THE UNIVERSITY OF TENNESSEE MARTIN

Center of Excellence for Experimental Learning in Agricultural Science

FY 2021
Annual Report

Department of Agriculture, Geosciences, and Natural Resources

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Center of Excellence for Experimental Learning in Agricultural Science Mission Statement

The mission of the Center of Excellence (COE) for Experimental Learning in Agricultural Science is to provide an innovative infrastructure through which existing and new experiential inter-disciplinary studies in production agriculture, the environment, and conservation techniques can take place. The COE in Agricultural Science is designed to create a model for quality teaching across various disciplines, while facilitating and increasing external grant and contract activities, increasing public/ private partnerships, and increasing outreach efforts. Other goals of the COE in Agricultural Science involve collaboration with secondary institutions, expanding livestock, crops, equipment, natural resource areas and other facilities to enhance experiential learning and yielding a major impact on the economy of the State of Tennessee.

Executive Summary

In accordance with the Center of Excellence (COE) for Experimental Learning in Agricultural Science mission statement, since January 2002, attention has been devoted to establishing a model field laboratory with facilities and resources to support experiential activities and research for students. This model field laboratory is used to promote and meet all goals of the COE mission statement. A major component of the COE is operation of a teaching and demonstration farm to complement ongoing academic programs in the Department of Agriculture, Geosciences, and Natural Resources (AGN) at the University of Tennessee at Martin (UTM). This endeavor was expanded effective January 1, 2006 when the Department of Agriculture, Geosciences, and Natural Resources assumed operational control of the entire 640 acres and associated buildings formerly operated by the Martin Experiment Station (University of Tennessee Institute of Agriculture). A major objective of this effort is to provide resources dedicated to the establishment of a quality experiential learning and applied research environment for the UTM campus and the citizens of Tennessee. This in turn meets the goals and objectives of the COE for Experimental Learning in Agricultural Science mission statement.

Presently, there are approximately 200 acres of COE property in field crop production with another 250 acres devoted to forage production and pasture for teaching herds/flocks of beef cattle, swine, horses, meat goats, and sheep. In addition, there are six outdoor research ponds (0.1 acre each) and ten indoor research tanks used for fisheries management. The COE also includes an alternative fuels (biofuels) laboratory, a wildlife biology field laboratory, a Tyson poultry facility, a companion animal laboratory, and two Veterinary Health Technology teaching laboratories. As a major thrust of the COE, the UTM Teaching and Demonstration Farm provides resources and facilities for public service activities and research to support public and private stakeholders involved in agricultural and natural resource sciences. Animals and facilities associated with the COE provide resources for training competitive teams for local, regional, and national competitions, as well as involvement in assisting collegiate and high school FFA and 4-H teams preparing for and competing in their respective interscholastic events across the state. This subsequently increases collaboration with secondary institutions and outreach efforts in accordance with the mission statement.

The University of Tennessee at Martin is an ideal location for the COE due to the existence of agricultural entities already in operation. The West Tennessee Agricultural Pavilion (Ned R. McWherter Agricultural Complex) serves as a hub of activity for clients in a variety of ways, ranging from livestock shows to the annual Santa's Village. The Santa's Village event has been in operation for the last 35 years and is a cooperation between the city of Martin and university faculty, staff, and students. The event provides great community outreach and community service through the collection of more than 18,000 canned goods and toy donations for the under-provided in our county. (Figure 1) The COE enables current and future faculty to not only serve the academic needs of current campus-based and online students, but also to expand opportunities for a statewide mixture of students in secondary schools as well as adult stakeholders through continuing-education offerings and events. The COE features applied research and external grant supported projects that complement the undergraduate and graduate teaching missions of the University of Tennessee at Martin.

During Fall 2020 and Spring 2021, the COVID-19 pandemic prompted the UT System to move most instruction at all campuses to the online environment. Due to CDC guideline, including social distancing parameters, activities such as student travel, travel studies, student club activities, guest speakers, and student club activities were cancelled through June 1, 2021. Additionally, all activities at the Ned McWherter Agricultural Pavilion, including 4-H and FFA events, were cancelled through June 1, 2021. Activities at the Ray and Wilma Smith Livestock Merchandising Facility were cancelled through August 1, 2021, as well.

Activities such as student internships, faculty research, and the Tennessee Governor's School for the Agricultural Sciences were all significantly impacted by the COVID-19 pandemic. Both in-state and out of state travel was strictly limited for much of Fall 2020, Summer 2020, and Spring 2021 by the UT System. Student internships, in many instances, were delayed or cancelled. Faculty research was difficult to plan and execute due to travel restriction and social distancing requirements. The Tennessee Governor's School for the Agricultural Sciences was offered virtually for the first time ever due to the COVID-19 pandemic during summer 2020. The Tennessee Governor's School for the Agricultural Sciences was offered in-person with 3 participants electing to attend virtually for summer 2021. In summary, many activities that impact and support the Center of Excellence here at UT Martin continued to be significantly altered during this fiscal year due to the COVID-19pandemic and, furthermore, impacted overall COE productivity.

Figure 3. Santa's Village Display at the Ned R. McWherter Agricultural Complex

In April 2021, The University of Tennessee, on behalf of its Martin campus, had a grand opening to celebrate the acquisition and future use of the Coon Creek Science Center.

Figure 1. Coon Creek Science Center facilities

The property was obtained from the Pink Palace of Museums for institutional use as a field laboratory for teaching, outreach, and research activities in Geosciences, Natural Resources Management, Astronomy, and Agriculture. The Coon Creek Science Center is one of a dozen most significant fossil sites in North America. The site has yielded over 600 different species of marine creatures, preserved as unaltered fossils. The Pink Palace museum's Coon Creek Science Center collection – includes a skull and skeletal remains of a 25 ft. Mosasaur – dating from the late Cretaceous, 75 million years ago, (a.k.a. -- the end of the Age of Dinosaurs). The University will utilize the property to offer enhanced undergraduate and graduate courses; public summer programming; Eco- and Paleo-tourism; and research. STEM teacher training is also performed and will continued on the site.

Figure 2. Coon Creek Science Center Fossil Dig

Funding provided by the Tennessee Department of Agriculture and the Tennessee Agriculture Enhancement Program funded the establishment and operation of a West Tennessee Animal Disease Diagnostic Laboratory (Figure 4) that opened on July 1, 2008. This laboratory serves as a satellite of the C.E. Kord Laboratory at the Ellington Agriculture Center in Nashville, Tennessee. Necropsies performed on animals used for food or fiber are performed at no charge to producers and public partners and all other lab services are performed on a fee schedule. The lab increases public and corporate partnerships with outreach efforts, in addition to being a valuable teaching tool. The lab is also used for instruction and demonstration for students and visiting groups that come to campus.

Figure 4. West Tennessee Animal Disease Diagnostic Laboratory.

The Veterinary Health Technology Option in Animal Science provides students an opportunity to earn a 4-year degree with a major in Agriculture, while meeting all of the qualifications established by the American Veterinary Medical Association to sit for the National Licensing Exam for Veterinary Technicians. The Veterinary Health Technology Option received initial accreditation in May 2014 from the American Veterinary Medical Association and the Committee on Veterinary Technician Education and Activities (CVTEA). We had our CVTEA site accreditation visit in February 2019 and received full accreditation through 2024.

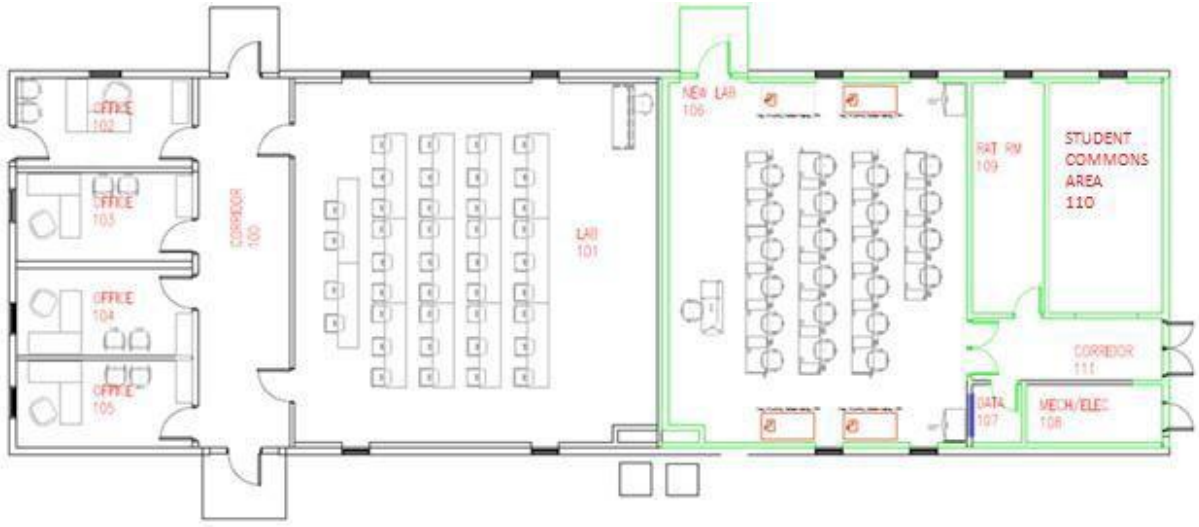


Figure 5. Vet Health Tech Facility Floor Plan

During spring 2015, a free stall barn adjacent to the Veterinary Technology Lab was partially renovated using Title III grant funds, as well as funds secured from a USDA RBEG grant. The Title III grant is providing over $300,000 over five years and includes a four-phase renovation (Figure 3) to the free stall barn. The barn was eventually renamed the Veterinary Health Technology Facility. Phase I work totaled approximately $140,000 and the partial renovation created a new state of the art smart classroom equipped with Clear Touch Panel computing technology. Phase II and III renovations began in 2016 and were completed in the summer of 2018 to provide four office spaces (Figure 6) and a state-of-the-art laboratory for Veterinary Technology students.

Most recently, Title III grant funds were used for phase IV renovations on the rear section of the Veterinary Health Technology Facility to create a new teaching laboratory (Figure 7) for laboratory animals and a new student commons area for the growing Veterinary Health Technology Program. This project was started during the 2017-2018 academic year and was completed during the 2018-2019 academic year. During the 2019-2020 academic year, this facility growth of the Veterinary Health Technology option increased available instruction and research capacity for all Animal Science faculty.

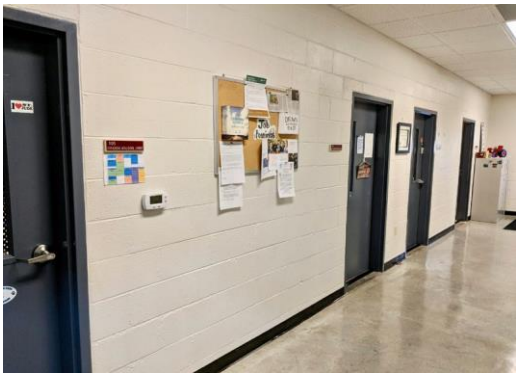


Figure 6. Offices at Vet Health Tech Facility

Figure 7. New Laboratory at Vet Health Tech Facility

Another important experiential learning project that has been funded through the UTM Provost's Office, is the design and construction of a new Beef Evaluation Center. This center will provide experiential learning opportunities for animal science students utilizing and growing the current cow-calf herd. The Beef Evaluation Center will include a 1,245 ft^2 laboratory and a 250 ft^2 student commons area, (Figure 8) and a large, covered livestock working facility. This laboratory will also increase available interdisciplinary research capacity for all Animal Science faculty. This project was expected to begin in Fall 2018; however, it was delayed due to increased steel prices that carried the project total over budget. Fundraising is underway by Chancellor Craver and construction is TBD. Fencing was added Spring 2020 for farm production, research, and pasture in preparation for construction (9a and 9b).

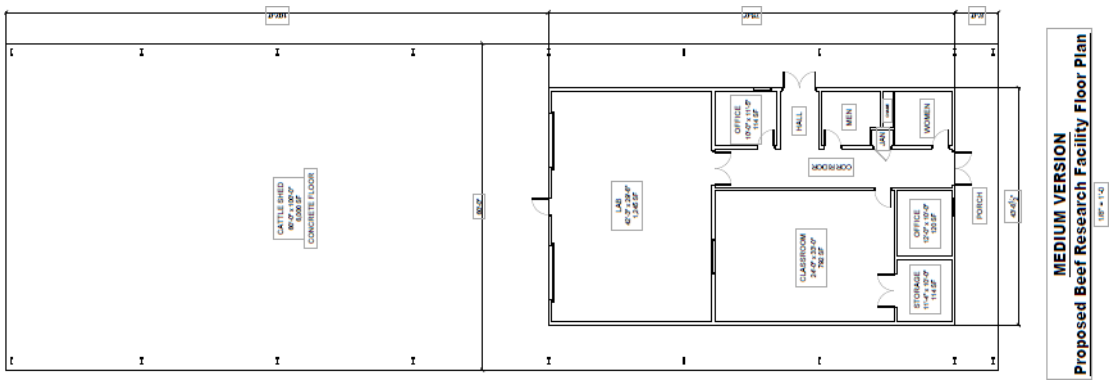


Figure 8. Beef Evaluation Center Floor Plan.

Figure 9a & 9b. New fencing around future Beef Evaluation Center location.

In 2012, alumni faculty member Dr. Bob Hathcock, with the support of current faculty member Dr. Joseph Mehlhorn and the Northwest Tennessee Beekeepers Association, installed a small 11-hive apiary on the north end of the UTM Teaching and Demonstration Farm. The purpose of this apiary was to provide a vehicle for instruction/outreach regarding best management practices in beekeeping for West Tennessee beekeepers. In 2016, Dr. Hathcock and the Association turned the apiary over to the Department of AGN for future use and upkeep. In 2017, the apiary was upgraded to 25 hives and the Department of AGN began to involve Teaching and Demonstration Farm student workers to complete apiary maintenance (see Figure 10). This provides a unique hands-on learning experience for these students. The apiary also allowed for cross-collaboration between the Department of AGN and other departments on campus such as faculty and students from the Department of Chemistry. Beginning September 2017, honey and lip balm from the apiary is being sold in the UTM Bookstore, at UTM football games, and at other public events on the UTM campus. This project continues to be successful and continues to grow.

Figure 10. Student workers completing apiary maintenance.

The Center of Excellence has hosted the Tennessee Governor's School for the Agricultural Sciences (TGSAS) since 2004. TGSAS provides exceptional agricultural experiential learning opportunity for Tennessee high school sophomores and juniors. (Figure 11. a & b) The academic program is a 4-week residential program that covers a variety of agriculture and natural resource topics. Students complete college courses as well as learn research techniques through group study research projects. A copy of the 2021 TGSAS Annual Report can be found on the Center of Excellence web site. http://www.utm.edu/departments/agnr/coe.php

With the tremendous success of the Tennessee Governor's School for the Agricultural Sciences from a student recruitment standpoint, there was an excellent opportunity to develop an "honors" program specifically for AGN students. With this vision and the help of a dedicated group of AGN faculty, the Agriculture, Geosciences, and Natural Resources Fellows Research Program (AGN-FRP) was born. The program includes an additional 12 hours of course work tailored AGN-FRP to enhance students' investigative skills and promote undergraduate research. The AGN-FRP provides an opportunity for outstanding AGN students to gain organized experiences in research and scholarship through a mentored relationship with an AGN faculty member. The primary goal of the AGN-FRP is to foster and enhance undergraduate research in a manner that is mutually beneficial for the student and the faculty mentor. The additional training from the FRP program has positioned the students to be successful in advanced academic fields.

Figure 11. a. 2021 TGSAS Counselors and b. Class of 2021 with staff and counselors

UT Martin continues partnership with Tyson Foods Inc.

The University of Tennessee at Martin has continued to partner with Tyson Foods Inc. to add chicken to the list of animals UT Martin students work with during agricultural production courses during FY2020-2021. Tyson provides the birds, which will be housed in a renovated barn facility on the UT Martin Teaching Farm. The facility officially opened March 1. This facility is used for teaching, research, and career training. (Figure 12)

Figure 12 a,b,&c - New Tyson facility. Below is the ribbon cutting of the newTyson facility at UTM and a picture of the Tyson facility on campus.

UT Martin receives Wildwood Farm gift

The University of Tennessee at Martin received the largest single gift in its history when Melanie Smith Taylor and her family announced that Wildwood Farm in Germantown, TN, will be transferred to the university upon her death. The gift will allow UT Martin to increase educational program offerings in veterinary technology and other agricultural disciplines soon. The gift will provide opportunities for UT Martin to collaborate with the University of Tennessee Institute of Agriculture.

The farm includes 350 acres of mixed pasture and mature oak woodlots surrounded by dense residential development. The Big Barn was completed in 1935 and became the hub of equestrian history in the Mid-South. Originally built as one of the top American Saddlebred show stables in the country, Wildwood transformed into the setting for many equestrian events.

The gift will make possible educational opportunities in veterinary technology, horsemanship, plant and soil science, environmental management, and natural resources management. Early programming will focus on adding a cohort for veterinary technology to complete the core of 200-400 level veterinary technology courses.

Figure 13a. Ms. Melanie Taylor Smith (third from left) at Wildwood Farm gift signing

Figure 13b. Aerial view of Wildwood Farm in the heart of Germantown, TN

Faculty and Staff of Center of Excellence for Experimental Learning In Agricultural Science

Center of Excellence Faculty

Name	Title	Area of Expertise
Ary, Clint	Associate Professor	Veterinary Science
Bird, Will	Associate Professor	Agricultural Education
Buttrey, Emalee	Associate Professor	Animal Science
Chesnut, Matt	Lab Instructor	Veterinary Science
Cole, John	Assistant Professor	Agricultural Engineering
Darroch, Barbara	Associate Professor	Plant and Soil Science
Gale, Paula	Professor	Soil Science
Garner, Kelly	Lab Instructor	Veterinary Science
Lepcha, Isaac	Lecturer	Plant and Soil Science
Mehlhorn, Joey	Director/Professor	TGSAS
Mehlhorn, Sandy	Associate Professor	Agricultural Engineering
Morphis, Zach	Lab Instructor	Veterinary Science
Pelren, Eric	Professor	Wildlife Biology
Roberts, Jason	Professor	Veterinary Science
Simpson, Mark	Professor	Geosciences-GIS/Meteorology
Smartt, Philip	Professor	Natural Resources Management
Tewari, Rachna	Associate Professor	Agricultural Economics
Totten, Wes*	*Director/Professor	Plant and Soil Science
Waldon, Amanda	Lab Instructor	Veterinary Science
Walker, Danny	Associate Professor	Veterinary Science
Watson, Diana	Assistant Professor	Animal Science
Wolters, Bethany	Assistant Professor	Plant & Soil Science

Center of Excellence Staff

Arant, Carrie	Business Manager	Budgets and Accounting/TGSAS
Bradford, Nathan	Teaching Farm Supervisor	Crop Management
Crockett, Jamie	Senior Farm Equipment Operator	Equipment Operation & Management
Cunningham-Corvin,Megan	Equestrian Coach	Horsemanship
Jackson, Kim	Administrative Specialist	Student Support & Contracts
Jones, BeLynda	Administrative Specialist	Veterinary Health Technology /TGSAS
Leiter, Kim	Assistant Equestrian Coach	Horsemanship
Pierce, Mike	Farm Manager	Crop and Animal Management
Woods, Tara	Research Associate	Animal Care and Support

Student Information

The Center of Excellence for Experimental Learning in Agricultural Science works closely with the Department of Agriculture, Geosciences, and Natural Resources to meet all student needs and the COE mission statement. The department has a current enrollment of approximately 1,270 students with areas of interest in Agricultural Business, Agricultural Science, Animal Science, Plant and Soil Science, Agricultural Engineering Technology, Geosciences, Wildlife Biology, Park Administration, Environmental Management, and Soil and Water Conservation. To see specific student awards and internships see Objective 8 on page 22.

Planned Program Activity in FY2021-2022

Activities of the Center for each general objective will include, but are not limited to:

Objective 1: Submit external grants seeking to support the Center of Excellence and its activities consistent with the mission and objectives of the Center of Excellence.

Target: Efforts will be directed at adding $100,000 in new grants and contracts during FY 2021-22 and maintaining or continuing existing grants and contracts.

Response: During the 17th year of operation, faculty members of the Center of Excellence were successful in acquiring a total of $914,030 in active grants (Appendix A). The continued success in acquiring external funding is due primarily to faculty appointments in the Department of Agriculture, Geosciences, and Natural Resources. The faculty identified potential funding sources and subsequently prepared grants and contracts from six different funding agencies in FY2021. Along with this funding the faculty continued research from grants and contracts established with five different funding agencies in prior fiscal years. A full report of all grants funded can be found on the Center of Excellence web site. http://www.utm.edu/departments/agnr/coe.php

Objective 2: Continue with the planning and design phase of a $2.5 million Beef Evaluation Center construction project.

Target: Renewed planning and fundraising for a new Beef Evaluation Center to support academics, cow-calf operation, and research and scholarly activity is underway for FY 2021-22. This facility will be comprised of a 40-seat state of the art classroom and studentcommons area. This laboratory will aid in student instruction but will also provide needed research space for undergraduate, graduate, and faculty research projects in all areas of animal science. The beginning of this project is now TBD.

Response: Activity with this objective has remained limited due to COVID-19 protocols. We are currently working with Mrs. Jenna Curtis-Swafford, Associate Vice Chancellor for Development and Planned Giving on this objective. A Beef Cattle Facility Board meeting will be held on Friday, November 12, 2021 on the UT Martin campus to continue fundraising discussion and activities

Objective 3: Partner with agronomic companies desiring demonstration areas for seed and chemical applications on a cost-sharing basis.

Target: Continue field operations for the 200-acres of crops currently in production emphasizing variety trials and demonstration plots for alternative crops. Complete a systematic review of all agricultural production areas of the COE and amend where necessary to ensure optimum productivity (pH, fertilization, organic matter, etc.). Identify new partnerships for field trials and alternative crops to enhance area agricultural enterprises. Continue to offer

producer-oriented field day programs in cooperation with area equipment dealers, chemical companies, and/or seed companies.

Response:

Agrigold
Bayer CropScience
Beck's Hybrids
Helena Chemical
Weakley County Farmers Co-Op
Tyson Poultry Barn
Syngenta
Nutrien Ag
Winfield Solutions

Objective 4: Generate timely, state-of-the-art information on key topics related to food, agriculture, and the environment with special attention to emerging issues that may have long-term implications for production of agricultural commodities while protecting natural resources in Tennessee.

Target: Seek to sponsor at least 30 speakers/programs that will be directed at enhancing knowledge of emerging issues in the agricultural sciences to include natural resources.

Response:

1. Erin Robbins and Jessica Brown- LVMT's from Auburn Veterinary School- did lab demonstrations for Nursing 340- March 2021
2. Dr. Cindy Schmidt, VET 320 class, North Madison Animal Hospital in person
3. Leslie Wereszack LVMT (virtual), senior clinical specialist/ICU supervising technician, Department of Small Animal Clinical Sciences at the UT College of Veterinary Medicine, Knoxville TN
4. Denver Melton, Live Production Grower Technician Manager, Tyson Inc., Union City, TN (came twice, once in both semesters)
5. Kimberly D. Wallace (virtual), Regulatory Board Administrative Director, State of Tennessee Department of Health-Related Boards, Nashville, TN
6. Dr. Eric Pelren, UT Martin
7. Dr. Stu Foster, Kentucky State Climate Office
8. Dr. Donna Mc Callister, Texas Tech University
9. Mr. Wil Tollefson, Tennessee state climate office
10. Mr. Carson Letot, Penn State University
11. Dr. Jennifer Williams, Teach Action Global
12. Samantha Goyret, Director, West Tennessee Local Food Network (virtual)
13. Jaclyn Fiola, Gradate Research Assistant, Virginia Tech (Virtual)
14. Ute Warkentin, Landscape designer, self-employed, from Vancouver, Canada (Virtual)
15. John Watkins, Grounds Director at Discovery Park of America (In-person)
16. Doug Tindall - University of Missouri College of Veterinary Medicine
17. Maryann Gomex Ross University College of Veterinary Medicine
18. Dr. Mark Gadlage, plant breeder at Corteva Agriscience; guest speaker via Zoom for PLSC 431.
19. Will Singer, graduate student in plant breeding at Virginia Tech University; guest speaker via Zoom for PLSC 431

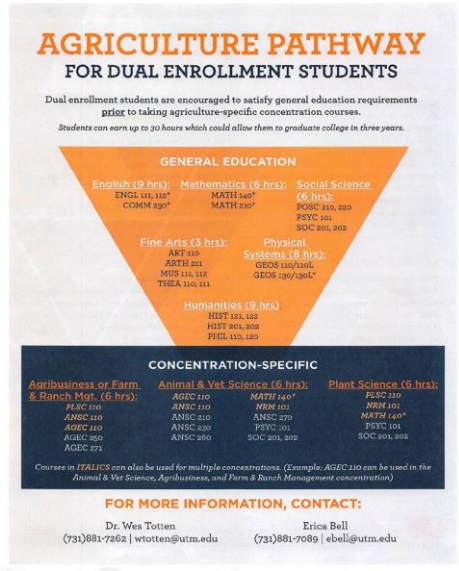
Objective 5: Communicate the objectives of the COE and related action programs to raise public awareness of the importance of the agricultural sciences and natural resources to the economic wellbeing of Tennessee and the surrounding areas.

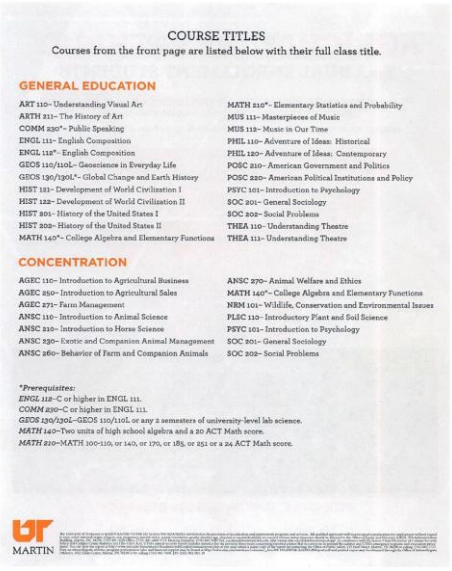
Target: Continue to utilize technology to enhance education for on-campus and off-campus students. Endeavor to offer at least one new program promoting agriculture and natural resources in Tennessee. Maintain and enhance course offerings for dual enrollment programs with high school students in Tennessee. Offer at least ten department courses for online delivery.

Response: The following courses were taught for high school dual enrollment credit in the 2020-21 academic year and below is the current flier that was distributed to the high schools.

AGEC 110	Introduction to Agricultural Business
AGEC 250	Introduction Agricultural Sales
ANSC 110	Introduction Animal Science
ANSC 210	Introduction Horse Science
ANSC 230	Exotic & Companion Animal Management
ANSC 260	Behavior Farm & Companion Animal
ANSC 270	Animal Welfare and Ethics
GEOL 110	Introduction Physical Geology
GEOL 120	Environmental Geology
PLSC 110	Introduction Plant & Soil Science

In addition to the dual credit courses, many courses were offered for online delivery as well. All Agriculture Business courses are now offered online, in addition to numerous courses in all programs in agriculture and natural resources within the AGN department. New courses are being developed and added online yearly by COE faculty.





Objective 6: Provide a forum for dialogue, debate, information sharing, and consensus building among policymakers, researchers, and leaders in non-governmental organizations, the private sector, and media through seminars, workshops, conferences, service learning, and publications.

Target: Plan and present at least 8 seminars/workshops on current topics of interest to animal and crop producers, as well as programs in natural resource management.

Response:

1. **Rachna Tewari** - CLASS (Climate Literacy for Agriculture and Sustainable Societies) Virtual conference, June 15-17, 2021, UT Martin.
2. **Bethany Wolters** - North American Colleges and Teachers of Agriculture Annual Conference, June 21-24, 2021

a. Poster presented: Self-guided learning labs in Soil Science Lets Students Get "Dirty" But Stay Healthy in a Pandemic. Hannah Angel (Virginia Tech), **Bethany Wolters (UTM) and Isaac Lepcha (UTM).**

3. **Rachna Tewari -** Attended Non-Land-Grant Agriculture and Renewable Resources Universities (NARRU) Annual Meeting. Fall 2020.
4. **Rachna Tewari -** Attended Global Learning in Ag Week. GLAG21: Take Action. Penn State University. Spring 2021.
5. **Rachna Tewari** - Attended webinar - "Diversity and Inclusion: Building Connection and Community in Physical, Online, and Hybrid Classrooms". Harvard business review. Fall 2020
6. **Rachna Tewari -** Agricultural & Applied Economics Association's 2020 Annual Meeting, 130th Tennessee Academy of Science Annual Meetings, 2021 Virtual Southern Agricultural Economics Association Meetings. February 2021, 5th International Conference on Climate Change (ICCC) 2021, February 2021, Innovative Teaching and Learning Conference, UT Knoxville, March 2021.
7. **Bethany Wolters** - Association of Education and Research Greenhouse Curators, July 2020
8. **Bethany Wolters** - Soil Health Institute Annual Meeting, July 30-31, 2020
9. **Bethany Wolters** - CSA-ASA-SSSA Annual Meeting, November 9-11, 2020
10. **Dr. Jason Roberts, Dr. Danny Walker, Dr. Clint Ary, Dr. Diana Watson, Amanda Waldon, Zach Morphis, Kelly Garner, Matt Chesnut, BeLynda Jones** - Music City Veterinary Conference, Murfreesboro, TN
11. **Dr. Clint Ary** - Tennessee Academy of Science, (TAS)
12. **Dr. Clint Ary** - North American Colleges and Teachers of Agriculture (NACTA)
13. **Dr. Barb Darroch** - Tennessee Soybean Promotion Board Annual Meeting, Nashville, TN (attended online). Jan. 2021
14. **Dr. Barb Darroch** - 2020 Virtual International Annual Meetings of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. (attended online) Students Scarlett McClurkan and Jessica Pence also attended online. Nov. 2020
15. **Dr. Barb Darroch** - Tennessee Academy of Science Virtual Annual Meeting. (attended online) Sydney Baker (student) also attended online. Nov. 2020
16. **Dr. Barb Darroch** - Cotton Tour, West Tennessee Research and Education Center, Jackson, TN. Attended online; students from PLSC 433 viewed the field day online. Sept. 2020
17. **Dr. Barb Darroch** - Soybean Disease Field Day, Milan Research and Education Center, Milan, TN. Attended online; students in PLSC 322 viewed the field day online. Sept. 2020
18. **Dr. Barb Darroch** - Virtual Milan No-Till Field Day, Milan Research and Education Center (attended online) July 2020
19. **Dr. Barb Darroch** - Soybean Scout School, West Tennessee Research and Education Center (attended online) July 2020

Publications

1. Pruitt, J.R., **R. Tewari** and J. Mehlhorn (2020). Reflections in Adjusting to a Global Pandemic from a Regional Agribusiness Program. Applied Economics Teaching resources, 2 (5), 32-45.

2. Sartain, A., **R. Tewari,** M. Simpson, J. Mehlhorn, N. Musunuru and B. Parr (2020). Willingness to pay for climate change mitigation: college students' perceptions in Tennessee and Kentucky. Advances in Social Sciences Research Journal, 7(9), 731-740.

3. Newman, L., J. Mehlhorn, **R. Tewari**, and B. Darroch. Consumer Perception of Antibiotic-Free and Hormone-Free Meat Products". Journal of Food Studies, September 2020, ISSN 2166-1073. Volume 9, Number 1 pp:80-94

4. **Tewari, R**., R. Pruitt and J. Mehlhorn. Reflections from faculty, students, and administration in adjusting to a global pandemic, in Transitioning Teaching in a Global Pandemic: Teaching Faculty Perspectives from SAEA Members. Organized Symposium, 2021 Virtual Southern Agricultural Economics Association Meetings. February 2021.

5. Nies, G. **J. Mehlhorn** and R. Tewari. Examining Correlations of the Role of Mistrust of Authority and Misperception of Health and Safety Risks of GMO Products. Selected paper accepted for presentation at 2021 Virtual Southern Agricultural Economics Association Meetings. February 2021.

6. Wright, M. and **R. Tewari**. The Application and Benefits of Climate Data in Research.

7. Selected paper presented at the 5th International Conference on Climate Change (ICCC) 2021, February 2021.

8. Gafford, A. and **R. Tewari.** An Initial Study on Calculating Carbon Emissions from Agricultural Production in West Tennessee. Selected paper presented at the 5th International Conference on Climate Change (ICCC) 2021, February 2021.

9. **Tewari, R.**, K. Lange, and J. Mehlhorn. Curious or not? A study of agriculture students' perceptions on curiosity dimensions. Selected paper presented at Agricultural & Applied Economics Association's 2020 Annual Meeting, Kansas City, Missouri, July 2020.

10. **Wolters, B**, & **Lepcha, I**. Unexpected shift to introductory soil field activity at home: Teacher and student experience. *Nat Sci Educ*. (2021); 50:1−9. https://doi.org/10.1002/nse2.20059

11. Inman, Kim, C. Ary, W. Bird, J. Mehlhorn, and **J. Roberts.** "Effects of Advanced Producer Training and Technology on Cattle Mortality During Dystocia." Macrothink Institute, Journal of Agricultural studies, 2020, Vol. 8, No.4. pages 350-359

12. Perceptions of Successfully Veterinary School Applicants: Assessment Data to Improve Student Success. Elizabeth Whitt, Clint Ary, Diana Watson, Jason Roberts, and Joey Mehlhorn. 2021 NACTA Virtual Conference June 21-24, 2021.

13. "Transitioning Governor's School to an Online Environment: Mistakes Made and Lessons Learned " Joey Mehlhorn, Philip Smartt, **Diana Watson**, **Clint Ary**, Will Bird, **Jason Roberts**, Sandy Mehlhorn (2021-0327) has been accepted for a poster presentation at the 2021 NACTA Virtual Conference.

14. Equine Skeleton Reconstruction for Use as a High Impact Practice. Savannah Metheny*, Diana Watson, **Jason Roberts,** Clint Ary, Jack Grubaugh, and Ray Witmer. University of Tennessee at Martin, Martin, Tennessee. Selected poster at the virtual Tennessee Academy of Science annual meeting, East Tennessee State University, Johnson City, Tennessee November 21, 2020. (P)

15. Inman, K., Ary, C., Bird, W., Mehlhorn, J., & Roberts, J. (2020). Effects of Advanced Producer Training and Technology on Cattle Mortality During Dystocia. *Journal of Agricultural Studies, 8*(4), 350-359. doi:http://dx.doi.org/10.5296/jas.v8i4.17483

Poster Abstracts

1. Equine skeleton reconstruction for use as a high-impact practice at the University of Tennessee – Martin (UTM). Savannah Metheny*, Diana Watson, Jason Roberts, Clint Ary, Jack Grubaugh, and Ray Witmer (TAS)

2. Student Perceptions of the Veterinary Profession Post High-Impact Practice Clint Ary, Emily Lewis, Jason Roberts, Will Bird, Joey Mehlhorn, University of Tennessee at Martin (NACTA)

3. Making Informed Curriculum Decisions Using Data as a Guide Clint Ary, Jason Roberts, Joey Mehlhorn, Scott Parrott University of Tennessee at Martin (NACTA)

Objective 7: Provide enhanced laboratory facilities and resources to support experiential learning.

Target: Expand experiential learning experience for students with at least one international travel course and offer at least 40 opportunities for internship participation. Identify opportunities for international study or internships.

Response:

1. Angelos, Madison- Jackson Animal Clinic, Jackson, TN
2. Cassetty, Rebecca- Auburn Veterinary School, Auburn, AL
3. Correia, Lillian- NVS, Nashville, TN
4. Cunigan, Divinety- MVS, Cordova, TN
5. Duncan, Savanna- Hooks Pet Clinic- Martin, TN
6. Hacker, Katelyn- Munford Animal Clinic, Munford, TN
7. Haynes, Kearsten- VCA Specialty, Chattanooga, TN
8. Holmes, Erin- Tennessee Equine- Eades, TN
9. Knox, Jamie- Bells Animal Clinic- Bells, TN
10. McCage, Ashton- VCA- Hawaii
11. McCoy, Alaynea- MVS- Cordova, TN
12. McKennedy, Katheryn- Prairie Haven Animal Hospital- Sherman, IL
13. Nash, Emily- Village Veterinary Specialty- Knoxville, TN
14. St. John, Michaela- Equine Veterinary Service- Paducah, KY
15. Tomczak, Kelsea- Mineral Wells Animal Clinic- Paris, TN
16. Weisenstein, Heather- Auburn Veterinary School- Auburn, AL
17. Wood, Holly- Cape Fear Animal Hospital- Fayetteville, NC

18. Cawthon, Marissa- Camden, TN
19. Clark, Mackenzie- Hooks- Martin, TN
20. Long, Lexie- NVS- Nashville, TN
21. Miller, Clint- UTK Vet School- Knoxville, TN
22. Parish, Michaela- JAC- Jackson, TN
23. Parks, Marissa-VCA- Tomball, TX
24. Poole, Kaitlyn- Munford, TN
25. Ruff, Heather- Auburn Vet School- Auburn, AL
26. Warren, Brandy- Beech Lake Animal Hospital- Lexington, TN
27. Anderson, Chloe- TN. Equine- Nashville, TN
28. Warner, Karley - Chattanooga Zoo
29. Forsythe, Zach – Gardiner Angus Ranch
30. Brewer, Will – Nutrien Ag Solutions
31. Burks, Hunter – Burks Farms
32. Floyd, Myah – West Tennessee AgResearch and Education Center, Jackson, TN
33. Fussell, Rhett – Bayer Crop Science
34. Hudgins, Emily – AmeriCorps (service at NRCS)
35. Leath, Kyle – RCG Trucking
36. Love, Hayden – West Tennessee AgResearch and Education Center, Jackson, TN
37. McIntyre, Currie – A&J McIntyre Farms
38. Pence, Jessica – UT Extension, Dresden, TN and UT Martin Teaching and Demonstration Farm
39. Sartain, Steven – Helena Agri Enterprises
40. Tribble, Jacob – North Delta Crop Consulting
41. Wilson, Ethan – West Tennessee AgResearch and Education Center, Jackson, TN
42. McGaugh, Jamie – Omni PGA Frisco Resort, Frisco, TX
43. Edwards, Bryce – Humboldt Country Club, Humboldt, TN

Objective 8: Support local, regional, and national competitions.

Target: Continue to host or participate in a minimum of 10 local, regional, and/or national competitions by UT Martin students and faculty.

Response:

- **Rachna Tewari -** Hosted: Academic Quiz Bowl (National), Agricultural & Applied Economics Association's 2020 Annual Meeting

- Participated: Montana Wright (Student worker for the CLASS (Climate Literacy for Agriculture and Sustainable Societies Project, PI- Tewari) 2nd Place poster - 'Application of climate data' at the Student competition at the 130th Tennessee Academy of Science Annual Meetings.

- State FFA Vet Science CDE. **Amanda Waldon** helped design this year's virtual test and assisted in hosting/recording (it was virtual with zoom calls). Judges from our department: **Kelly Garner, Zach Morphis, Dr. Danny Walker.**

- State 4H clinics event. Did companion animal/vet science. People participating **Dr. Ary, Dr. Walker, Tara Woods, Zach Morphis, Kelly Garner, Matt Chestnut, Amanda Waldon**

- Scarlett McClurkan participated in the SASES Research Poster competition at the 2020 Virtual International Annual Meetings of ASA, CSSA, and SSSA. Jessica Pence participated

in the SASES Internship Poster competition at the same meeting. Both students presented their posters online (November 2020).

- Sydney Baker participated in student research poster competition at the Tennessee Academy of Science Virtual Annual Meeting in November 2020. Sydney also presented online and came in third in her group.

Objective 9: Provide enhanced resources to assist in the operation of the Tennessee Governor's School for the Agricultural Sciences.

Target: Continue to seek new experiential learning opportunities for the Tennessee Governor's School for the Agricultural Sciences.

Response:

The Department of Agriculture, Geosciences, and Natural Resources hosted the 2021 Tennessee Governor's School for the Agricultural Sciences (TGSAS) on campus from May 29 – June 25, 2021. The program consisted of 35 scholars from across the state of Tennessee. Scholars completed six hours of college coursework. Courses taught included AGEC 110: Introduction to Agricultural Business or NRM 100: Introduction to Natural Resource Management. Scholarsalso participated in research activities through Group Study Projects (GSP). The GSP's covered precision agriculture and veterinary medicine. All GSP's covered the scientific method and focused on experimental research activities.

COVID 19 Transition: We are grateful that the State Department of Education has allowed us to offer TGSAS in a person to person or virtual format to the scholars this year. We had 32 in person and 3 selected the virtual format.

The TGSAS leadership team starting meeting early in the spring 2021 semester to start planning which was met challenges because we didn't know if we were going to be all virtual or face to face. We didn't know if we were going to be allowed to travel, if facemask were going to be the way we saw our students each day or exactly how we would be able to house students. We were very successful have our classes, travel to some exceptional learning places and have a little fun along the way. Our TGSAS counselors did an outstanding job with our scholars again this year.

Several virtual educational study tours were incorporated throughout the 4-week program. These included field trips to the following:

1. Yeargin Farms Tour, Greenfield, TN
2. Agri Center International, Memphis, TN
3. UT Research and Experiment Station, Milan, TN
4. Massey Farm, Mt. Pleasant, TN
5. Tyson Foods, Union City, TN
6. Farm Bureau Headquarters, Columbia, TN
7. Reelfoot Lake, Lake County, TN
8. Tennessee Department of Agriculture, Nashville, TN
9. Pictsweet, Bells, TN
10. Wildwood Farm, Germantown, TN

Objective 10: Provide local and regional experiential learning opportunities at the Coon Creek Science Center.

Target: Seek to sponsor at least 30 speakers/programs that will be directed at enhancing knowledge of emerging issues in the agricultural sciences to include natural resources.

Response: Due to COVID-19 Pandemic policy, speakers and programming at Coon Creek Science Center was not feasible for FY 2020-2021. Policy did not allow for travel, nor did it allow for large gatherings which severely limited experiential learning at CCSS. Small groups if 4 or less, led by Dr. Michael Gibson as apart of UTM Geology classes, were the sole activity during this time at CCSS. The only exception to this was the small gathering in April 2021 for the CCSS grand opening conducted under COVID-19 pandemic policy.

Planned Program Activity in FY2021-2022

Activities of the Center of Excellence for each general objective will include, but are not limited to:

Objective 1: Submit external grants seeking to support the Center of Excellence and its activities consistent with the mission and objectives of the Center of Excellence.

Target: Efforts will be directed at adding $100,000 in new grants and contracts during FY 2022-23 and maintaining or continuing existing grants and contracts.

Objective 2: Continue with the planning and design phase of a $2.5 million Beef Evaluation Center construction project.

Target: Renewed planning and fundraising for a new Beef Evaluation Center to support academics, cow-calf operation, and research and scholarly activity is underway for FY 2022-23. This facility will be comprised of a 40-seat state of the art classroom and student commons area. This laboratory will aid in student instruction but will also provide needed research space for undergraduate, graduate, and faculty research projects in all areas of animal science. The beginning of this project is now TBD.

Objective 3: Partner with agronomic companies desiring demonstration areas for seed and chemical applications on a cost-sharing basis.

Target: Continue field operations for the 200-acres of crops currently in production emphasizing variety trials and demonstration plots for alternative crops. Complete a systematic review of all agricultural production areas of the COE and amend where necessary to ensure optimum productivity (pH, fertilization, organic matter, etc.). Identify new partnerships for field trials and alternative crops to enhance area agricultural enterprises. Continue to offer producer-oriented field day programs in cooperation with area equipment dealers, chemical companies, and/or seed companies.

Objective 4: Generate timely, state-of-the-art information on key topics related to food, agriculture, and the environment with special attention to emerging issues that may have long-term implications for production of agricultural commodities while protecting natural resources in Tennessee.

Target: Seek to sponsor at least 30 speakers/programs that will be directed at enhancing knowledge of emerging issues in the agricultural sciences to include natural resources.

Objective 5: Communicate the objectives of the COE and related action programs to raise public awareness of the importance of the agricultural sciences and natural resources to the economic wellbeing of Tennessee and the surrounding areas.

Target: Continue to utilize technology to enhance education for on-campus and off-campus students. Endeavor to offer at least one new program promoting agriculture and natural resources in Tennessee. Maintain and enhance course offerings for dual enrollment programs with high school students in Tennessee. Offer at least ten department courses for online delivery.

Objective 6: Provide a forum for dialogue, debate, information sharing, and consensus building among policymakers, researchers, and leaders in non-governmental organizations, the private sector, and media through seminars, workshops, conferences, service learning, and publications.

Target: Plan and present at least 8 seminars/workshops on current topics of interest to animal and crop producers, as well as programs in natural resource management.

Objective 7: Provide enhanced laboratory facilities and resources to support experiential learning.

Target: Expand experiential learning experience for students with at least one international travel course and offer at least 40 opportunities for internship participation. Identify opportunities for international study or internships.

Objective 8: Support local, regional, and national competitions.

Target: Continue to host or participate in a minimum of 10 local, regional, and/or national competitions by UT Martin students and faculty.

Objective 9: Provide enhanced resources to assist in the operation of the Tennessee Governor's School for the Agricultural Sciences.

Target: Continue to seek new experiential learning opportunities for the Tennessee Governor's School for the Agricultural Sciences.

Objective 10: Provide local and regional experiential learning opportunities at the Coon Creek Science Center.

Target: Seek to sponsor at least 30 speakers/programs that will be directed at enhancing knowledge of emerging issues in the agricultural sciences to include natural resources.

Schedule 7

CENTERS OF EXCELLENCE ACTUAL, PROPOSED, AND REQUESTED BUDGET

Institution: **University of Tennessee at Martin** Center: **Experimental Learning in Agricultural Science**

	FY 2020-21 Actual			FY 2021-22 Proposed			FY 2022-23 Requested		
	Matching	Appropr.	Total	Matching	Appropr.	Total	Matching	Appropr.	Total
Expenditures									
Salaries									
Faculty	$38,464	$48,000	**$86,464**	$38,849	$48,000	**$86,849**	$40,792	$50,400	**$91,192**
Other Professional	$49,019	$63,000	**$112,019**	$12,000	$66,000	**$78,000**	$12,600	$69,300	**$81,900**
Clerical/ Supporting	$27,093	$21,000	**$48,093**	$23,000	$22,000	**$45,000**	$24,150	$23,100	**$47,250**
Assistantships	$117,510	$10,500	**$128,010**	$65,000	$12,000	**$77,000**	$68,250	$12,600	**$80,850**
Total Salaries	**$232,086**	**$142,500**	**$374,586**	**$138,849**	**$148,000**	**$286,849**	**$145,792**	**$155,400**	**$301,192**
Longevity	$3,695		**$3,695**			**$0**			**$0**
Fringe Benefits	$34,571	$80,000	**$114,571**	$10,000	$80,000	**$90,000**	$10,500	$84,000	**$94,500**
Total Personnel	**$270,352**	**$222,500**	**$492,852**	**$148,849**	**$228,000**	**$376,849**	**$156,292**	**$239,400**	**$395,692**
Non-Personnel									
Travel		$14,805	**$14,805**	$3,500	$15,000	**$18,500**	$3,675	$15,750	**$19,425**
Other Supplies	$95,215	$65,196	**$160,411**	$108,495	$67,109	**$175,604**	$113,919	$70,464	**$184,383**
Equipment	$68,515		**$68,515**	$15,000		**$15,000**	$15,750		**$15,750**
Maintenance	$13,613		**$13,613**	$10,000		**$10,000**	$10,500		**$10,500**
Scholarships	$3,967		**$3,967**			**$0**			**$0**
Consultants	$44,719		**$44,719**	$35,000		**$35,000**	$36,750		**$36,750**
Other (Specify):									
Utilities and Fuel	$8,622	$5,250	**$13,872**	$9,000	$5,600	**$14,600**	$9,450	$5,880	**$15,330**
Rental and Insurance	$12,314		**$12,314**	$10,750		**$10,750**	$11,287		**$11,287**
Total Non-Personnel	**$246,965**	**$85,251**	**$332,216**	**$191,745**	**$87,709**	**$279,454**	**$201,331**	**$92,094**	**$293,425**
GRAND TOTAL	**$517,317**	**$307,751**	**$825,068**	**$340,594**	**$315,709**	**$656,303**	**$357,623**	**$331,494**	**$689,117**
Revenue									
New State Appropriation		$307,751	**$307,751**		$318,268	**$318,268**		$334,181	**$334,181**
Carryover State Appropriation	$0		**$0**			**$0**			**$0**
New Matching Funds	$499,141		**$499,141**	$338,035		**$338,035**	$357,623		**$357,623**
Carryover from Previous Matching Funds	$16,470		**$16,470**			**$0**			**$0**
Total Revenue	**$515,611**	**$307,751**	**$823,362**	**$338,035**	**$318,268**	**$656,303**	**$357,623**	**$334,181**	**$691,804**

Staffing of the Center of Excellence for Experimental Learning in Agricultural Science

The staffing strategy for the COE focuses on bringing a diversity of talent to the Center of Excellence to better meet the goals and objectives of the Center of Excellence. This is accomplished by offering staffing appointments ranging from 25 percent to 50 percent to faculty and staff of the Department of Agriculture, Geosciences, and Natural Resources. Staffing includes a Director (25 percent appointment) and Business Manager (25 percent appointment) and faculty who are selected through a proposal process (25 percent appointments and one cooperating faculty member with no formal assigned appointment) and the Director of the Tennessee Governor's School for the Agricultural Sciences. Three support staff members are also assigned to the COE. Staffing assignments (with COE appointment percent) include:

Administration:

Dr. Wes Totten	Director (25%)
Mrs. Carrie Arant	Business Manager (25%)

2019-20 RFP Faculty:

Dr. Clint Ary	Animal Diagnostic Lab (25%)
Dr. Philip Smartt	Park and Recreation and Forestry (25%)

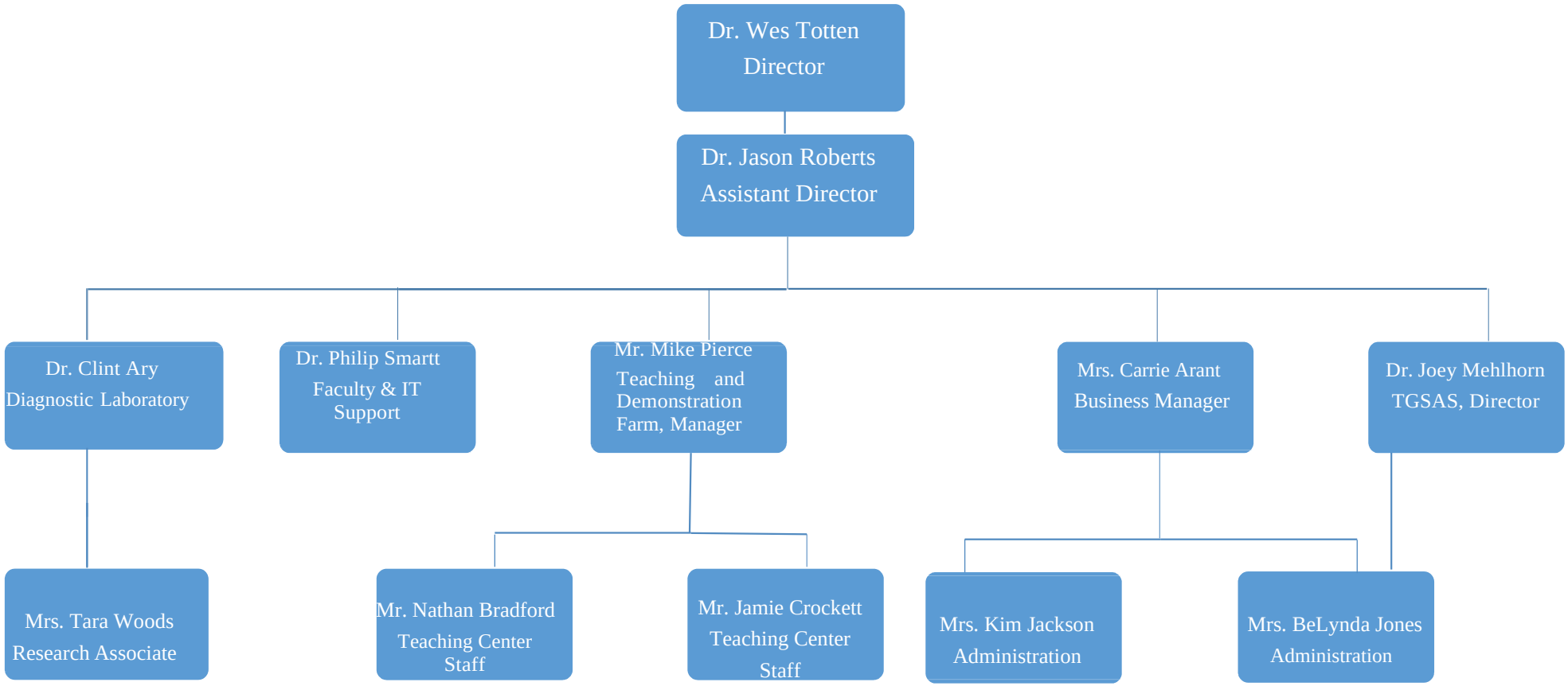
Staff:

Mr. Michael Pierce	Teaching and Demonstration Farm/Ag Pavilion (100%)
Mr. Nathan Bradford	Teaching and Demonstration Farm/Ag Pavilion (100%)
Mr. Jamie Crockett	Teaching and Demonstration Farm/Ag Pavilion (100%)
Mrs. Tara Woods	Research Associate/Diagnostic Laboratory (100%)

A complete Faculty/Staff listing is on page 10.
An organizational staffing chart is included.

Center of Excellence for Experimental Learning in Agricultural Science

Organizational Staffing



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Appendix A

Summary of Contract, Grant and Unrestricted Gift Activity

Ary, Clint. Funding for operation of West Tennessee Animal Disease Diagnostic Laboratory. State of Tennessee, Department of Agriculture $105,000 (Funded)

Cole, John. “Hydraulic Conductivity Trailer.” United States Department of Agriculture, Natural Resources Conservation Service $24,000 (Funded)

Cole, John. “Tennessee corn through the lens of virtual reality, building now for immediate future.” Tennessee Corn Promotion Board $23,842 (Funded)

Darroch, Barbara. “The Effect of Seed Applied Inoculants.” Tennessee Soybean Promotion Board $9,900 (Funded)

Darroch, Barbara. “Cultivar and Plant Growth on Insect Populations.” Tennessee Soybean Promotion Board $3,600 (Funded)

Darroch, Barbara. “Effect of poultry litter on soybean nodulation and yield.” Tennessee Soybean Promotion Board $15,700 (Funded)

Darroch, Barbara. “Capacity Building for Enhanced Research and Experiential Education: Resilient Cropping Systems for the Upper Mid-South.” United States Department of Agriculture, National Institute of Food and Agriculture $148,589 (Funded)

Darroch, Craig. “Use of soybean residue as an alternative litter material in broiler houses.” Tennessee Soybean Promotion Board $5,000 (Funded)

Delmond, Anthony. “Alternative Market Opportunities for Tennessee-Grown Corn Products.” Tennessee Corn Promotion Board $19,900 (Funded)

Gale, Paula. “Increasing the Resilience of Agricultural Production in the Tennessee and Cumberland River Basins through More Efficient Water Resource Use.” National Institute of Food and Agriculture $22,951 (Funded)

Gale, Paula. “Investigating Benchmark Soil Landscape in the South: Linking soils, landscapes, vegetation and hydrology.” United States Department of Agriculture, Natural Resources Conservation Service $100,000 (Funded)

Gale, Paula. “Nutrient Dynamics in Soils Along the Forked Deer River, North Jackson Restoration Site.” State of Tennessee, West Tennessee River Basin Authority $32,000 (Funded)

Gale, Paula. “Quantitative Tools for developing Ecological Sites in the Southeastern U.S.” United States Department of Agriculture, Natural Resources Conservation Service $37,736 (Funded)

Grubaugh, Jack and Barb Darroch. “TN FY21 PD Survey UT Martin.” United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine $22,000 (Funded)

Grubaugh, Jack and Barb Darroch. “TN FY20 PD Survey UT Martin.” United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine $22,000 (Funded)

Grubaugh, Jack. “TN FY21 Asian Defoliator Survey 1S.1286.” United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine $5,000 (Funded)

Mehlhorn, Joseph. “Tennessee Governor’s School for Agricultural Sciences” State of Tennessee, Department of Education $156,000 (Funded)

Mehlhorn, Sandy. “Cover Crop and Increased Infiltration Rates’ Effect on Yields.” Tennessee Corn Promotion Board $11,541 (Funded)

Pruitt, J. Ross. “Finding Specialty Niche Markets for Farmers Using Social Aspects of Food.” United States Department of Agriculture, National Institute of Food and Agriculture $204,330 (Funded)