

A black and white cow stands in a lush green field. In the background, a large, leafy tree stands prominently. Beyond the field, a white farm building with a tall silo is visible. The landscape is surrounded by rolling green hills under a blue sky with scattered clouds. Another cow is lying down in the distance to the left.

MIDDLE TENNESSEE STATE UNIVERSITY

# FARM LABORATORIES

**MIDDLE  
TENNESSEE**  
STATE UNIVERSITY





01



## TABLE OF CONTENTS

- 03 Introduction
- 05 Dairy Unit
- 07 Milk Processing Unit
- 09 Beef Unit
- 10 Swine Unit
- 11 Crops Unit
- 12 Unmanned Aircraft Systems
- 13 Horticulture/Garden Unit



"Agriculture is the most healthful, most useful and most noble employment of man."

—George Washington







MTSU Farm Laboratories provide the “hands-on” element of the School of Agribusiness and Agriscience (ABAS). Students farm 750 acres including a state-of-the-art dairy and milk processing plant, two beef herds, and a farrow-to-finish swine operation. We raise several crops including corn, soybeans and hemp plus a student garden, green houses, and a student farmer’s market.

The Farm Labs exist to complement and enhance classroom training to make for a complete undergraduate education, preparing students for successful careers in agriculture and science. The ABAS program’s goal is to turn students into workforce/career-ready graduates.

MTSU faculty and students are active in research involving livestock management, row and forage crop production, dairy production, milk processing and marketing, and horticulture and garden production. We are a “grass to glass” operation where students feed the cows, milk the cows, pick up and haul the milk, process the milk, and deliver it to campus for other students to consume. Undergraduate students are encouraged to use the Farm Laboratories in their undergraduate research. We think of our students as the future of modern agriculture. Through experiential learning in modern facilities, they have the opportunity to develop an excellent work ethic, attention to detail, knowledge of sanitary and regulatory practices, and systematic approaches to manufacturing milk products, breeding and raising beef cattle and swine, growing feed crops to support other ABAS units, and maintaining a robust garden.

**Experiential Learning and Research Center (ELRC)** The Experiential Learning and Research Center on Guy James Road is the newest of the Farm Laboratories. With 435 acres of pristine Tennessee rolling-hill farm country, the center includes a \$2.7 million state-of-the-art dairy, a registered Angus herd, student gardens that include horticulture hoop houses, and an apiary. The dairy was completed in September 2011 as a part of a \$4.4 million farm improvement project.







**The Dairy Unit** allows students to experience modern dairy production techniques. It includes some 140 cows, replacement heifers, and calves. At any given time about 60–70 cows of the mixed Holstein and Jersey herd are in the milking line. Students participate in every aspect of the day-to-day operation of the dairy including the following:

- Mixing and feeding using a Total Mixed Ration (TMR) system
- Milking the Holstein and Jersey-mix herd
- Feeding and caring for replacement heifers from bottle-feeding through the feeding of hay and grain as they get older
- Participate in breeding decisions and artificial insemination
- Forage harvesting

#### More Dairy Unit Facts

- All students who go through the ABAS curriculum will have an opportunity to milk at the dairy before they graduate.
- Our state-of-the-art composting pack barn is a natural composting operation in action. Compost is cleaned out of the pack barn in the spring and used to reduce fertilizer costs on the hay fields and to enhance the students' work in the gardens.
- About 24 percent of the milk produced at peak time is brought to campus to our Milk Processing Unit. There, it is pasteurized and bagged to be delivered to campus cafeterias.
- The Dairy Unit engages with the community by working with several 4-H, FFA, and collegiate dairy judging teams and by participating in occasional live broadcasting on local news stations.







"Perfection is not attainable,  
but if we chase perfection,  
we can catch excellence."

—Vince Lombardi



#### Milk Processing Unit

The Milk Processing Unit adds to the experiential learning of students interested in dairy science, food service, agritourism, and agribusiness. Students haul the milk from the dairy, and then the milk is lab tested to check for antibiotics, pasteurized and homogenized, and put into five-gallon bags for delivery to our campus cafeterias.



#### More Milk Processing Unit Facts

- Students who work in the Milk Processing Unit receive certification in CHARM antibiotic testing, FOSS butterfat testing, and Weighmaster/ Sampler license.
- Because the milk industry is the most highly regulated food sector, students must learn about sanitation, regulatory, marketing, distribution, and inventory systems.

- The unit annually processes 11,000–12,000 gallons of milk each year. The milk plant serves the campus and provides chocolate milk for local activities.
- MTSU is strategically positioned as the only university in the state with a full-scale milk processing plant.
- Several state, federal, and commercial groups utilize the Milk Processing Unit for training regulatory officials, business professionals, and industry personnel.





### Beef Unit

- The Beef Unit offers experiential learning for some 300 Animal Science majors. It consists of two farms, the largest covering 140 acres and the other 65 acres.
- The Angus herd is pastured at the Experiential Learning and Research Center on Guy James Road.
- The breeding program at the Beef Unit includes artificial insemination and Angus, Hereford, and Simmental herd sires. Students participate in an estrous synchronization, an artificial insemination project, during the beef production course.
- The Beef Unit gives students experience in working cattle through a corral and chute system, giving proper vaccinations, collecting measurements for EPDs such as weaning and yearling weights, feeding and caring for cattle, halter breaking and showing, forage production, and many other aspects of cattle production.
- Faculty members and students use the Beef Unit for research.



### Swine Unit

- The Swine Unit is another prime example of experiential learning at MTSU. Students can be part of the entire life cycle of a pig, which includes breeding, farrowing, weaning, and growing/finishing all in one semester.







### Crops Unit

The Crops Unit includes pastures, haylage, dry hay, and feed grain for the Dairy, Beef, and Swine Units, as well as for selling on the market. Classes collect data with hands-on methods, and a new weather station gathers and stores data. Students use the latest in Precision Agriculture technology to analyze data to make informed agronomic decisions.



### Unmanned Aircraft Systems Operations

Our Experiential Learning and Research Center exists to support research, instruction, and outreach missions of ABAS. The laboratory uses cutting-edge technologies to enhance teaching and research in traditional agronomy, horticulture, and precision agriculture. Students have the opportunity to gain deep understanding and practical knowledge in agricultural science through

- experiential learning and scientific investigation using unmanned aviation systems (UAS) and their different application domains in agriculture such as increasing agronomic water use efficiency<sup>1</sup> and nitrogen use efficiency of different native warm-season grasses<sup>2</sup> in Middle Tennessee.
- learning about agricultural remote sensing using multispectral and hyperspectral cameras and spectroscopy;
- studying climatology and plant and environment interaction; and
- hands-on learning in the production and physiology of major field crops, forages, and vegetables in the middle Tennessee region.

<sup>1</sup> This project was supported by Agriculture and Food Research Initiative Competitive Grant no. 2015-68007-23212 from the USDA National Institute of Food and Agriculture.

<sup>2</sup> This project was supported by Capacity Building Grants for Non Land Grant Colleges of Agriculture Program Grant no. 2015-70001-23418 from the USDA National Institute of Food and Agriculture.







### Horticulture/Garden Unit

The Horticulture/Garden Unit occupies 25 acres and includes

- Hoop-house gardening
- Outside and traditional gardening
- Horticultural and ornamental plants grown in hoop-house and greenhouses
- An orchard



Students in horticulture classes spend many hours applying classroom study in practical situations. All the vegetable, fruit, and ornamental plants that are sold in the Student Farmers Market are grown at the farm. Just as farmer markets across the state continue to grow, our Student Farmers Market is as popular today among our campus community as it ever has been.







"We consider our students  
the real product . . ."

The production of this publication is supported by USDA National Institute of Food and Agriculture Grant Number: 2015-70001-23418 and 2015-68007-23212.

I AM *true*  
**BLUE**

MIDDLE TENNESSEE STATE UNIVERSITY

0615-1853 – Middle Tennessee State University does not discriminate against students, employees, or applicants for admission or employment on the basis of race, color, religion, creed, national origin, sex, sexual orientation, gender identity/expression, disability, age, status as a protected veteran, genetic information, or against any other legally protected class with respect to all employment, programs, and activities. The following person has been designated to handle inquiries related to nondiscrimination policies for MTSU: Assistant to the President for Institutional Equity and Compliance. For additional information about these policies and the procedures for resolution, please contact Marian V. Wilson, assistant to the president and Title IX Coordinator, Institutional Equity and Compliance, Middle Tennessee State University, Cope Administration Building 116, 1301 East Main Street, Murfreesboro, TN 37132; Marian.Wilson@mtsu.edu; or call (615) 898-2185. MTSU's policy on nondiscrimination can be found at: <http://www.mtsu.edu/titleix/>.

School of Agribusiness  
and Agriscience

MTSU Box 5 - SAG 100

Murfreesboro, TN 37132

Office: 615-898-2523

Fax: 615-898-5169

[mtsu.edu/abas](http://mtsu.edu/abas)