K	$317K	-$19K
MS	84	$28.3M	$335K	$337K	-$2K
NC	188	$76.6M	$406K	$356K	+$50K
OK	97	$37.9M	$393K	$334K	+$59K
SC	54	$14.3M	$262K	$345K	-$83K
TN	88	$33.8M	$386K	$336K	+$50K
TX	250	$93.2M	$372K	$292K	+$80K
VA	125	$41.5M	$332K	$326K	+$6K
Avg		$46.3M	$318K		
Data from the USDA CRIS system, FY 2008. ***University of Puerto Rico and University of the Virgin Islands not included in analysis.***					



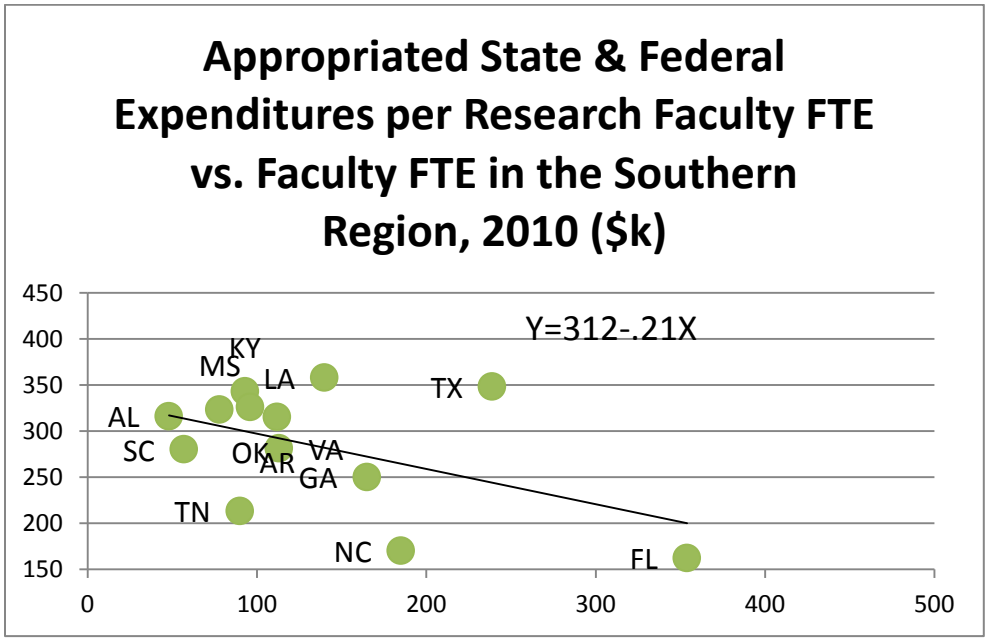
From these data, we concluded that we must increase research faculty FTE, and unfortunately the increase had to come at the expense of operational support. Therefore, during the budget reductions of 2008 through 2010, Departments and AgResearch and Education Centers were provided the flexibility to determine how best to absorb budget reductions (staff salary, operating, graduate student support) based on the operation of their units. The UT AgResearch Dean's office provided the dollar amount of the reductions for each unit, and reductions were not across-the-board; greater reductions were taken at the AgResearch and Education Centers. Wide variation existed in the manner in which each Department and AgResearch and Education Center addressed their budget reductions across staff salary, operating and graduate student support. The table below summarizes changes in research faculty FTE and staff FTE in the Departments and AgResearch and Education Centers. Over the past five years, we have made a conscious effort to increase research faculty FTE. This increase has come at the expense of staff, especially at the AgResearch and Education Centers.

AgResearch Faculty FTE and Staff FTE Within Departments and AgResearch and Education Centers, 2008 to 2014			
Year	**AgResearch Faculty FTE ***	**Staff FTE Departments**	**Staff FTE Centers**
2008	86.6	70.3	177.1
2009	90.0	70.2	160.6
2010	91.2	63.0	121.0
2011	91.4	60.9	118.5
2012	94.1	59.4	118.0
2013	94.8	60.6	120.0
2014	93.2	61.7	121.0
Change	+ 6.6	- 8.6 (12%)	- 56.1 (32%)
* *Includes open and filled lines*			

Several years following budget reductions, we wanted to learn where UT AgResearch stood relative to our peers in the southern region who had also been through budget reductions. All Agricultural Experiment Stations in the southern region saw a reduction in their state plus federal allocation between 2008 and 2010 (see table below for 2010 data). Most Experiment Stations also saw a reduction in research faculty FTE during this time. Changes in state plus federal appropriated funding per faculty FTE between 2008 and 2010 varied across Experiment Stations with some declining significantly while others changed very little even though funding and faculty FTE declined.
In 2010, state plus federal appropriated funding per research faculty FTE for UT AgResearch dropped to $323K from $386K in 2008. UT AgResearch had a positive funding model relative to our peers in the southern region in 2010 (+ $30,000 per faculty FTE); however, the degree of positive funding relative to our peers was not as great as that observed in 2008 (+ $50,000 per faculty FTE). In 2010, UT AgResearch ranked 5th in the southern region in state plus federal appropriated dollars per research faculty FTE and in positive funding model relative to southern region peers.

As we have experienced budget reductions and increased research faculty FTE, we still remain in the top one-third of Agricultural Experiment Stations in the southern region regarding support to our faculty.

State and Federal Allocations, Research Faculty FTE and Grantsmanship for Agricultural Experiment Stations in the Southern Region, FY 2010					
State	**Faculty FTE**	**State + Federal**	**State + Federal per faculty FTE**	**Regression State + Federal per Faculty**	**Positive/ Negative Funding Model per faculty FTE**
				Y=312-.21X	
AL	48	$7.8M	$162K	$302K	-$140K (13)
AR	112	$39.2M	$348K	$289K	+$59K (3)
FL	354	$60.1M	$170K	$238K	-$68K (11)
GA	165	$41.3M	$250K	$277K	-$27K (10)
KY	93	$33.5M	$358K	$292K	+$66K (2)
LA	140	$39.4M	$281K	$283K	-$2K (9)
MS	78	$24.5M	$315K	$296K	+$19K (7)
NC	185	$63.5M	$343K	$273K	+$70K (1)
OK	96	$31.3M	$326K	$292K	+$34K (4)
SC	57	$12.1M	$213K	$300K	-$87K (12)
TN	90	$28.9M	$323K	$293K	+$30K (5)
TX	239	$67.0M	$280K	$262K	+$18K (8)
VA	113	$35.6M	$316K	$288K	+$28K (6)
Data from the USDA CRIS system, FY 2010. ***University of Puerto Rico and University of the Virgin Islands not included in analysis.***					



AgResearch Partnerships/Collaborations

Partnerships and collaborations are playing an increasingly important role in our research programs which will ultimately benefit stakeholders in Tennessee and throughout the Southeast and help us to more effectively and efficiently fulfill our collective research, teaching and outreach missions.

Joint Programs with The University of Tennessee, Knoxville

UT AgResearch collaborates with UTK in the funding of three organized research units (ORU): Microbiology Across Campuses Educational and Research Venture (M-CERV), Center for Wildlife Health (CWH), and the Plant Research Center (PRC).

M-CERV has been in existence for four years. Goals of M-CERV for the Knoxville campuses of UT are: 1) to provide a framework to facilitate integration of microbiologically-related educational and research activities, 2) to facilitate research and educational collaborations among microbiologists, both faculty and graduate students, associated with various academic units in Knoxville, and 3) to promote and enhance associations among microbiologists that will engender large project planning and grant applications not presently practical in any one unit.

To date, 12 grants have been submitted to major federal granting agencies including NSF, USDA, and DOE. Thus far, extramural grants resulting from initial M-CERV support have been funded with a total value of $2,426,813. This has yielded greater than a 20-fold return on investment based on grants that have been funded in Years 1-3 of M-CERV. A much larger return on investment is anticipated if only a few of the submitted grants are funded. The M-CERV model is quite robust and has resulted in a substantial return on investment, and scientists from several different departments/units within UTK/ORNL are now working together which is an important goal of M-CERV. These collaborations have been fruitful and will likely continue long after M-CERV.

Center for Wildlife Health (CWH) is a newly funded ORU established in 2013. Goals of the CWH ORU are: 1) to increase research collaborations among UTK, UTIA (AgResearch and CVM), and ORNL scientists on wildlife and zoonotic diseases, which is a growing concern in natural resources, agriculture, and human health; and 2) to promote large project planning and grant applications not presently practical in any one unit. Funding for the CWH ORU is from UTK (33%), AgResearch (33%) and from UT CVM (33%).

Plant Research Center (PRC) has been in existence for four years. UTK and UT AgResearch each provide $25,000 to the PRC annually. Details of the PRC were presented earlier in this report.

Multi-State and Integrated Research/Teaching/Outreach Efforts

We currently have several multi-state and integrated research/teaching/outreach grants funded by federal agencies including USDA, US Department of Transportation, the National Institute of Health, and the National Science Foundation. These partnerships/ collaborations are with faculty from several academic institutions and with federal and state agencies (please refer to the Table below).

Lead PI	Prime Agency	Lead or Sub	Project Title	Other entities involved	Notes
Tim Rials	DOT-Sungrant	Lead	Southeastern Sun Grant Initiative	MSU, Clemson, UGA, NCSU, Auburn, UF, Florida ATM, NCSU, VaTech, UK	Center that make awards for both a research and/or extension focus
Qixin Zhong	USDA-AFRI	Lead	Nanodispersing Lipophilic Antimicrobials to Improve Food Safety	NCSU, NC A&T	Integrated-Research and Extension
John Moulton	NSF	Lead	MIDGEPEET: A Collaborative Effort to Increase Taxonomic Expertise in Understudied Groups of Nematocerous Diptera	UC Davis, Iowa State, Clemson, Canadian Food Inspection Agency	MultiState-Research
Kim Jensen	USDA-AFRI	Lead	Consumer and Producer Attitudes Toward GHG Reduction Strategies in Beef Production	USDA ARS, Knowledge Networks (CA)	MultiState-Research
David Butler	USDA-NIFA	Lead	Advanced development and implementation of anaerobic soil disinfestation technology as an alternative to methyl bromide	UC Davis, USDA ARS, UC SantaCruz, UC ANR Cooperative Extension	Integrated-Research and Extension
Tim Rials	USDA-AFRI	Lead	Southeast Partnership for Integrated Biomass Supply Systems	Auburn, UGA, NCSU, ArborGen	Integrated-Research and Extension
Tim Rials	USDA-NIFA	Lead	Sun Grant Program-Southeastern Regional Center	UFL, Auburn, NCSU, MSU, UGA, TexasTech, UVirgin Islands	This is a center that make awards for both a research and/or extension focus

Xinhua Yin	USDA NRCS CIG	Lead	Precision Nitrogen Injections Using Integrated Optical Sensing and Variable rate Technologies	U Missourri, LSU, MSU	Integrated-Research and Extension
Stephen Oliver	USDA-AFRI	Lead	Southeast Quality Milk Initiative	UGA, UK, MSU, VaTech, UFL, DairyXNet	Integrated-Research/Extension/Teaching
Frank Hale	University of Florida Lead-USDA NIFA	Sub	Southern Plant Diagnostic Network-Tennessee 2012-2013	AL, AK, FL, GA, KY, LA, MS, NC, Puerto Rico, SC, TN, TX, US Virgin Islands	Integrated-Extension and Teaching. Network to enhance national agricultural security by quickly detecting introduced pests and pathogens
David Butler	USDA-NIFA	Lead	Overcoming Obstacles to Adoption of Anaerobic Soil Disinfestation	USDA ARS, UFL, Florida A&M	Integrated-Research and Extension
Nikki Labbe	Auburn University-USDA NIFA	Sub	Elucidation of Feedstock-Microbe Interactions for Butanol Production from Lignin	Auburn, TN	Integrated-Research and Extension
Jun Lin	NIH	Lead	Ferric enterobactin acquisition systems in Campylobacter	UArk, Cornell University	MultiState-Research
Jun Lin	NIH	Lead	Antimicrobial peptide resistance in Campylobacter	Oklahoma St, USDA ARS,	MultiState-Research
Jun LIn	Iowa State-USDA NIFA	Lead	Novel and practical approaches for mitigation of Campylobacter in poultry	Iowa State, UT, OSU, Eastern Illinois	Integrated-Research and Extension
Federico Harte	USDA-NIFA	Lead	Pasteurization of High Quality Organic Fruit and Vegetable Juices Using Nonthermal Technologies	Cornell, VaTech, UFL	Integrated-Research and Extension

Federico Harte	NIH	Lead	Milk based nano-delivery systems for hydrophobic drugs to infants and children	U Michigan	MultiState-Research
Kurt Lamour	University of Arkansas-USDA NIFA	Sub	Managing Downy Mildew of Spinach: A Genomics-Based Approach to the Host and the Pathogen	UAK, WashState, UC Davis, UC ANR Cooperative Extension	Integrated-Research and Extension
Scott Schlarbaum	UC Davis-USDA AFRI	Sub	Development of Disease-Resistant Walnut Rootstocks: Integration of Conventional and Genomic Approaches	UN ANR Cooperative Extension, UC Davis, USDA FS, USDA ARS,	Integrated-Research and Extension
Joe Bozell	Purdue University	Sub	Chemical Catalysis for the Conversion on Renewable Feedstocks into Chemicals and Fuels	Purdue, UTK, UT	Integrated-Research and Extension
Ernest Bernard	New Mexico State University-DOI-NPS	Sub	Inventory of Soil Microbial and other Soil Faunal Ecosystem Components at the White Sands National Monument and Guadalupe Mountains National Park	NMSU, UT	MultiState-Research
Patrick Keyser	Common-wealth of Kentucky	Sub	Responses of Northern Bobwhite to habitat and harvest management at Peabody WMA	Kentucky, TN	MultiState-Research
Patrick Keyser	USDA NRCS CIG	Lead	Restoring imperiled grassland wildlife through grazing innovation in the eastern United States	UKRF, KY Chapter of Wildlife Society	Integrated-Research and Extension

Other AgResearch Partnerships

We also have entered into a variety of different partnerships and Memoranda of Understanding (MOU) with private companies (national and international), with state and federal agencies, and with international universities. The following are examples of other partnerships/collaborations that are currently active.

- Partnership between Southeast Select Sires, UT Animal Science Department and the Middle TN AgResearch and Education Center. Its purpose is to signify the added value to cattle production through improved reproductive management. AI training and certification classes are held in the spring and fall.

- The Center for Athletic Field Safety is dedicated to researching the performance and safety of both natural and synthetic turf surfaces used on athletic fields. The Center was created through a partnership with AstroTurf in 2010 and the ~$3.5 million award from AstroTurf is the largest single sports turf award ever provided to a faculty member team in the US.

- An MOU was signed with Agrokor, a Croatian agri-business, and UTIA. One component of the MOU involves an evaluation of Agrokor dairy operations and delivery of recommendations to improve their productivity. Another objective is to explore potential research opportunities with Agrokor and with faculty from universities in Croatia.

- Ames Plantation was established in 1901 by Hobart Ames. His widow, Julia Colony Ames, created in her will in 1950, the Hobart Ames Foundation, to own and operate the Ames Plantation for the benefit of The University of Tennessee and to provide the grounds for the National Championship for Field Trialing Bird Dogs. In 1950, the Ames Plantation became an "Agricultural Field Station" for AgResearch and in the early 1970's became an "Agricultural Experiment Station".

- An MOU between the University of Tennessee and the USDA Forest Service, Southern Experiment Station. 2012. Purpose: To collaborate in regard to integrating tree improvement knowledge and materials into silvicultural research and development using pedigreed materials on southern National Forests.

- An MOU between the University of Tennessee and the Tennessee Department of Agriculture, Division of Forestry. 2010. Purpose: To collaborate and support activities related to tree improvement, artificial regeneration of hardwoods, and establishment of seed orchards within the state of Tennessee.

- An MOU between the University of Tennessee and the Tennessee Wildlife Resources Agency. 2012. Purpose: To collaborate and support activities related to tree improvement, artificial regeneration of hardwoods, and establishment of seed orchards within the state of Tennessee.

- An MOU between the University of Tennessee and the NBCI Management Board. 2013.

Purpose: To host and support a permanent operational home for the National Bobwhite Conservation Initiative.

- An MOU between the University of Tennessee and Southwest Forestry University (China). 2010. Purpose: To develop academic and educational cooperation on the basis of equality and reciprocity and to promote sustainable partnerships and mutual understanding.

- An MOU between the University of Tennessee and Nanjing University (China). 2010. Purpose: To develop academic and educational cooperation on the basis of equality and reciprocity and to promote sustainable partnerships and mutual understanding.

- An MOU between the University of Tennessee and Universitas Bangka Belitung. 2011. Purpose: To develop academic and educational cooperation on the basis of equality and reciprocity and to promote sustainable partnerships and mutual understanding.

- CRC has developed a relationship with Salzburg University of Applied Sciences' Kuchl Campus and the Universidad del Bio-Bio, Chile. Through a formal agreement, Salzburg University sends several highly qualified graduate students and research associates each year to the Center to conduct the research project required for their graduate degree. Similarly, exchanges have occurred with faculty and students at Bio-Bio in Concepcion, Chile. These relationships create valuable educational and professional development opportunities for students and researchers affiliated with the CRC.

- A similar internship program is being established with Florida International University in Miami to train select undergraduates in the science and technology of biomass.

- The Integrated Biomass Supply Systems (IBSS) SEED Fellowship program was successfully piloted in 2012 with five students from Tuskegee University and Auburn University. The second class of fellows is underway with students from the University of Tennessee, North Carolina State University, and Auburn University. This program has resulted in a highly trained cadre of undergraduate students who are well versed in biomass and biofuel production issues and ready to go to work in the biofuel industry.

- UT AgResearch has a wonderful partnership with commodity groups including the Tennessee Soybean Promotion Board, Philip Morris International, Altria Client Services, Tennessee Cattlemen’s Association, Tennessee Dairy Producers Association, and Tennessee Advanced Genetics.

- UT AgResearch has strong partnerships with the Tennessee Farm Bureau and the Tennessee Department of Agriculture.

Governor's Rural Challenge: A 10-Year Strategic Plan to Increase Rural Tennessee's Capacity to Produce

In December 2012, Governor Bill Haslam challenged the Tennessee Farm Bureau Federation (TFBF), the Tennessee Department of Agriculture (TDA), and The University of Tennessee Institute of Agriculture (UTIA) to develop a strategy for ensuring the growth and prosperity of Tennessee's agriculture and forestry industries over the next decade. The governor set a goal of making Tennessee number one in the Southeast in the development of agriculture and forestry, and emphasized opportunities to increase farm income and agribusiness investment. The governor asked for "practical, affordable, actionable steps that we can take to propel the industry into the future", and that a strategic plan be developed by 2014.

The Executive and Steering Committees, composed of producers, agri-business leaders, commodity association representatives, and others, established specific guiding principles to enhance private enterprise and innovation, motivate private equity, build business relationships, support entrepreneurship, take advantage of strengths and assets, address supply chain gaps, and emphasize cooperation and collaboration.

Twenty seven action steps were proposed for implementation by the Executive Committee with a focus on building production capacity and incentivizing the private sector through four major recommendations:

1. Advance agriculture, natural resources and rural infrastructure as Tennessee business priorities.
2. Ensure a positive and predictable regulatory and policy environment for Tennessee agriculture and natural resources.
3. Expand marketing opportunities for Tennessee producers and encourage new production systems and agribusinesses.
4. Increase the scope and depth of a skilled and educated workforce through career, technical and higher education.

AgResearch in collaboration with other components of UTIA will play a prominent role in achieving many of the proposed goals of this exciting program. For example, new research areas were identified to expand Tennessee's viticulture and enology sector. Other areas that will require AgResearch involvement include:

- Incentivize the repopulation of the beef herd
- Revitalize dairy production
- Improve risk management with smart irrigation and technologies
- More regional grain storage and value-added processing
- Infrastructure, facilities and collaboration toward exports and global business
- Continue to support the state's momentum in biobased fuels and products

The report indicated that the agricultural innovation strategy should address (1) early stage capital, (2) agricultural technology incubator network, and (3) entrepreneur development and business acceleration. The proposed initiative will enhance educational outreach and impacts, create rural jobs, new investment opportunities and leverage significant private sector investment.

The report specifically noted an increase in funding to support research and extension programs that provide science-based, objective research and education, emphasized on-farm applied research and demonstrations, and a way to find a permanent solution for nonformula funding issues within the UT system.

AgResearch is well-positioned to play a prominent role in achieving many of the action items identified in the 10-year strategic plan, and many of the action items identified in the Governor's Rural Challenge are consistent with our vision presented throughout the AgResearch Unit Review document. AgResearch has an excellent working relationship with TFBF and TDA. We very much look forward to working with TFBF, TDA, and other UTIA entities in fulfilling the goals and objectives of this noteworthy strategic plan. The Governor's Rural Challenge: A 10-Year Strategic Plan document follows.

GOVERNOR'S RURAL CHALLENGE
A 10-YEAR STRATEGIC PLAN

Increasing Rural Tennessee's Capacity to Produce

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A Report to Governor Bill Haslam | December 2013

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"My goal is for Tennessee to be number one in the Southeast in the growth and development of agriculture and forestry."

– Gov. Bill Haslam, Dec. 3, 2012

The Honorable Bill Haslam, Governor
State of Tennessee
State Capitol Building
Nashville, TN 37243

Dear Governor Haslam:

The executive committee is proud to present to you this strategic plan for growing Tennessee's agriculture and forestry industry over the next decade.

We believe the recommendations contained in this report are in keeping with your challenge to develop "practical, affordable and actionable steps" to not only increase farm profitability and agribusiness investments but to generally bring more prosperity to our rural areas.

Agriculture and forestry contribute more than $66 billion to our state's economy and account for more than 337,880 jobs. While the impact of these industry sectors are significant, we are convinced that through the adoption of this plan, we can help maximize our capacity to produce and generate even greater returns for farmers, agribusinesses and rural communities.

Of particular interest, is the need to develop a skilled and educated workforce to fill high-tech, advanced jobs required on the farm and in our laboratories and boardrooms. We fully support and endorse your plan to close the education gap between our urban and rural populations with the Drive to 55 initiative.

We want to thank you for your support, and more importantly, for casting the vision that Tennessee can be a leader in the development of agriculture and forestry.

On behalf of the members of the steering committee and many others who contributed to this report, please accept it with our sincerest respect and appreciation for your leadership.

Respectfully,

Julius Johnson,
Commissioner,
Tennessee Department
of Agriculture

Lacy Upchurch,
President,
Tennessee Farm Bureau
Federation

Dr. Larry Arrington,
Chancellor,
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INTRODUCTION

In December 2012, Gov. Bill Haslam challenged the Tennessee Farm Bureau Federation (TFBF), the Tennessee Department of Agriculture (TDA) and the University of Tennessee Institute of Agriculture (UTIA) to help develop a strategy for ensuring the growth and prosperity of agriculture and forestry over the next decade. He set a goal of making Tennessee number one in the Southeast in the development of agriculture and forestry, and emphasized opportunities to increase farm income and agribusiness investment. The governor asked for "practical, affordable, actionable steps that we can take to propel the industry into the future." The governor asked that a strategic plan be developed by 2014.

The Executive Committee identified broad expectations with an emphasis on incentivizing the private sector:

- Continue to focus on rural job creation and economic development
- Cultivate new agribusiness investments that lead to job creation and farm markets
- Increase farm profitability
- Develop public/private partnerships

Specific guiding principles were established to give more focus and direction for the strategic plan development process. Those guidelines included looking for ways to enhance private enterprise and innovation, motivate private equity, build business relationships, support entrepreneurship, take advantage of strengths and assets, address supply chain gaps, and emphasize cooperation and collaboration.

The following 27 action steps are proposed for implementation by the Executive Committee with a focus on building production capacity and incentivizing the private sector through four major recommendations:

1. Advance agriculture, natural resources and rural infrastructure as Tennessee business priorities.
2. Ensure a positive and predictable regulatory and policy environment for Tennessee agriculture and natural resources.
3. Expand marketing opportunities for Tennessee producers and encourage new production systems and agribusinesses.
4. Increase the scope and depth of a skilled and educated workforce through career, technical and higher education.







RECOMMENDATION ONE

Advance agriculture, natural resources and rural infrastructure as Tennessee business priorities.

Action 1.1: Develop a comprehensive inventory of rural assets and their economic value – a "rural balance sheet" – to complement existing reporting of income and employment. In addition to the traditional agriculture and forestry assets of land, water, forests and wildlife, the emerging opportunities of natural gas, biomass-based products, and ecosystem value should also be quantified. Physical capital (livestock, equipment and facilities) as well as human capital (educational attainment level) should also be evaluated. The initial balance sheet would establish a measurable baseline with annual updates in the *Economic Report to the Governor of the State of Tennessee*. The University of Tennessee Institute of Agriculture should lead this effort.

Action 1.2: Complement the state summary with comprehensive county profiles of existing and potential sustainable carrying capacity – economic, environmental and social benefits from optimal development of rural assets.

Action 1.3: Increase agricultural/rural involvement with the Tennessee Chamber of Commerce. Establish agricultural committees within local chambers.

Action 1.4: Encourage farmers and agricultural professionals to be active members in local and state business organizations.

Action 1.5: Establish a communications strategy to inform policymakers on opportunities, regulatory barriers and other challenges to increase Tennessee agriculture and forestry's capacity to produce which makes rural economic development a heightened state and local government priority.

Action 1.6: Encourage more profitable forestry management on private woodlands through increased use of forest management plans, reforestation and financial incentives.

Action 1.7: Protect access to global markets by advocating for critical infrastructure including maintenance and upgrading of the river and rail systems.

Action 1.8: Create a study committee to document challenges and recommend rural broadband solutions to the Commissioner of Agriculture that enhance data management and enable technological efficiencies.

"Develop a comprehensive inventory of rural assets and their economic value – a rural balance sheet – to complement existing reporting of income and employment…. The initial balance sheet should establish a measurable baseline with the annual updates in the *Economic Report to the Governor of the State of Tennessee*."

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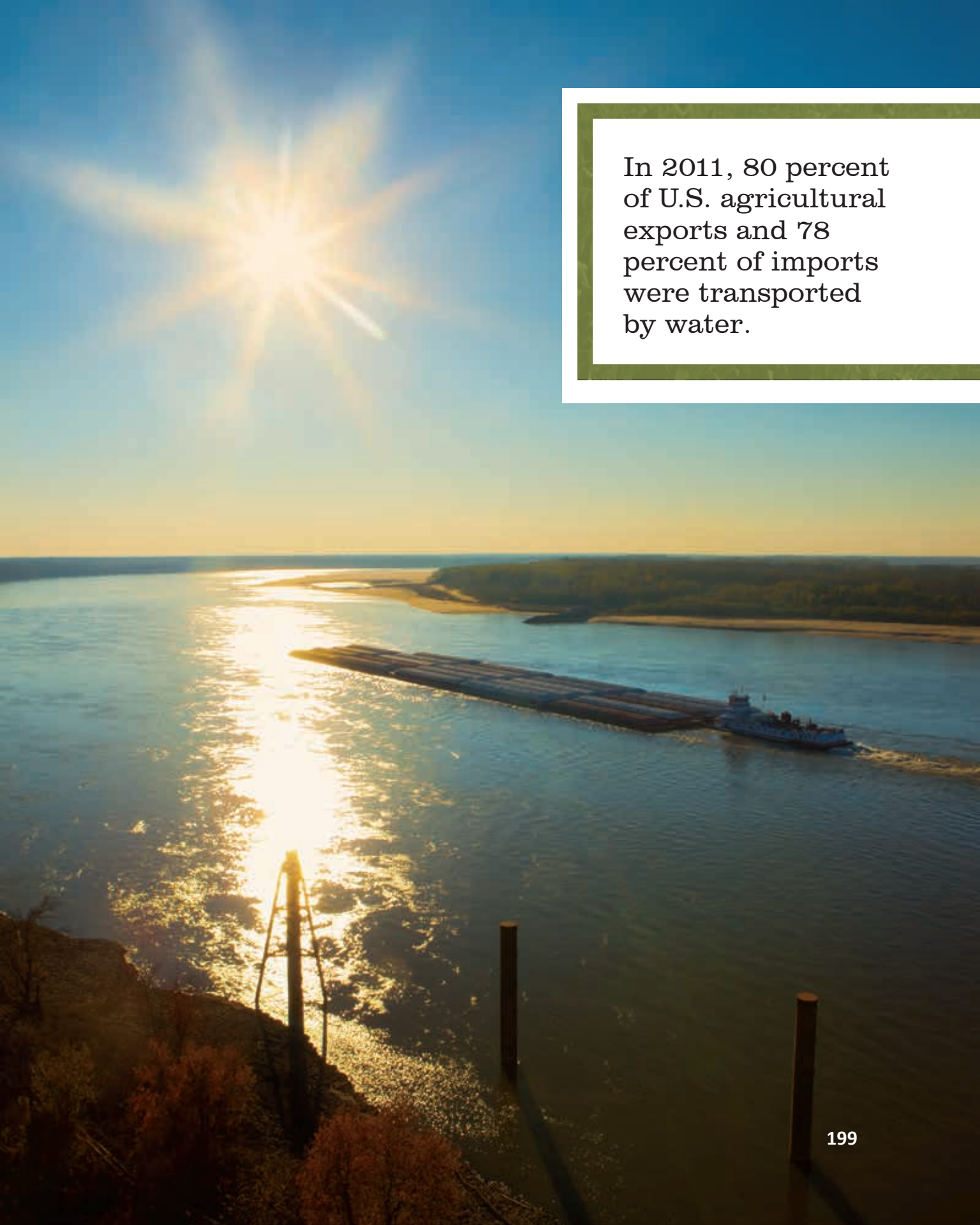


In 2011, 80 percent of U.S. agricultural exports and 78 percent of imports were transported by water.

RECOMMENDATION TWO

Ensure a positive and predictable regulatory and policy environment for Tennessee agriculture and natural resources.

Action 2.1: The Tennessee Department of Agriculture should incorporate energy into its other natural resource responsibilities (agriculture and forestry) in order to bring cabinet-level advocacy on this critical sector of the rural economy. Federal regulatory pressure on coal, emergence of natural gas, Tennessee's competitive advantage on biomass-based fuels and its electric membership cooperatives merit focus and attention.

Action 2.2: The state should continue to facilitate and enhance regulatory partnerships among agencies, industry, research and extension toward an environment that facilitates agribusiness and enhances the competitiveness of rural Tennessee. Regulations must be science-based.

Action 2.3: Streamline environmental permitting and potential siting of production/CAFO/processing facilities to target rural expansion/recruitment consistent with existing "megasite" industrial development except at a smart and appropriate scale to match rural assets such as the public/private development of Cates Landing in Lake County.

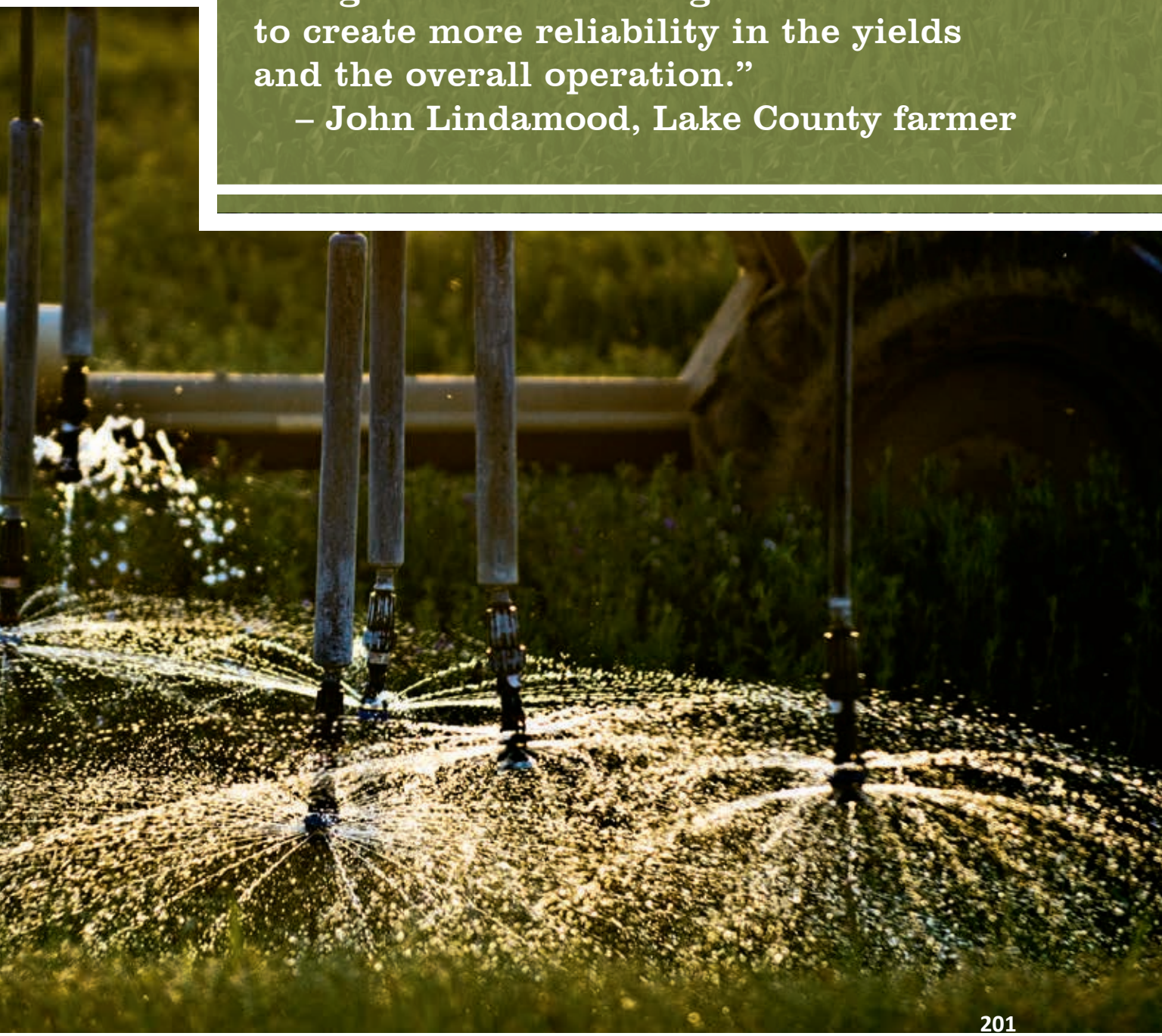
Action 2.4: Create a study committee to document and communicate existing law and best available hydrologic information, and make actionable recommendations to the Commissioner of Agriculture that ensures agriculture's priority use of water resources in Tennessee.

Action 2.5: The state should fund livestock welfare oversight through the Department of Agriculture with law enforcement authority to respond and investigate allegations of livestock cruelty.

Action 2.6: Review marketing policies to identify barriers to "farm to table" production and processing, and encourage increased production of grapes and other locally sourced crops and enterprises.

Action 2.7: Encourage tax exemption standardization for timber harvesters.

"Irrigation is something *we can* do to create more reliability in the yields and the overall operation."
– John Lindamood, Lake County farmer



RECOMMENDATION THREE

Expand marketing opportunities for Tennessee producers and encourage new production systems and agribusinesses.

Action 3.1: Refocus the Tennessee Agricultural Enhancement Program (TAEP) and investigate a range of options to increase and ensure long-term funding including tax credits, foundations and other public/private sector investments to incentivize and increase rural balance sheet value (net worth) including:

- Incentivize the repopulation of the beef herd.
- Revitalize dairy production.
- Improve risk management with smart irrigation and technologies.
- More regional grain storage and value-added processing.
- Infrastructure, facilities and collaboration toward exports and global business.
- Continue to support the state's momentum in biobased fuels and products.

Action 3.2: Enhance market development activities within the Department of Agriculture and its partners that directly improve farm net income and cash receipts:

- Increase agribusiness recruiting to increase demand for Tennessee-grown commodities.
- Capture local markets – incentivize and encourage small business development.
- Enhance "Pick Tennessee Products" (branding) program and expand it to include forestry and nontraditional rural enterprises.
- Research areas to expand Tennessee's viticulture and enology sector.
- Prioritize adoption of green certification of the state's wood products.
- Improve forest health, commodity quality to capture better prices and markets.
- Maximize opportunities for agritourism and ecotourism development.

Action 3.3: Stimulate rural enterprise innovation across the state. Continue and enhance public/private support of Memphis BioWorks Foundation and the UT Center for Profitable Agriculture (CPA). This collaborative effort leverages:

- The commercial leadership, business development capabilities and proven record within BioWorks.
- CPA's well-documented expertise and leadership related to farm-based, value-added enterprise evaluations and development.
- Investments made by the Tennessee Department of Economic and Community Development (ECD) through their network of nine Regional Accelerators.
- Other statewide resources already in place such as UT AgResearch and other research programs.

The agricultural innovation strategy should address (1) early stage capital, (2) agricultural technology incubator network, and (3) entrepreneur development and business acceleration. The proposed initiative will enhance educational outreach and impacts, create rural jobs, new investment opportunities and leverage significant private sector investment.

Action 3.4: Promote expansion of commodity value-added processing and differentiation through established member-owned cooperatives including the Tennessee Farmers Cooperative, Farm Credit and electric membership cooperatives. Seek suggestions and recommendations from the Tennessee Council of Cooperatives on incentives and actions that improve their effectiveness and economic opportunities.

Action 3.5: Enhance incentive programs that encourage agribusinesses such as processing facilities, bioenergy and biotechnology to locate in rural Tennessee on par with similar initiatives within ECD and Tennessee economic development districts.

Grape Production

Grape-bearing acreage has grown in Tennessee but it has not kept pace wih increased market demand. Tennessee's 30 commercial vineyards are foundational to expanding the state's viticulture industry, which has an $881 million economic impact.

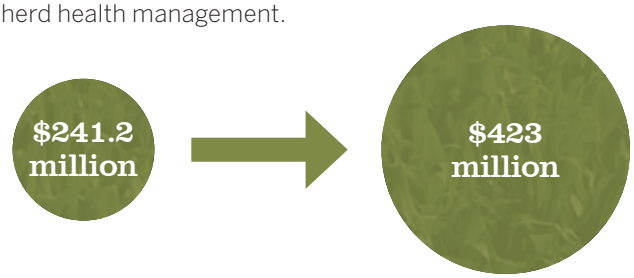
Tennessee is well-positioned to greatly increase grape production, as neighboring states have done in recent years.

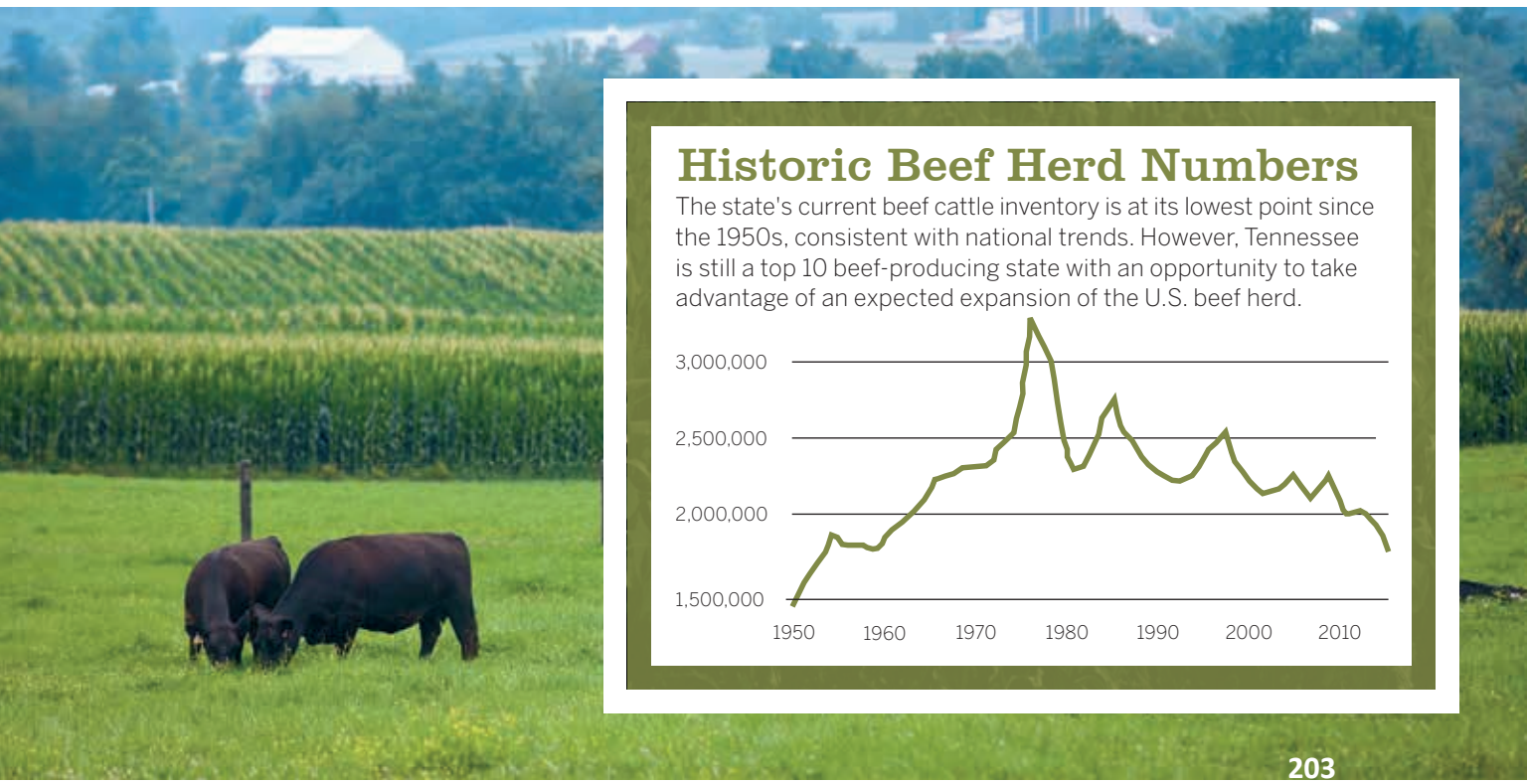
Source: Stonebridge, Economic Impact of Grapes and Wine in Tennessee, 2011

Dairy Farms

The number of dairies in Tennessee continues to decline, but dairies offer a significant economic benefit to local economies.

The total economic impact of Tennessee's dairy industry has the potential to increase from a baseline of $241.2 million to nearly $423 million with improved herd health management.





Historic Beef Herd Numbers

The state's current beef cattle inventory is at its lowest point since the 1950s, consistent with national trends. However, Tennessee is still a top 10 beef-producing state with an opportunity to take advantage of an expected expansion of the U.S. beef herd.

RECOMMENDATION FOUR

Increase the scope and depth of a skilled and educated workforce through career, technical and higher education.

Action 4.1: Actively promote and endorse Governor Haslam's "Drive to 55" initiative to enhance rural Tennessee's economic outlook, and to ensure that agriculture and forestry have a technically trained workforce for tomorrow's farms and forests.

Action 4.2: Increase funding to support research and extension programs that provide science-based, objective research and education. Emphasize on-farm applied research and demonstrations. Find a permanent solution for nonformula funding issues within the UT system.

Action 4.3: Expand the number of youth participating in 4-H and FFA educational programs and improve event scheduling and coordination. Fund a West Tennessee 4-H Conference Center to increase participation and educational opportunity in that part of the state.

Action 4.4: Increase support for CTE by re-establishing three full-time regional supervisory positions for secondary agricultural education programs in Tennessee. Conduct a labor needs assessment in collaboration with industry and revise the curriculum as needed to meet labor demands in Tennessee.

Action 4.5: Increase agricultural awareness for youth beginning in elementary schools and link to careers in STEM areas.

Action 4.6: Review and revise the agricultural and natural resources curriculum in higher education to align with contemporary needs of employers.

Action 4.7: Support educational programs through extension that encourage efficient resource utilization and best management practices in production systems to increase profitability.

"We face a challenge in educating the workforce we will need, and agriculture is certainly among the many industries that will need a skilled workforce. Our Drive to 55 initiative is addressing that need and can help close the gap between rural and urban communities."

– Gov. Bill Haslam, Tennessee Agriculture Leadership Forum, Oct. 15, 2013

BRIDGING THE RURAL EDUCATION GAP

Community colleges provide a much needed educational service across the state; however, many don't offer agricultural courses within rural communities where the majority of agribusinesses and farms are located. Middle Tennessee State University is helping to bridge the gap by partnering with community colleges to offer an associate's degree. Building on this partnership, MTSU's School of Agribusiness and Agriscience has also designed a 2+2 program which creates an opportunity for students to earn a bachelor's degree in Agribusiness without ever leaving their hometown community college campus. This and other similar partnerships across the state will be critical for helping to develop a skilled and educated workforce for tomorrow's agriculture and forest industries.

Drive to 55
Mission: Workforce Ready.

THE PLANNING PROCESS

The planning process acknowledged the critical role of the private sector for rural job creation and was designed to maintain a narrow focus on actions that would "incentivize the private sector" toward increased rural economic activity.

A steering committee, comprised of 28 individuals representing diverse interests in farm production, agribusiness, finance, education and government was formed to provide valuable input and guidance in the development of the strategic plan.

In addition to guidance from the steering committee, comprehensive and broad-based input was gathered from UTIA regional advisory councils, TDA employees, commodity groups and associations, an online survey and numerous one-on-one interviews and conversations among industry leaders.

The strategic planning process started with a "blank slate" when the steering committee first met in Columbia, Tenn., on March 15, 2013, to address these two questions from Commissioner Julius Johnson:

What can be done to make you more profitable/ productive/efficient over the next decade?

What is the single most important thing that would have the greatest impact in your operation?

One-hundred and eighteen (118) specific responses to the commissioner's two challenge questions were captured as opportunities from the steering committee. These initial responses were grouped and categorized in order to explore themes and to find common ground on which to focus the strategic planning efforts.

Three regional UTIA advisory councils were facilitated to capture additional input for the steering committee's review and consideration. The participants in these sessions were not briefed on the steering committee's initial observations. This provided the Executive Committee and the planning process with an independent and "fresh" set of ideas. In addition, these councils provided insight into regional differences, consensus on industry strengths and weaknesses as well as implementation opportunities and challenges.

The Executive Committee and Steering Committee also had the benefit of a comprehensive industry trends analysis prepared by the UT Agri-Industry Modeling and Analysis Group (AIM-AG) and general public input on important issues from an online survey.

The steering committee met two more times during the year to consider additional information and refine recommendations. A draft set of recommendations was presented on Oct. 15 to key industry leaders gathered for the Tennessee Agriculture Leadership Forum in Murfreesboro, Tenn., with the goal of having the plan finalized in time to be presented to the Governor in December.

ACKNOWLEDGEMENTS

The Executive Committee wishes to acknowledge and thank the following individuals and organizations for their contribution and support:

Steering Committee Members:

Jeff Aiken, Telford
Steve Bennett, Thompson's Station
Barry Brandstetter, Memphis
Mike Brundige, Martin
Mark Burnett, Pikeville
Brent Carter, Fayetteville
Tim Chowning, Springfield
Don Collier, Seymour
Amy Delvin Tavalin, College Grove
Mike Estes, Murfreesboro
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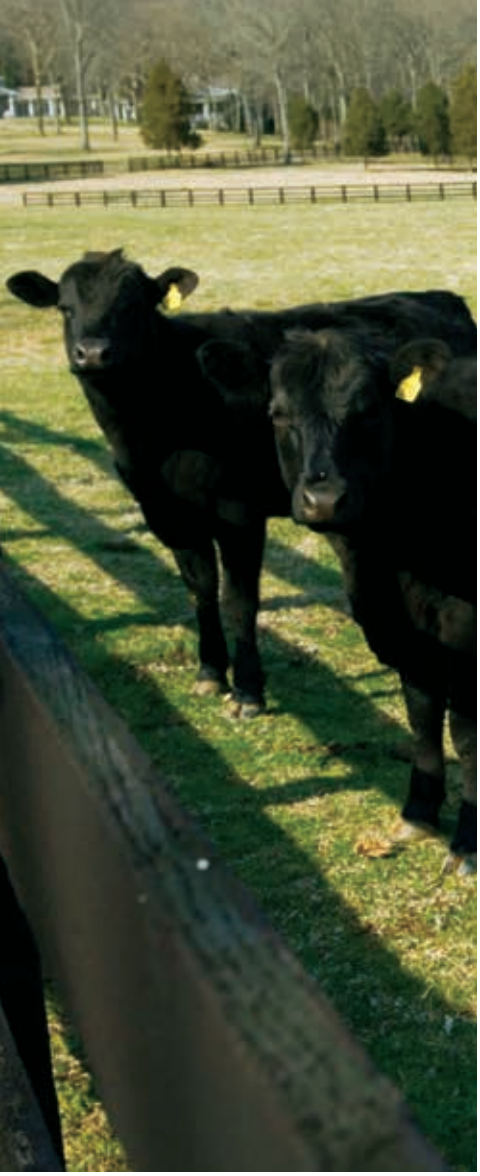
Eric Maupin, Dyersburg
Eric Mayberry, Hurricane Mills
Jimmy Moody, Dyersburg
Ben Moore, Dresden
Reyes Rich, Moss
Chelsea Rose, Hickman
Ray Sneed, Covington
Jimmy Tosh, Henry
Catherine Via, Bells
Stephen Worley, Hampshire

Others:

CoBank
Farm Credit of Mid-America
Tennessee Department of Agriculture
- Louis E. Buck, strategic plan facilitator

Tennessee Farm Bureau Federation
University of Tennessee Institute of Agriculture
- Agri-Industry Modeling & Analysis Group
- Herb Byrd, Extension Evaluation
- Regional Advisory Councils



TN.gov/agriculture/ruralchallenge

Tennessee Department of Agriculture
Ellington Agricultural Center
P.O. Box 40627
Nashville, TN 37204
(615) 837-5103

THE UNIVERSITY of TENNESSEE INSTITUTE of AGRICULTURE

Farm Bureau Tennessee

Guiding Principles As We Move Forward

As we move forward over the next five years and beyond, we will be guided by the following principles:

- Our focus will remain on our mission of service for the public good by conducting science-based, cutting-edge research that translates into products and processes that improve people's lives. We will achieve excellence and be accountable for the resources we receive from state, federal and extramural sources.

- We will continue to grow faculty and staff; people that are leaders in their field and are passionate about what they do. In doing so, we will balance the need for fundamental, translational, and applied sciences across the range of disciplines that AgResearch serves. We commit to providing the greatest amount of personnel and infrastructure support possible to facilitate faculty-based programs.

- AgResearch commits to developing a culture of research excellence and implementing policies and procedures that facilitate the success of faculty-based research programs. We will work collaboratively with other UTIA mission areas (academic programs, extension, and veterinary medicine) to integrate student learning and outreach into UT AgResearch programs.

- Commercializing faculty-developed technologies will become more important to AgResearch programs and to the success of UTIA. We will work with The University of Tennessee Research Foundation to develop programs and approaches which efficiently protect our faculty's inventions and facilitate development of the technology for stakeholder use.

- We will grow the AgResearch portfolio by identifying new and emerging areas of research at the federal, state and regional levels to support innovative and interdisciplinary research activities that meet our programmatic goals. This would involve nurturing productive internal collaborations to strengthen program effectiveness, development of multi-disciplinary teams, and expansion of existing working relationships with external partners including other universities and industry.

- UT AgResearch has a wonderful partnership with commodity groups including the Tennessee Soybean Promotion Board, Philip Morris International, Altria Client Services, Tennessee Cattlemen's Association, Tennessee Dairy Producers Association, and Tennessee Advanced Genetics. Other strong partnerships include our relationship with the Tennessee Farm Bureau and the Tennessee Department of Agriculture. We will continue to nurture these partnerships and identify new partnerships that will enhance our collective research programs ultimately impacting our stakeholders.

- We will continue to train the next generation of scientists to continue important research that

will be necessary to feed the world. We have just entered into an agreement with The University of Tennessee, Knoxville to enhance the number of Chinese PhD students at UTK and UTIA. This program entails China supporting PhD student stipends, and tuition thereby creating an outstanding resource for these highly motivated students to work in our scientists' laboratory. The goal is to have 100 PhD students in place by 2019.

- We will continue exploring opportunities for collaborative research including sharing research infrastructure at AgResearch and Education Centers, distance education of undergraduate and graduate courses, and outreach programs. We have initiated a dialogue with several institutions and continue to identify programs that would benefit from this approach.

- We will encourage and facilitate the development of multidisciplinary, multi-state teams that deal with significant issues impacting the Southeast. As an example, UT and five other states in the Southern Region recently received a large multi-state integrated grant from USDA-NIFA to enhance the profitability and sustainability of the dairy industry in the Southeast. Similar approaches could serve as a model to continue development of such efforts in a variety of topical areas thereby making participating institutions far more competitive than any single university. Another advantage of this approach is that it is quite likely that these proposals can attract other funding partners including State departments of agriculture, State Farm Bureaus, pharmaceutical companies and other agri-industry sectors serving the agricultural industries. This could expand and include a regional approach to undergraduate and graduate teaching and extension and outreach. Collectively, this approach could serve as a very useful model to develop productive partnerships that will ultimately benefit stakeholders in Tennessee and throughout the Southeast and help us more effectively and efficiently fulfill our collective research, teaching and outreach missions.