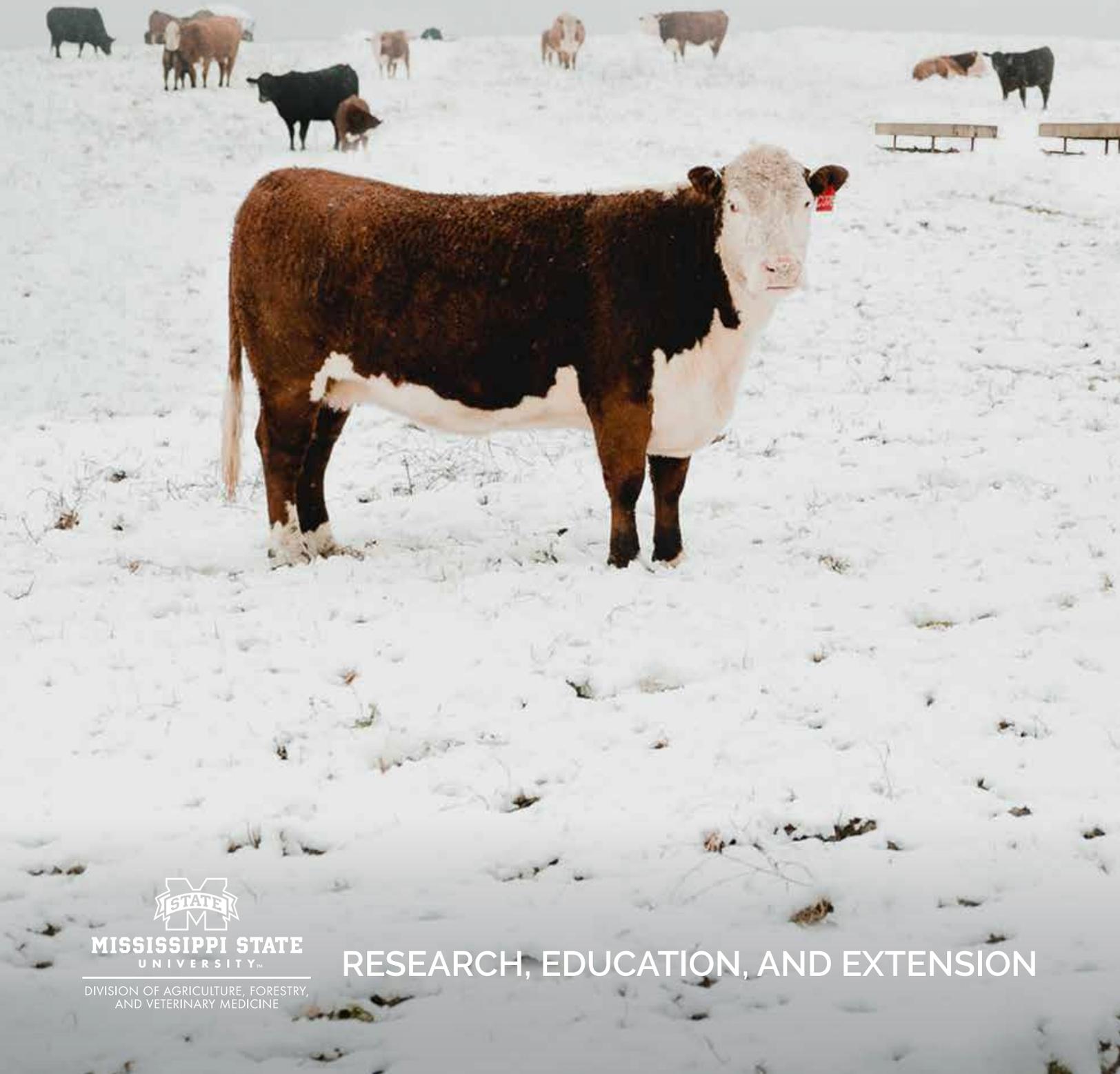


MISSISSIPPI

# LANDMARKS

VOLUME 17, NUMBER 3



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## VICE PRESIDENT'S LETTER

Many readers of this publication will note that those who have come before me as vice president in the MSU Division of Agriculture, Forestry, and Veterinary Medicine use this space at the end of each year to pause and reflect

on the great work that takes place in this division. 2021 saw us face some similar challenges from the previous year related to COVID-19, namely the Delta variant, but our faculty, staff, and students overcame obstacles once again. I am thankful to represent them and hopeful that 2022 will be the year we move past the worst of this pandemic.

As we conclude the year, I am pleased to offer some positive news. For the seventh straight year, MSU has set a new record for enrollment, with 23,086 attending this fall. This number includes 2,563 in the College of Agriculture and Life Sciences, 573 in the College of Forest Resources, and 512 in the College of Veterinary Medicine.

Serving as vice president allows me to travel across the state and see how DAFVM units are focused on work relevant to the citizens of Mississippi. During these outings, I have observed our cutting-edge water research and Extension programs both on our Starkville campus and at the Delta Research and Extension Center in Stoneville. Our division also has a multitude of coastal projects addressing the needs of those citizens and industries. At our Mississippi Agricultural and Forestry Experiment Station Pontotoc Ridge-Flatwoods Branch, you can see our innovative sweet potato research and outreach.

I have learned how multiple units in the division have come together to serve the catfish industry at the Thad Cochran National Warmwater Aquaculture Center, how our units met the challenges of COVID, how the Forest and Wildlife Research Center helps recruit new industry to the state, and what makes the College of Veterinary Medicine a national and international leader in veterinary epidemiology and aquatic health.

I also get a glimpse of new efforts that will potentially change agriculture in the future: tile drainage research in wet soils, autonomous agricultural equipment research, and exploration of carbon markets for our forest and crop landowners.

Being relevant to the needs of our state is always a desire of ours. As you read the articles in this edition of *Mississippi LandMarks*, I hope you see the commitment from our people. I greatly appreciate your continued support of our work and wish you a peaceful, healthy holiday season.

KEITH H. COBLE  
Vice President

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ON THE COVER

Cattle weather a rare Mississippi snow storm on January 11 at the Mississippi Agricultural and Forestry Experiment Station's H. H. Leveck Animal Research Center on the MSU campus. (Photo by Michaela Parker)



# Client Choice at Food Pantries Can Lead to Better Nutrition

Charles Wills and Pandora Redmond work at Hearty Helpings Food Pantry in Greenville.



Armed with the knowledge that food insecurity and obesity often go hand in hand, the AIM for CHangE program is working to modify the way food pantries operate in several impoverished Mississippi counties.

Masey Smith, AIM for CHangE program manager with the Mississippi State University Extension Service, is trying to move some food pantries to a client-choice model. AIM for CHangE is short for Advancing, Inspiring, Motivating for Community Health through Extension.

“Client choice is a type of behavioral-design intervention,” Smith said. “Instead of giving a client a box of food and you feel good about it, we want to emphasize the dignity of the client by giving them some choice in the shopping experience.”

For example, a food-pantry client could choose peas instead of green beans or rice instead of pasta. Choice is especially important when the person has a restricted diet, and client choice also reduces waste.

“Having a choice in the shopping experience can be empowering and dignifying to our community members who need these provisions,” Smith said.

AIM for CHangE identified 12 Mississippi counties where the adult obesity rate is 40 percent or higher: Sharkey, Washington, Issaquena, Sunflower, Humphreys, Holmes, Leflore, Quitman, Jefferson, Jefferson Davis, Claiborne, and Noxubee.

“You see the prevalence of obesity in areas where a high percentage of the population is food insecure,” Smith said.

Without access to quality foods, which cost more than sugar- and fat-filled foods, the population tends to become obese and suffer from related health problems.

“It’s not because this population eats more or has a surplus of food, but it is because what they are eating is junk food,” she said.

Food pantries can help combat this problem by offering healthy options and educating clientele on how to use them. Smith said one step in this process has been the development and placement of signage that directs clients to nutrient-dense, quality foods.

“We want to help food pantries make the healthy choice the easy choice,” Smith said.

Smith said food-pantry organizers are encouraged to pay particular attention to the type of food offered and how it is presented.

“With labeling and increased awareness by clients and staff, we hope food pantries begin to procure healthier choices,” Smith said. “A food pantry may notice that they are ordering a lot more cereal, which is not a very healthy choice, rather than more nutrient-dense foods such as fruits and vegetables.”

A next step is encouraging use of these healthier food options. If a food pantry offers lentils, clients could benefit from recipes and instructions on how to cook this protein.

“Through AIM for CHangE, we’re trying to meet the food pantries where they are and bring them one step closer to offering better food options for their clients,” Smith said.

Alexis Hamilton, an Extension AIM for CHangE agent in the Delta, works closely with Hearty Helpings Food Pantry in Greenville. This facility offers food-pantry pickups weekly to hundreds of families, as well as hot lunches 4 days a week. Demand grew tremendously when the pandemic struck.

“They had to switch to a drive-around process for the food pantry, but AIM for CHangE is getting them ready to offer choice to a select group of clients who have special needs or restricted diets,” Hamilton said.

As life returns to normal after the pandemic, Smith said she hopes client choice can become the standard at many of the state’s food pantries.

AIM for CHangE is designed to create community coalitions to solve health issues alongside local champions. By increasing opportunities for physical activity and promoting access to healthier foods, community-led AIM for CHangE coalitions are developing healthier cultures across Mississippi.

BY BONNIE COBLENTZ • PHOTOS BY KEVIN HUDSON

“We want to help food pantries make the healthy choice the easy choice.”

MASEY SMITH

Samantha Burchwell (left), Dr. Tongyin Li, and Dr. Guihong Bi conduct blueberry research in high tunnels at the MAFES R. R. Foil Plant Science Research Center. (Photo by Kevin Hudson)

# Blueberry Research

Extends Off-Season Supply



“High tunnels can extend the production season and help reduce the risk of frost damage. Due to the exclusion of rain, high tunnels can also help reduce disease pressure and improve blueberry fruit quality.”

DR. GUIHONG BI

Dr. Guihong Bi is conducting two long-term blueberry studies with the goals of extending the crop’s harvest season and increasing the availability of locally produced off-season, fresh blueberries in the market.

Bi, a plant and soil sciences research professor in the Mississippi Agricultural and Forestry Experiment Station (MAFES), began one project in 2019 to develop sustainable production practices to extend the blueberry harvest season and enhance berry yield and quality in high tunnels with southern highbush cultivars.

“High tunnels can extend the production season and help reduce the risk of frost damage,” Bi said. “Due to the exclusion of rain, high tunnels can also help reduce disease pressure and improve blueberry fruit quality.”

In a second study, which began in late 2020, she hopes to identify suitable substrate and sustainable management

strategies to optimize nutrient-use efficiency, minimize environmental contamination, and reduce blueberry production costs.

Researchers use two high tunnels in these projects, each with about 200 plants, at the MAFES R. R. Foil Plant Science Research Center on the MSU campus, commonly known as North Farm.

“Container production provides the flexibility of utilizing soilless substrate and adjusting substrate pH to meet plants’ needs,” Bi said. “Soilless substrate is another cost for growers, so we want to look at something that is not expensive, locally available, and renewable.”

One potential substrate is pine bark. Assisted by graduate student Samantha Burchwell, Bi and Dr. Tongyin Li, an assistant professor in the College of Agriculture and Life Sciences (CALS) Department of Plant and Soil Sciences, spent much of 2021 testing substrates with different percentages of

aged pine bark to see how they affect blueberry growth, yield, and quality.

“Nutrient management is an essential part of sustainable agriculture,” Bi said. “Developing efficient practices to optimize nutrient-use efficiency and improve blueberry yield and quality will help reduce excessive fertilizer use, protect our environment, reduce grower production cost, and improve grower profits.

“Our research found that there is great potential to produce early-season blueberries in high tunnels using early-fruiting southern highbush cultivars,” she added. “The peak harvest in our study was from mid-April to mid-May, about 4 to 6 weeks earlier than the traditional field blueberry production in Mississippi using rabbiteye cultivars. This will allow growers to sell blueberries at a higher off-season price and increase profits.”

Bi and Li are also analyzing blueberry antioxidant activity, total phenolics and flavonoids (beneficial metabolites found in plants), and anthocyanins (pigments that give fruits their colors).

“We are conducting postharvest assessment of fruit quality and shelf life,” Li said. “We are collecting data on plant growth, time of berry harvest, and yield, as well as fruit quality, including berry size, color, firmness, titratable acidity, and sugar content.”

The projects, which conclude in 2022, are supported by the Mississippi Department of Agriculture and Commerce Specialty Crop Block Grant program, MAFES, and the CALS Undergraduate Research Scholars Program.

BY NATHAN GREGORY

# Reclaimed Wood

Offers Beauty and Other Advantages

Mississippi State researchers who would rather see old wood repurposed than sent to a landfill are addressing some of the unique challenges of using reclaimed wood in new building projects.

Challenges range from dealing with insects that emerge from reclaimed wood to determining how to value rough timbers salvaged from demolition projects. The depth of beauty and uniqueness of finished products made with reclaimed wood make it worth the effort.



Reclaimed wood is salvageable raw material from sources such as fence posts, abandoned buildings, and trees cut down in metropolitan areas, said Mia Craig, who is pursuing a master's degree in sustainable bioproducts in the MSU College of Forest Resources (CFR).

"The value of reclaimed wood depends on who is asked," Craig said. "From a market perspective, the answer is price. For a consumer, the value might be quantified based upon wood species. Some species are more desirable than others, especially the wood from species we can no longer cut or harvest."

Craig is conducting a survey that examines consumer perceptions of reclaimed wood from wood-frame deconstruction. She is also developing a case study of three major cities in the U.S. that have urban wood programs. The goal is to determine how such a program could be implemented in Mississippi.

Dr. Rubin Shmulsky is head of the CFR Department of Sustainable Bioproducts. His perspective on reclaimed wood comes from working with it himself, assisting on technical issues related to its use, and overseeing graduate work in the department.

He said reclaimed wood tends to have a high cost because of the labor involved, but that cost could go down as more people offer reclaiming services.

"Growing trees and cutting, drying, and milling them is cost-effective, partly because there is a lot of automation in this industry," Shmulsky said. "Taking old houses down carefully is a lot more hands-on and requires skilled labor and time. For those who have a feeling of environmental responsibility or those who love timber with a story, that adds value to houses and helps justify the cost of the material."

Shmulsky said reclaimed wood can cost about the same as freshly milled lumber, or it can cost more than twice as much.

Dr. Beth Stokes examines reclaimed wood for termite damage and deterioration.

"The variation in price depends on species, size, the associated story and the market," he explained. "In many cases, there is no comparison. For example, lumber claimed and resawn from old American chestnut beams from an existing barn is rare and not easily replaceable. When that type of product becomes available, it commands a premium.

"Other examples include wide pecky-cypress lumber reclaimed from salvaged, sunken logs, and old growth Southern pine or heart pine," he said. "Alternatively, 1-inch-thick softwood lumber that's removed from an old building, denailed, planed, and offered for sale may be much closer in price to freshly milled lumber based on its relatively abundant availability."

Dr. Beth Stokes, an assistant professor in the Department of Sustainable Bioproducts, is conducting long-term testing of treated wood products in various real-life conditions. Her work to prevent termite infestations has revealed what makes wood attractive to these destructive pests.

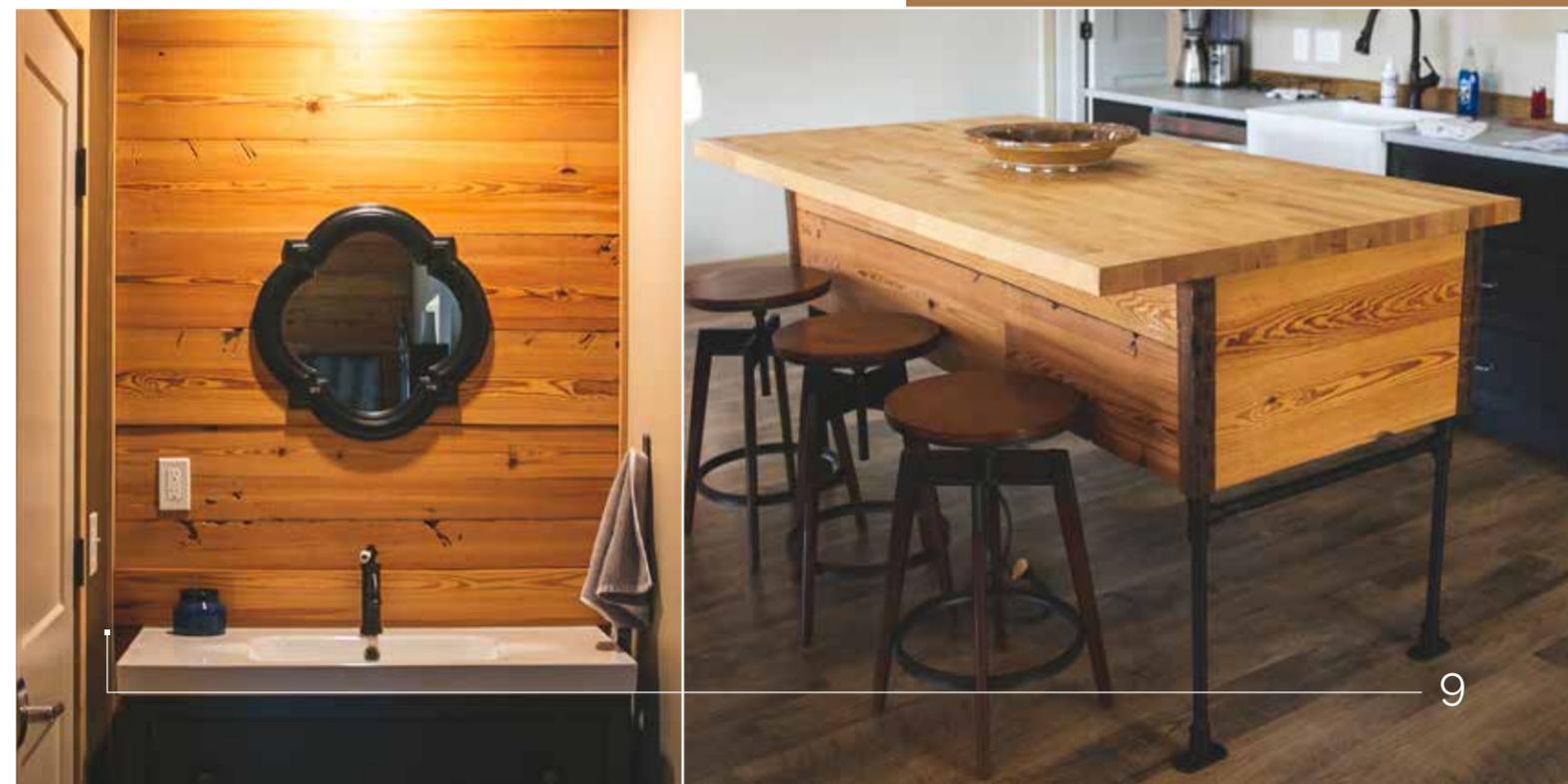
"Termites like wood that has a bit of age on it," Stokes said. "They preferentially go to the easiest avenue of attack."

Fortunately for those who want to use reclaimed wood, Stokes said much of it is heartwood, which is dense and difficult for termites to process.

BY BONNIE COBLENTZ • PHOTOS BY MICHAELA PARKER

"Taking old houses down carefully is a lot more hands-on and requires skilled labor and time. For those who have a feeling of environmental responsibility or those who love timber with a story, that adds value to houses and helps justify the cost of the material."

DR. RUBIN SHMULSKY



Proactive Monitoring Ensures the

# Safety of U.S. Food Supply



“This is all about being defensive—being proactive—and making sure the food supply is safe. The U.S. does a tremendous job of protecting its food supply, and the idea of this cooperative effort is to make sure consumers are confident in their food supply.”

DR. DARRELL SPARKS



Research associate Jessi Collier performs a liquid extraction for pesticide detection in the Mississippi State Chemical Laboratory.

Since preventing a problem is better than recovering from one, Mississippi State has partnered with state and federal agencies to conduct surveillance on agricultural commodities before they enter the food supply.

The goal is to enhance the safety of the human food and animal feed infrastructure in the state. Awareness of this need came in the nationwide post-9/11 assessments of potential weaknesses. The work is being funded by a \$2.19 million Food Safety Integration grant from the Food and Drug Administration.

Dr. Darrell Sparks, Mississippi Agricultural and Forestry Experiment Station scientist, interim state chemist, and director of the Mississippi State Chemical Laboratory, said the issue being addressed is the possibility that contaminants can unintentionally enter the food chain during crop production.

“This is all about being defensive—being proactive—and making sure the food supply is safe,” Sparks said. “The U.S.

does a tremendous job of protecting its food supply, and the idea of this cooperative effort is to make sure consumers are confident in their food supply.”

The Food Safety Modernization Act of 2011 greatly expanded the scope of the FDA’s inspection of human food and animal feed. The rationale was that what goes into animal feed eventually becomes human food. In 2020, MSU entered a 5-year cooperative agreement to take food defense another step forward.

“We cast a wide net to determine where the minor problem areas are occurring so they don’t expand and become health issues,” Sparks said.

The Mississippi State Chemical Laboratory was accredited under ISO/IEC 17025 to meet FDA’s standards in November 2016 and then updated to the current accreditation standard in 2020. Sparks said this accreditation provides the assurance that calibration and testing laboratories are delivering good services and consistent data. Most labs must hold accreditation in order to be deemed technically competent.

“As part of this cooperative agreement, we have worked with the FDA to select hazard-commodity pairs, and then we test those that have been identified as potentially posing a threat,” Sparks said.

One example of a hazard-commodity pair is aflatoxin and corn. Corn waiting for harvest can grow the mold that produces aflatoxin under conditions such as drought or insect damage. Sophisticated equipment tests for the presence of aflatoxin in corn, and any grain where an unsafe level of aflatoxin has been detected is rejected.

“Damaged crops lead to mold growth, and the resulting aflatoxin can end up in animal feed,” Sparks said. “When an animal eats corn infected with aflatoxin, it affects the health of the animal. If a dairy cow eats it, it can be expressed as another type of aflatoxin that shows up in the milk. Dairy farmers have to waste that milk, because you don’t want any aflatoxin making it into the human food supply.”

Other hazard-commodity pairs are related to the substances a growing plant can uptake in the field.

“Farm chemicals approved for use in food crops are safe when used appropriately,” Sparks said. “That doesn’t mean we don’t need a system in place to monitor them.”

This surveillance helps prevent recalls by testing commodities before they enter the food supply, said Dr. Ashli Brown, DAFVM associate vice president and professor in the College of Agriculture and Life Sciences Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology.

“We have one of the safest food supplies in the world, and this program makes it that much better,” Brown said. “It allows us to work with producers to rectify a problem before it even gets in the system. And because it is a partnership between federal and state agencies, we are able to use our resources efficiently because we are coordinating investigations and working together.”

BY BONNIE COBLENTZ • PHOTOS BY MICHAELA PARKER

## Research Helps Make the Case for Cormorant Control Changes



Adobe Stock

Using research conducted by MSU scientists to make their case, the U.S. Congress has introduced legislation proposing to increase the flexibility catfish farmers have in protecting their farms from predatory birds.

A 5-year economic analysis concluded that double-crested cormorants cost the catfish aquaculture industry more than \$64 million per year in fish losses and expenditures for equipment and labor used to scare the birds away from ponds.

Both the Senate and the House of Representatives have introduced the Cormorant Relief Act, which would loosen regulations on farmers' use of lethal measures to control the predatory birds if passed.

Dr. Ganesh Kumar, a Mississippi Agricultural and Forestry Experiment Station aquacultural economist based in the Thad Cochran National Warmwater Aquaculture Center at the Delta Research and Extension Center in Stoneville, was one of the key researchers in this study. Farmers have to use nonlethal bird-scaring tactics before they can resort to lethal measures. Lethal cormorant control requires a permit that stipulates the limits on how many birds can be taken under the Migratory Bird Act.

"The cost of bird damage management was negligible before cormorant populations began increasing exponentially, so, up until 2007, it didn't appear in production budgets," Kumar said. "Now, if you put the amount and manpower

spent together, it is the fifth largest cost in catfish farming behind feed, fingerlings, labor, and electricity. It is a very significant economic issue on most catfish farms."

Most expenses related to bird patrolling are fixed costs. If producers do not raise large volumes of fish, they struggle to break even after covering the fixed costs associated with avian predator control.

"Commercial operations—mostly family-run farms—spent about \$285 an acre on bird dispersal," Kumar said. "If you don't produce enough fish and generate sufficient revenue to cover all costs, the producer loses money."

Kumar collaborated with Dr. Brian Dorr, a wildlife biologist with the U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services program. The National Wildlife Research Center, the research unit of the Wildlife Services program, has a field station in Starkville. It has an agreement with the Mississippi Agricultural and Forestry Experiment Station to fund an aquaculture unit at the H. H. Leveck Animal Research Center.

**“Commercial operations—mostly family-run farms—spent about \$285 an acre on bird dispersal. If you don't produce enough fish and generate sufficient revenue to cover all costs, the producer loses money.”**

DR. GANESH KUMAR

consumption goes way up. So, these techniques are working to reduce the consumption. I think where all of this is heading is determining the best level of management or the most economically efficient way to reduce bird predation and maximize harvest."

BY NATHAN GREGORY

Dr. Ganesh Kumar, shown next to a catfish pond at the Delta Research and Extension Center, studies the cost of cormorant damage to the aquaculture industry. (Photo by Kevin Hudson)



CVM student Callie Ward spent weeks caring for Buddy.

# Buddy the Dog

Recovers under Intensive CVM Care

**M**ultiple, in-house specialists and 24-hour care prepared Buddy the dog to walk out of Mississippi State University's College of Veterinary Medicine with tail wagging 16 weeks after being admitted with severe burns.

Two-year-old Buddy, a yellow Labrador retriever mix, came to CVM April 26 after being intentionally burned April 22 in Tate County, Mississippi. He had second to fourth degree burns on about 5 percent of his body, primarily his face, forehead, ears and right front leg.

"He was stable when he arrived, and other than the burns, his physical exam was pretty normal," said Dr. Betsy Swanson, CVM's soft-tissue surgeon and Buddy's primary physician. "He was bandaged and painful on his face, but he still gave kisses."

When neighbors found him stumbling up the street with an electrical cord wrapped around his neck, they called for help. The local humane society took Buddy to the Horn Lake Animal Hospital for emergency care before he was transported to Stateline Animal Clinic in Southaven.

These facilities stabilized him, providing pain medication, antibiotics, fluids, and wound care. That Monday morning, he was transferred to CVM for specialized care.

"One of my main clinical and research interests is wound healing and management of chronic wound infections," Swanson said. "This definitely came into play for treating a severe burn."

CVM staff began the hard work of removing charred skin and allowing the wounds to heal.

"His face was burned from the front part of his ears and his forehead to just behind his nose down to his upper lips on each side," Swanson said. "He must have closed his eyes tight, but his eyelids and the tear glands that in part keep his eyes moist were damaged."

Veterinarians applied the skin of North Atlantic cod to the burns on his face and ears. The cells are removed from this product—made for both humans and animals—leaving a matrix of tissue. When placed on a burn, the body's own tissue fills in, incorporating the fish skin into the healing area over about a week.

Buddy had five layers of fish skin grafted onto his face. The manufacturer, Kerecis Vet, donated all of the skin grafts used in Buddy's wound care.

"Once we did the first graft over his wounds, his pain was significantly reduced," Swanson said. "When he first came in, we had to put him under anesthesia every day to change his bandages. He was on three different injectable meds to keep his pain under control."

The skin grafts were successful, and Buddy's outer skin, or epithelium, began to close over the wounds. Hair regrew in places.

"Worst case, he will have a bald patch in the same areas that Labs go gray," Swanson said. "He will need sun protection or a hat. Buddy will also need artificial tear drops to keep his eyes properly moistened."

"The new skin around and between his eyes is fragile and has been prone to be damaged easily," she said. "It was the last place to heal, and we hope that it will not be a long-term issue."

During his long recovery, Buddy's entire head was covered in protective bandages, meaning Buddy was unable to see for months.

"At first, he would put his chin in our hand and come with us when we called him," Swanson said. "Later, he would put

his neck on your leg in the heel position and walk when you walked. He learned how to run and play in his outdoor area."

Callie Ward, a third-year veterinary student from Live Oak, Florida, cared for Buddy for 6 weeks. She spent hours a day with him, from breakfast and a morning walk through his physical exam and catheter care until supper and his nighttime routine.

"Physically, I did activities to help him grow stronger such as long walks and learning to step up and down from sidewalk ledges," Ward said. "Emotionally, I focused on enrichment activities to keep his mental health in balance, such as playing with a chew toy that has cheese, learning new tricks, and

cuddling in his kennel while I did paperwork."

Buddy was Ward's first case as a clinical student, and meeting the challenges of his care made her more confident.

"Through him, I learned more than I ever thought possible about pain management, wound care, bandaging techniques, surgeries, patient care, and more," Ward said. "Caring for Buddy helped me make strong mentorships with faculty, and Buddy has helped me realize that I can go any direction I want to in the veterinary industry."

The severity of his burns meant Buddy had a long hospital stay, but his

recovery was smooth. Thanks to immediate, excellent local emergency care, CVM specialists were able to prevent infection and keep Buddy appropriately nourished, hydrated, and healthy.

His CVM team included faculty, residents, and students from anesthesia, ICU, ophthalmology, and radiology. The bill exceeded \$40,000, paid for by the Tunica County Humane Society with donations from kind-hearted people nationwide.

By November, Buddy remained in foster care while learning house manners and returning to CVM for bandage changes.

BY BONNIE COBLENTZ • PHOTOS BY TOM THOMPSON



Third-year veterinary student Sophie Mauldin (left) and Dr. Betsy Swanson spend time with Buddy at the College of Veterinary Medicine.

# Club Advances Meat Science

## Recruitment and Outreach

Corbin Fornes arrived at Mississippi State University in 2019 with one goal: to become a veterinarian.

But his path changed when he met Dr. Derris Devost-Burnett and Dr. Thu Dinh in the meat chemistry and cuisine course. The class teaches students the anatomy, biology, and chemistry of the animal muscles that become meat.

“These professors fueled the flame that I had for meat science, which started in high school on my FFA meat judging team,” said Fornes, a junior from St. Cloud, Florida. “Initially, I only wanted to take the meat chemistry and cuisine course to gain some background knowledge for one of my other upcoming classes. But it had a much more significant impact on me.”

Devost-Burnett, a meat scientist and biologist, and Dinh, a meat scientist and chemist, teamed up to create the course shortly after Devost-Burnett began teaching at MSU in 2015. Both are associate professors in the College of Agriculture and Life Sciences Department of Animal and Dairy Sciences. At the time, they didn’t realize they were creating more than a class.

“The whole process—from conception to consumption—of how muscles become meat is interesting to me,” said Devost-Burnett. “I also like to cook and hang out by the grill, and I thought food would be a good way to teach students about the different muscles and the science behind their makeup and how that affects the best way to cook and enjoy meat.”

“We have a dearth of students in this field and a lack of diversity. The course and the club have been a good way to connect with people.”

DR. DERRIS  
DEVOST-BURNETT



Dr. Thu Dinh (left), Devost-Burnett, and a student run tests in a meat science laboratory.

Dr. Derris Devost-Burnett (left) and Corbin Fornes



“We call it the ABC curriculum: anatomy, biology, and chemistry,” he said. “Understanding how all these things work together helps you when you cook a piece of meat. Cows don’t have a collarbone, so the brisket helps support the chest area. It’s very muscular. You can cook it quickly, but it’s going to be tough.”

At the end of the class, students participate in a cooking contest to demonstrate what they’ve learned. They choose any cut of beef, lamb, pork, or goat; process it themselves at the Mississippi Agricultural and Forestry Experiment Station Meat Science and Muscle Biology Laboratory; and then cook it. Students enjoyed the class so much that they began asking how they could stay involved. So, Devost-Burnett and Dinh started the Meat Chemistry and Cuisine Club.

The club is more than an extracurricular activity. It has been a catalyst for recruitment and outreach for the department on campus and throughout the country. With their mobile cooking and educational unit, the club caters events, attends field days, and visits high schools. Devost-Burnett has also done distance education programs for other universities.

“As a recruitment and outreach tool, it’s been great,” Devost-Burnett said. “It’s a good way to fill the gap. We have a dearth

of students in this field and a lack of diversity. The course and the club have been a good way to connect with people. Eating is always a sure way to connect with people.”

Like Fornes—who now plans to study meat science in graduate school and one day have a career as an industry professional, teacher, or researcher—other students have changed majors or chosen a major because they took the class and got involved in the club.

“This course is open to any student who wants to take it; it’s not just for those studying animal and dairy science,” Devost-Burnett said. “It allows for nontraditional students to foray into this field. They get an understanding that in this field you’re not just a glorified butcher. It is a respectable career and an important one.”

Even if students don’t choose a career in animal and dairy science, Devost-Burnett said they’ve learned the truth behind the industry.

“Their participation creates advocacy outside the livestock arena,” he said. “These students may go on to become policy makers, lawyers, and teachers, and they can influence how this industry is perceived.”

BY SUSAN COLLINS-SMITH • PHOTOS BY KEVIN HUDSON



# Testing the Limits

## Study Examines Sensor Placement, Density

Mississippi State scientists recently completed a 3-year study that will help northeast Mississippi farmers better manage crop irrigation with center pivots.

Dr. Mary Love Tagert, an associate Extension professor and researcher in the Department of Agricultural and Biological Engineering, led the project that used sensors to evaluate the change in a field's soil moisture over time.

"Our goal was to develop better guidelines for producers on how many sets of soil-moisture sensors may be needed in any given field," Tagert said. "We discovered that even in smaller fields, if you have differences in elevation and soil texture, you really need to use more than one set of sensors."

Although a growing number of Mississippi farmers use soil-moisture sensors, many follow the general recommendation to place sensors every 80 to 100 acres. The MSU study provided information that will lead to more accurate recommendations on how and where to place sensors.

"In the 44-acre field we monitored, the data led us to recommend using four sets of sensors," Tagert said. "Under center-pivot irrigation, you should place one set right ahead of the pivot start point and another set at the end of the pivot, as

these locations will be the driest and wettest parts of the field, respectively, after irrigation is completed. We found that certain areas of this field consistently dry out faster than other areas, and there is one section that always stays wet longer."

As soil begins to dry out, moisture varies more across the field than when soil is completely wet. Soil texture affects how much moisture is retained. This study found that elevation can also significantly impact moisture levels, even in a field with homogenous soil.

These factors are important when deciding when to irrigate, what part of the field to irrigate, and how much water to use, Tagert said.

Using results from the study, farmers can determine how many sensors to install in a field by using public data tools, she added. Soil data and information are on the U.S. Department of Agriculture Natural Resources Conservation Service soil survey website at <https://bit.ly/3jM1QoX>. Topographic maps for Mississippi are available on the Mississippi Automated Resource Information System (MARIS) website at <https://bit.ly/3hiR0Uc>.

Soil-moisture sensors vary in cost and features, but Tagert said the use of just a few basic sensors can save time and money.

"With the water and energy they can help save, sensors usually pay for themselves and then some," she said. "If farmers are limited in the number of sensors they can purchase, they should place them in the areas that represent the majority of the field."

Dr. Dennis Reginelli, executive director of the Mississippi Soybean Promotion Board and retired MSU Extension agronomist, said irrigation research focused on center-pivot application is lacking in northeast Mississippi.

"We supported and participated in this study because we knew it was a good match to address the gap in data on center-pivot irrigation and soil-moisture sensor placement," Reginelli said. "Irrigation is a key element for farmers, and we know this will help them make more precise decisions about irrigation."

Blade Hodges, who worked on the project as a graduate student in the College of Agriculture and Life Sciences, was interested because of the value the research provides farmers.

"Farmers in this area of the state rely a lot on water-storage systems, so they have to be sure they are using that water wisely and in the most effective way," Hodges said. "This research helps them understand how to use soil-moisture sensors to help them conserve water and not run out."

The study was funded by the Mississippi Soybean Promotion Board and Southern Sustainable Agriculture Research and Education, a grants and outreach program of the U.S. Department of Agriculture National Institute of Food and Agriculture.

BY SUSAN COLLINS-SMITH • PHOTOS BY MICHAELA PARKER

"With the water and energy they can help save, sensors usually pay for themselves and then some."

DR. MARY LOVE TAGERT



Dr. Xuefeng Zhang (left) and Dr. Yunsang Kim measure a piece of their PCM-LRPU composite.



## New Construction Composite Can Conserve Energy

Lignins provide structure for the cell walls in most of the world's plants, and they may soon also be providing a similar service in the walls of buildings after the development of a new energy-saving construction foam at Mississippi State.

Production of this biobased composite is divided into two steps: (1) synthesis of lignin-based rigid polyurethane (LRPU) foam with the cell-wall pores; and (2) incorporation of phase change material (PCM) as an energy-saving component into LRPU to produce a PCM-LRPU composite.

Dr. Xuefeng Zhang, an assistant research professor in the Forest and Wildlife Research Center Department of Sustainable Bioproducts, began developing a lignin-based rigid polyurethane foam in 2017. A year later, he and Dr. Yunsang Kim, also an assistant professor of sustainable bioproducts, discovered the presence of cell-wall pores in the cell walls of the foam. In 2020, they produced the first PCM-LRPU composite.

"The composite can be sandwiched with wood panels to produce an ordinary wood sandwich panel, which is called a structural insulated panel," Zhang said. "With PCM storing and releasing thermal energy via latent heat through a phase transition, a sandwich panel made with our PCM-LRPU foam could serve as a thermal-regulation material for buildings."

Energy savings is not the only benefit the new composite offers. Evaluations of the synthetic foam's mechanical and thermal properties showed its sustainability and effectiveness as a load-bearing component in structures.

"The compressive strength of PCM-LRPU is comparable to a commercial rigid polyurethane foam," Kim said. "When the PCM solidifies around and below room temperature, PCM-LRPU exhibits approximately one order of magnitude higher compressive strength than the commercial foam."

Sandwich panels containing the PCM-LRPU foam can be used as structural walls and opaque building envelopes—the barriers that help maintain comfortable indoor conditions. Zhang said the panels can be prefabricated and brought to a construction site for assembly and installation as components for buildings.

**“We think this composite can save energy consumption for cooling and heating in buildings year-round.”**

**DR. XUEFENG ZHANG**

"When outside temperature goes above the melting temperature of PCM, the solid PCM will go through a solid-to-liquid phase transition, which will, in turn, absorb surrounding heat and delay the heat transfer from outside to inside and keep the inside of a building cool," Zhang said. "When the temperature goes down, PCM-LRPU will release heat via a liquid-to-solid phase transition to keep the building warm. We think this composite can save energy consumption for cooling and heating in buildings year-round."

This research is published in *ACS Applied Energy Materials*, but the long-term goal for this new construction material is mass production.

"There is still a lot of work to be done to reach that level since most of the process has been at laboratory scale," Kim said. "We are in contact with companies who might be interested in bringing this new building material into the market. The polyurethane chemical companies and structural insulated panel companies would be able to mass produce this new material for public use if they see fit."

"Given its energy saving potential, however, it should be noted that there should be many factors involved when it comes to the widespread application of the PCM-LRPU foam into structures, including heat transfer rate, thermal reliability, price, safety, and manufacturability," he added.

BY NATHAN GREGORY • PHOTO BY KEVIN HUDSON



“We want to make conservation and environmentalism more inclusive because it impacts us all.”

MORGAN ALEXANDER

# Culture and Conservation

## Graduates Seek to Educate with Natural Resources Podcast



Makayla Brister (left) and Morgan Alexander prepare to produce an episode of their *Culture and Conservation* podcast.

**M**akayla Brister and Morgan Alexander are passionate about conservation and have a mission to educate others about natural resources and career opportunities in the field.

Graduates of the MSU College of Forest Resources (CFR), they have long shared conservation-related information on social media. Recently, they decided to expand these efforts with the *Culture and Conservation* podcast so they could discuss topics in depth.

“We wanted a way to give people more information about different conservation topics because conservation can’t happen without people,” Brister said. “But we also want to increase awareness about what careers you can go into in the natural resources field. We know there are a lot of people who love the outdoors but would never consider that as a career path because they just don’t know it’s a possibility.”

Brister and Alexander see wide-open opportunity in the field for minorities, especially Black women, and they intend

the podcast to be a catalyst for introducing more minorities to careers related to natural resources.

The duo chose topics for the podcast based on pop culture, trending subjects they see on social media, and conversations and questions with friends and family. They occasionally feature minorities who work in all types of careers in natural resources.

Brister and Alexander, who are from the Jackson area, spent much of their childhood outdoors interacting with nature in various ways, including fishing and working in the yard and garden. But their interest in natural resources was ignited when they saw television commercials showing wildlife rescued and rehabilitated after oil spills.

“I think we both saw those commercials and thought we would like that kind of job,” Brister said.

When they met as undergrads in a CFR class, the two instantly connected.

“We were two of four Black girls in the class,” Alexander said. “Our friendship flourished from there. We bonded over our love of conservation, but we were both excited to see someone else who looked like us. There just weren’t a lot of minorities in our classes.”

The podcast is a labor of love for the pair, who have been working to bridge the gap between minorities and

conservation as a career since they served as ambassadors for CFR as undergraduates.

“When we would go to recruitment events, students who would normally walk right past our table would stop because they saw us and our friend Murry,” Alexander said. “Even if they knew they were going to college to be teachers or something, they still opened up their minds to learn about conservation. But we did see an increase in the number of Black students who enrolled and graduated from CFR after us.”

“So, we’ve been bringing culture and conservation together since undergrad, and this has been meaningful work for us,” Alexander added. “Every culture has a unique connection to the natural world, and we want to make conservation and environmentalism more inclusive because it impacts us all.”

Brister is attending graduate school at MSU and studying precision-agriculture technology. Her research project focuses on helping farmers identify economic opportunities in conservation, such as converting land with consistently low yield into bobwhite quail habitat.

Alexander is an admissions counselor in the MSU Office of Admissions and Scholarships, where she helps with student recruitment, which includes conservation education on campus and in the community.

BY SUSAN COLLINS-SMITH • PHOTOS BY KEVIN HUDSON

Nelson McGough (left) and Dr. Jason Barrett

# SipSafe Program

## Tests Water in Early-Education Facilities

Lead is a naturally occurring element found in air, water, soil, and a variety of manufactured products, but high concentrations of the heavy metal can be harmful, especially for children.

MSU Extension, in partnership with the University of Mississippi and several state agencies, has embarked on a multiyear program funded by the Environmental Protection Agency to test for lead in childcare and school facilities that serve children from birth to 5 years.

Dr. Jason Barrett, associate Extension professor with the Mississippi Water Resources Research Institute (MWRRI), leads the project with input and support from the Mississippi Department of Health, Mississippi Bureau of Public Water Supply, Child Care Licensure, Mississippi Department of Education, Mississippi State Chemical Laboratory, University of Mississippi Sea Grant Law Center, University of Mississippi Lead in Drinking Water Team, and Lead Poisoning Prevention and Healthy Homes Program.

“Because young children’s brains are growing and developing, they are more at risk from elevated lead levels in drinking water,” Barrett said. “Lead poisoning can cause brain damage, learning difficulties, and delayed growth and development. The good news is that families and educators can take steps to prevent lead poisoning.”

Just as the program was slated to begin, the COVID-19 pandemic hit. Schools and many childcare centers closed, and those still open could not allow lead-testing teams into their facilities to draw water samples. However, SipSafe team members used the time to develop a curriculum for teachers to use, a 1-hour continuing education course for childcare providers, and a variety of educational publications to share with center directors, teachers, and families.

“While this EPA grant program is designed to establish a robust national program for lead testing in drinking water, they also understand how important it is to educate our clients, so they have been incredibly supportive of our Extension educational efforts,” Barrett said. “The steps for reducing exposure to lead in water are straightforward and can make a big difference for Mississippi’s children.”



Nelson McGough, an MWRRI research technician, travels across the state to run the sampling program. He sets out water-sampling materials just before testing sites close for the day, and he is the first person to run each faucet early the next morning. After laboratory testing on each sample, Nelson analyzes the data and prepares a report for the facility that includes the lead levels found in water drawn from each faucet.

“If lead levels are higher than the action level of 5 parts per billion, we work with the facility to figure out the cause and we suggest solutions,” McGough said. “In an ideal world, all of the old lead pipes would be replaced, but that may not be feasible due to the cost. It’s reassuring to know people can take much more cost-effective and simple steps to protect children’s health by simply flushing the water faucet each morning before using the water and using cold water for making baby bottles and cooking.”

For more information, visit <http://extension.msstate.edu/sipsafe>.

BY KERI COLLINS LEWIS • PHOTOS BY MICHAELA PARKER

“Because young children’s brains are growing and developing, they are more at risk from elevated lead levels in drinking water. The good news is that families and educators can take steps to prevent lead poisoning.”

DR. JASON BARRETT

# Carbon and Climate Collaborative (CCC)

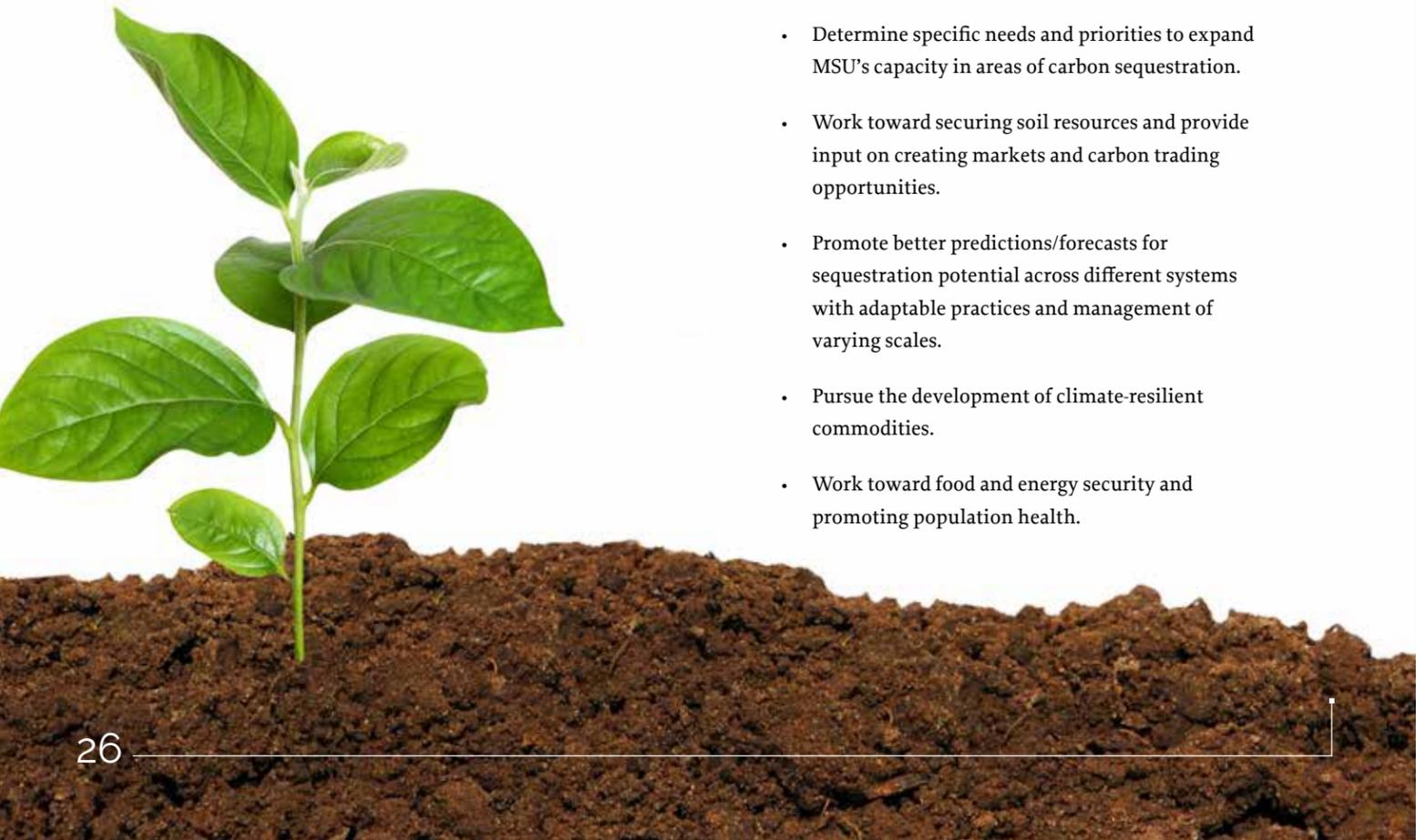
The Carbon and Climate Collaborative is a work group of research and Extension faculty across the College of Forest Resources and the College of Agriculture and Life Sciences with the goal of addressing issues for forest and agricultural land owners.

## Our Vision

Position MSU as a premier institution to support land, water, and energy management for profitability and sustainability in the agricultural and forestry sectors by providing research and Extension expertise on the impacts and opportunities of evolving climate challenges and emerging carbon/ecosystem service markets.

## Objectives

- Develop and sustain an interdisciplinary working group of research and Extension personnel to address landowner carbon sequestration and profitability potential.
- Engage stakeholders in education and research opportunities for carbon markets and ecosystem services.
- Determine specific needs and priorities to expand MSU's capacity in areas of carbon sequestration.
- Work toward securing soil resources and provide input on creating markets and carbon trading opportunities.
- Promote better predictions/forecasts for sequestration potential across different systems with adaptable practices and management of varying scales.
- Pursue the development of climate-resilient commodities.
- Work toward food and energy security and promoting population health.



The Strand Theatre is a historic landmark in downtown Kosciusko. It is being renovated to house a Native American museum and event space. (Photo by Michaela Parker)



## 1/82: Attala County

### MSU in Attala County:

715 Fairground Road  
 Kosciusko, MS 39090  
 attala@ext.msstate.edu  
 becky.hamilton@msstate.edu

<b>County seat:</b>	Kosciusko
<b>Population:</b>	18,477
<b>Municipalities:</b>	Sallis, Ethel, McCool, Kosciusko
<b>Communities:</b>	McAdams
<b>Industries:</b>	agriculture, steel, sheet metal, paper, petroleum, solar, construction, manufacturing
<b>Natural resources:</b>	minerals, water, forest
<b>Attractions:</b>	Attala County Courthouse, Kelly Statue in the City Cemetery, Charlie Musselwhite Blues Trail Marker, Kosciusko Information Center, Maple Terrace Inn, many historic homes, Delta Gamma Room, Mary Ricks Thornton Cultural Center, downtown murals, Choate's Stand on Natchez Street, Redbud Springs Park, Jason Niles Park, Hugh Ellard Park
<b>History notes:</b>	Kosciusko is the largest city on the Natchez Trace Parkway and the closest to it. The city is named after American Revolutionary War hero General Tadeusz Kosciuszko. During the War of 1812, General Andrew Jackson and his troops camped in Kosciusko on their way to the Battle of New Orleans. Attala was home to many Choctaw Indians who farmed and brought beef cattle to the area.
<b>Did you know?</b>	Kosciusko is the birthplace of talk show host, actress, and philanthropist Oprah Winfrey, legendary blues harmonica player Charlie Musselwhite, civil rights activist James Meredith, and famed musician Elmo Peeler.

“Attala County is a wonderful area in Mississippi that offers a diverse community and an array of amenities for everyone to enjoy. The small-town atmosphere and friendly people are sure to draw you in and make you feel welcome.”

BECKY HAMILTON, MSU Extension County Coordinator

*Editor's note: 1/82 is a regular feature highlighting one of Mississippi's 82 counties.*

# NewsNotes



VanderSchaaf

**Dr. Curtis VanderSchaaf**, former assistant professor at Louisiana Tech University, joined MSU Extension in the southwest region as a forestry specialist. He also is a faculty member in the College of Forest Resources (CFR) Department of Forestry. VanderSchaaf is a member of the Society of American Foresters and the forestry honor society Xi Sigma Pi.



Brown

**Dr. Ashli Brown**, a professor in the CALS Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, is the new associate vice president of the Division of Agriculture, Forestry, and Veterinary Medicine. Brown has served since 2013 as state chemist in the Mississippi State Chemical Laboratory.



Reddy

**Dr. K. Raja Reddy**, a research professor in the CALS Department of Plant and Soil Sciences, William L. Giles Distinguished Professor, and MAFES research scientist, was named a fellow of the Mississippi Academy of Sciences.



Khaita

**Dr. Margaret Khaita**, a professor in the College of Veterinary Medicine Department of Pathobiology and Population Medicine, was appointed to the One Health High-Level Expert Panel, which advises the Food and Agriculture Organization of the United Nations, World Organization for Animal Health, United Nations Environment Program, and World Health Organization.



Green

**Dr. John J. Green**, an MSU alumnus, is the new director of the Southern Rural Development Center headquartered at Mississippi State. He was formerly a professor of sociology and senior research associate with the Center for Population Studies at the University of Mississippi.



Sparks

**Dr. Darrell Sparks**, an associate professor in the CALS Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, has been named interim state chemist and director of the Mississippi State Chemical Laboratory.



Bachman

**Dr. Gary Bachman**, Extension horticulturist and MAFES scientist in the Department of Plant and Soil Sciences stationed at the Coastal Research and Extension Center, won the 2021 best column award for *Southern Gardening* from the American Society of Horticulture Science.



Buys

**Dr. David Buys**, Extension health specialist and associate professor in the CALS Department of Food Science, Nutrition, and Health Promotion, was honored for excellence in research by NE:1939, a multistate research group focused on improving the health span of aging adults.



Demarais

**Dr. Steve Demarais**, Taylor Chair in Applied Big Game Research and Instruction in the CFR Department of Wildlife, Fisheries, and Aquaculture, received the Caesar Kleberg Award for Excellence in Applied Wildlife Research from the Wildlife Society.



Stone

**Dr. Amanda Stone**, an assistant professor in the CALS Department of Animal and Dairy Sciences, has been elected vice president of the American Dairy Science Association's Southern Branch. Stone is the Extension dairy specialist and a scientist in the Mississippi Agricultural and Forestry Experiment Station (MAFES).



Chang

**Dr. Sam Chang**, a professor in the CALS Department of Food Science, Nutrition, and Health Promotion, won the MAFES Excellence in Research Faculty Award, which is sponsored by the Mississippi Land Bank. Chang is director of the Mississippi Center for Food Safety and Postharvest Technology and the MAFES Experimental Seafood Processing Laboratory.



Walne

**Charles "Hunt" Walne**, an agronomy doctoral student in the CALS Department of Plant and Soil Sciences, received the 2021 Outstanding Student Manuscript Award from the Mississippi Academy of Sciences. Walne's research focuses on the interaction between plant genetics, crop management practices, and environmental stressors.



Devost-Burnett

**Dr. Derris Devost-Burnett**, an assistant professor in the College of Agriculture and Life Sciences (CALS) Department of Animal and Dairy Sciences, will serve as national secretary for Minorities in Agriculture, Natural Resources, and Related Sciences, a society focused on promoting academic and professional advancement by empowering minorities.



Knight

**Dr. Patricia Knight**, a research professor at the MAFES South Mississippi Branch Experiment Station and director of coastal horticulture research, was named a fellow of the American Society for Horticultural Science.



Dinh

**Dr. Thu Dinh**, a MAFES scientist and associate professor in the Department of Animal and Dairy Sciences, received the 2021 American Meat Science Association Achievement Award.



Spencer

**Dave Spencer**, an agronomy doctoral student in the CALS Department of Plant and Soil Sciences, received the Gamma Sigma Delta International Graduate Student scholarship. Spencer's research involves conservation practices, such as cover crops and reduced tillage, and their effects on irrigation efficiency and off-site agrochemical transport in corn production.

# DevelopmentCorner

Endowed Scholarship Honors

## Legacy

of Thornton and Magnolia Pinkston Miller

Thornton and Magnolia Pinkston Miller taught their family the importance of education and helped to make sure the children in their extended family had an opportunity to pursue a formal education.

Through the Thornton and Magnolia Pinkston Miller Endowed Scholarship in the MSU College of Agriculture and Life Sciences (CALs), the couple's contributions as prominent farmers, entrepreneurs, and philanthropists in the Bayland Community of Yazoo County will continue to benefit others.

"Uncle Thornton and Aunt Mag, as we affectionately called her, were wonderful people," said their niece Ann Smith. "They loved their community, and they instilled in their family a love of learning, enduring moral and spiritual values, strong work ethic, and humanitarian spirit.

"Biologically, they didn't have any children of their own," she said. "But we were all their children. All of us say that Aunt Mag and Uncle Thornton were very influential in our lives, educations, and careers."

Family members who have found success in various careers, including agriculture, education, and broadcast media, owe a lot to their aunt and uncle who encouraged and mentored them through the years, Ann Smith said.

"We wanted their legacy to live on in some way," said their grandniece Donna Michelle Smith. "We felt like they would want us to pay it forward. So, we knew funding an academic scholarship at Mississippi State University was one of the best things we could do to honor them."

Born in 1885 and 1901, respectively, Thornton and Magnolia Pinkston Miller farmed the land Thornton Miller inherited from his father. They raised row crops, livestock, and various types of produce.

"They had cotton, chickens, cows, goats, geese, fruit trees, pecan trees, and all different kinds of things," Ann Smith said. "They worked the land until they were no longer able, and then they rented it out to other farmers in the community."

In addition to farming, the couple owned a small grocery store in the community, where Magnolia Miller was the store clerk.

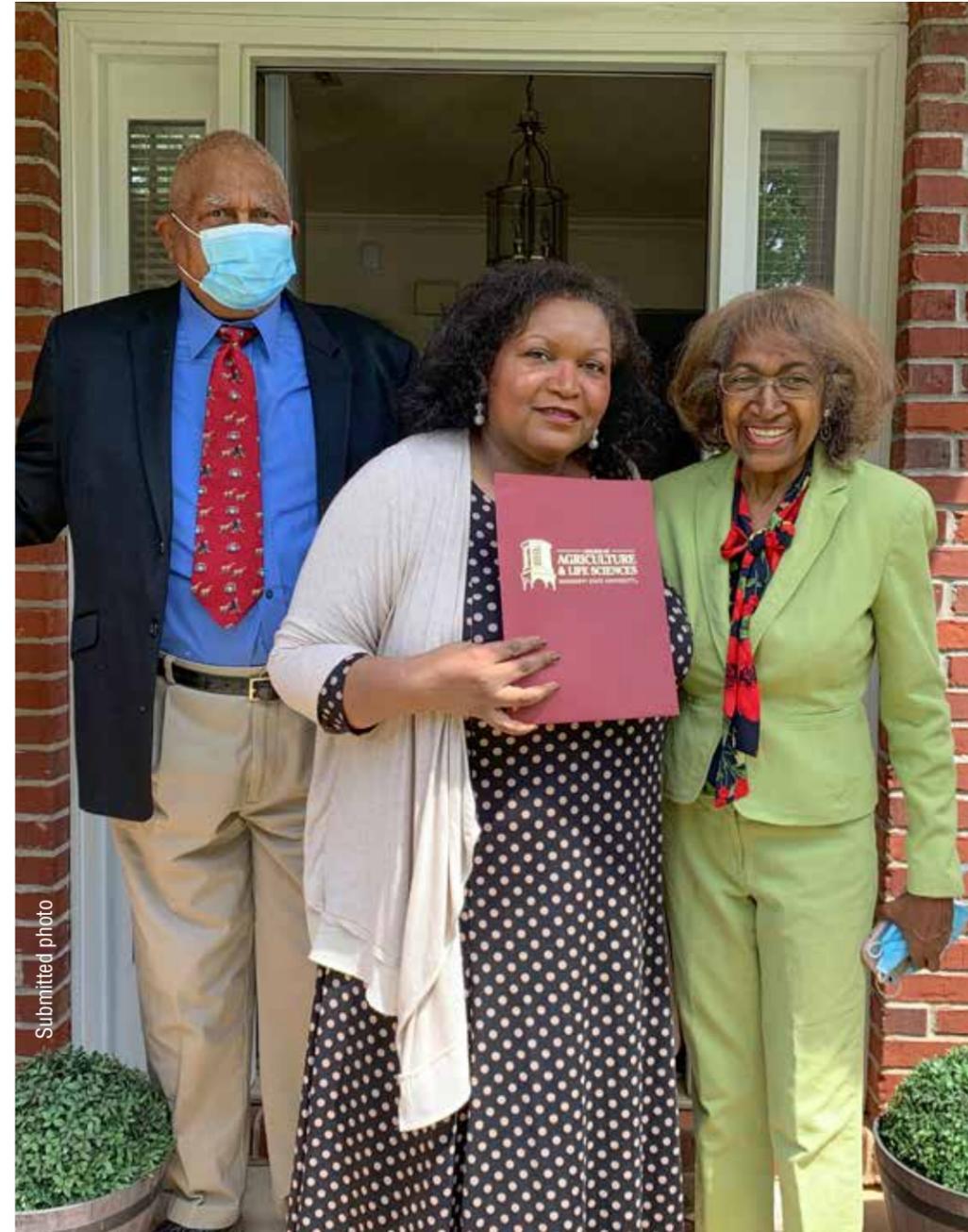
"She was known for allowing customers to purchase items on credit," Ann Smith said. "Of course, if she knew they were in dire need, she often did not collect outstanding payments."

Although neither of them earned degrees, both understood the importance of education and supported W. A. Campbell Elementary School, among other educational institutions. They were also active in New Foundation Baptist Church.

The Thornton and Magnolia Pinkston Miller Endowed Scholarship will be awarded annually to a full-time student in the College of Agriculture and Life Sciences. A Black or African American student from Yazoo County or Humphreys County will receive priority. However, if no Black or African American student qualifies, any student who meets the other qualifications will be considered.

To learn how to contribute to this or other endowed scholarship funds, contact Will Staggers, director of development for CALs, the MSU Extension Service, and the Mississippi Agricultural and Forestry Experiment Station, at (662) 325-2837 or [wstaggers@foundation.msstate.edu](mailto:wstaggers@foundation.msstate.edu).

BY SUSAN COLLINS-SMITH



“We wanted their legacy to live on in some way. We felt like they would want us to pay it forward. So, we knew funding an academic scholarship at Mississippi State University was one of the best things we could do to honor them.”

**DONNA MICHELLE SMITH**

Donna Michelle Smith (center) with her parents, Don and Ann Pinkston Smith, proudly created a scholarship in honor and memory of their beloved family members Thornton and Magnolia Pinkston Miller.

**JIMMY KIGHT**

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For more information on giving in support of Mississippi State University, visit the MSU Foundation website.

[msufoundation.com](http://msufoundation.com)



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Tupelo, MS 38801

With 28,000 acres of commercially grown sweet potatoes, Mississippi ranks second nationally in acreage of the crop. These sweet potatoes were harvested in September in Chickasaw County. (Photo by Kevin Hudson)

