MISSISSIPPI LANDMARKS

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MISSISSIPPI STATE UNIVERSITY

DIVISION OF AGRICULTURE, FORESTRY, AND VETERINARY MEDICINE

RESEARCH, EDUCATION, AND EXTENSION

MISSISSIPPI
LANDMARKS

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VICE PRESIDENT'S LETTER

Each spring, when the daffodils bloom across the MSU Starkville campus, we are reminded that after the dark days of winter, light returns. As we mark the 1-year anniversary of the beginning of a period unlike any other in our nation's history, we see signs of hope and reasons for gratitude in the Division of Agriculture, Forestry, and Veterinary Medicine.

I am pleased to announce the selection of a new DAFVM vice president after a national search was conducted by Provost David Shaw. Please join me in congratulating Dr. Keith Coble, William L. Giles Distinguished Professor and head of the Department of Agricultural Economics. Dr. Coble, who has been an MSU faculty member for more than 20 years, has served as a special assistant to the vice president since July 2020. His leadership experience, depth of knowledge related to the agricultural community, and insight into governmental policy and how it impacts Mississippians will be invaluable in this new role.

We also welcomed new leaders in other roles on campus. DAFVM leaders are excited to continue to work with Dr. Julie Jordan, who was named vice president of the Office of Research and Economic Development after ably serving as the interim leader of that unit. We also appreciate the return of Dr. Joe Street, who is serving as an interim associate director of the Mississippi Agricultural and Forestry Experiment Station.

We are completing a condensed spring semester in a school year that brought us new ways of teaching and learning, increased enrollment, and opportunities to share our impact with the state's legislative leaders.

Our longstanding Producer Advisory Council meetings, conducted regionally through a series of virtual sessions and presentations, refreshed the vitally important relationships between our specialists and researchers and the clients we serve.

In this, my final *Mississippi LandMarks* letter, I want to thank everyone for their support and assistance during my time as the interim vice president. I've been honored to serve and represent all the division's unique and important units, and it has been my pleasure to advocate for the people who do the daily work for Mississippians of all ages and interests.

I am working with Dr. Coble to accomplish a smooth transition and encourage you to support his efforts to lead DAFVM to new levels of service, discovery, and learning.

Reuben Moore

REUBEN MOORE
Interim Vice President

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ON THE COVER

Deseret, a 3-month-old, pure-bred Nubian dairy goat, born in January 2021 at Cole's Ridge Farms in Sturgis, Mississippi, stands near milking stanchions in the barn. (Photo by Michaela Parker)

Disconnected Farmers

Agricultural Areas Need Rural Broadband Investment

Dr. Devon Meadowcroft

Dr. Brian Mills

From computer programs that regulate moisture sensors to smartphone apps that allow growers to monitor market data, most facets of agriculture continue their shift to digital platforms. This transition makes reliable internet access no longer a luxury, but a necessity.

Despite Mississippi agriculture's annual economic impact of around $7 billion, broadband infrastructure is in short supply in the state's densest agricultural hub: the 19-county Mississippi Delta.

Broadband is defined as internet access with download speeds above 25 megabits per second and upload speeds of at least 3 megabits per second. Dr. Brian Mills and Dr. Devon Meadowcroft, Extension agricultural economists based at the MSU Delta Research and Extension Center in Stoneville, compiled data that illustrate the limitations facing many counties and how the lack of broadband access creates significant disadvantages to growers wherever fast internet is scarce.

Their study used Federal Communications Commission broadband data and U.S. Census population statistics to examine farm employment and population with no broadband access in each of the state's 82 counties.

They found that about 27 percent of Mississippians who live in rural counties lack broadband access. Nearly 60 percent of

> "Agriculture is critical to the state's economy, and one of the best ways we can support it is to find ways to get reliable internet access to our growers."
>
> DR. DEVON MEADOWCROFT

the state's almost 3 million residents reside in rural counties and account for 80 percent of the state's population without broadband. Only 17 counties were classified as urban based on USDA Economic Research Service definitions.

"Broadband internet takes a lot of infrastructure and up-front cost to install, and rural areas don't get the same investment that more populated ones do," Mills said. "Most newer precision farming technology, such as irrigation programs that allow you to see what your moisture sensors are doing in real time remotely, requires a lot of data. Without internet access, growers can't find out this type of information as quickly as they would if they had it, and they lose out on potential profit."

While nearly 20 percent of the state's overall population lacks broadband access, Mills and Meadowcroft specifically examined the Delta after the relationship between the rate of farm employment and lack of broadband access became apparent. However, many areas in south Mississippi suffer from the same lack of resources.

Meadowcroft noted a prime example of this relationship in Issaquena County, which had both the highest farm employment rate (37 percent) and lowest percentage of population with broadband (4 percent).

"It's good for policymakers to see what this situation currently looks like in Mississippi and look for ways to allocate resources toward bridging that gap," she said. "Many people in rural populations need reliable internet just as much as those in suburbs and large cities. Agriculture is critical to the state's economy, and one of the best ways we can support it is to find ways to get reliable internet access to our growers."

Read their MSU Extension Service publication, *Mississippi Agriculture Lacks Broadband Access*, at http://extension.msstate.edu/publications/mississippi-agriculture-lacks-broadband-access.

BY NATHAN GREGORY • PHOTOS BY KEVIN HUDSON

Talking Turkey

Gobbling Activity Is Related to Weather

It seems that wild turkeys don't like humidity any more than people do.

That is a finding of a study conducted by the MSU Forest and Wildlife Research Center (FWRC) in response to complaints that Mississippi's turkey season was not timed properly.

The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) is responsible for setting hunting seasons. It has traditionally instituted a statewide, 7-week, spring harvest season for turkeys. Hunters routinely argue that there are different peaks in gobbling activity across the state, meaning the season should open and close at different times in different parts of Mississippi.

Dr. Francisco Vilella, an FWRC adjunct professor and scientist with the U.S. Geological Survey Cooperative Fish and Wildlife Research Unit, said turkey hunters in the southern part of the state thought the season began after peak gobbling activity ended. Hunters in north Mississippi thought the season began too early before turkeys began their ritual vocalizations and courtships. Gobbling is an activity of toms—adult male turkeys.

"The objective of this study was to determine whether differences in peak gobbling activity existed across a latitudinal gradient of Mississippi," Vilella said.

This study, *Latitude and Daily Weather Effects on Gobbling Activity of Wild Turkeys in Mississippi*, was published online in the August 2019 edition of the *International Journal of Biometeorology*.

The data suggested that weather has as big an impact on gobbling activity as anything else, and the existing hunting season covers peak times of turkey activity across the state.

"Across the globe, natural-resource managers strive to understand the effects of weather on wildlife populations to implement effective conservation and game species management," Vilella said. "Weather has been recognized as a density-independent factor influencing the abundance, distribution, and behavior of vertebrates."

Vilella said the MSU data indicated that no changes were required to the hunting season framework established by MDWFP. While turkeys have different peaks at the geographic ends of the state, both peaks are captured by the hunting season.

Matthew Palumbo of Lackawanna, New York, took on this study for his graduate research project. Palumbo earned a master's degree in wildlife and fisheries science in 2010 from MSU.

"Data were collected from a statewide gobbling survey in 2008 and 2009 that monitored gobbling activity a month prior to the hunting season, throughout the season, and a month after the season," he said.

The researchers applied mathematical models to describe the probability and frequency of gobbling activity within northern and southern regions of the state.

"Our results revealed an approximate 10- to 14-day difference in peak gobbling activity between southern and northern Mississippi, but those peaks occurred during hunting season," Palumbo said.

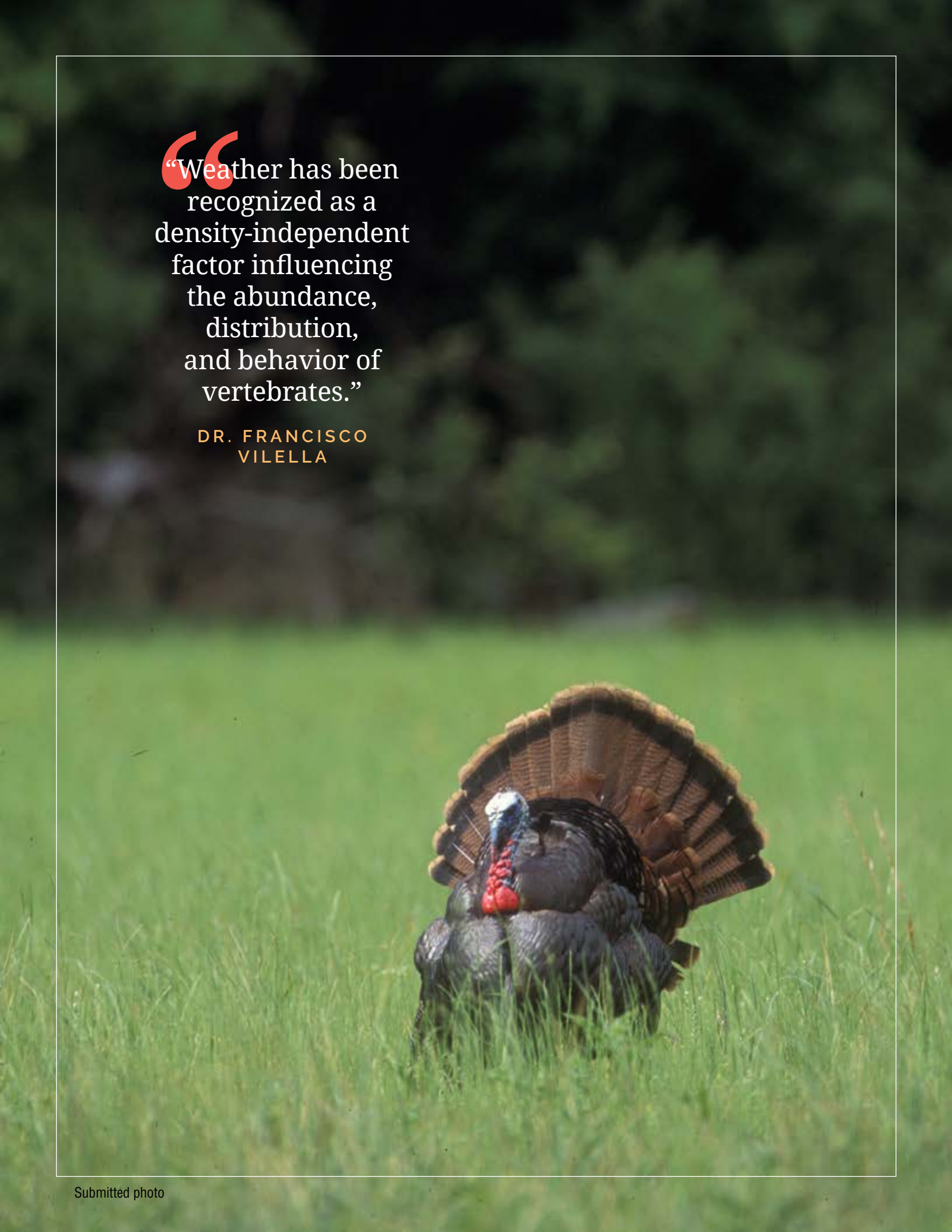
Dry conditions played a major factor in gobbling activity.

"Perhaps more importantly for hunters trying to better understand when toms vocalize more often in the spring, gobbling activity was more prevalent on less humid days," Palumbo said.

This study also presented information to MDWFP on how the spring harvest season relates to regional breeding behavior in the form of frequency and intensity of gobbling activity.

"Our study design may be particularly applicable in states with relatively shorter seasons or highly variable daily weather conditions that moderate gobbling frequency," Palumbo said.

BY BONNIE COBLENTZ



> “Weather has been recognized as a density-independent factor influencing the abundance, distribution, and behavior of vertebrates.”
>
> DR. FRANCISCO VILELLA

Submitted photo

“Through social media, Extension can provide trusted information related to nutrition.”

QULA MADKIN

Keep It Simple

Dietitian Focuses on Small, Easy Steps for Healthier Lifestyles

A career as a registered dietitian wasn't what Qula Madkin had in mind when she started college, but she has no doubt it was meant to be.

"I didn't even know what a registered dietitian was when I was younger," Madkin said. "In college, my goal was to become a physical therapist."

When the requirements to apply for the physical therapy program changed, Madkin, who was a freshman at Mississippi State at the time, decided she needed to pursue a different degree to avoid taking on more student-loan debt.

"I remember it like it was yesterday," said the Purvis, Mississippi, native. "I went through my undergraduate course catalog and highlighted in pink the classes I'd taken to decide what I would major in. Lo and behold, food, nutrition, and dietetics came out on top."

As a nutrition instructor with the MSU Extension Service, Madkin helps develop, coordinate, and distribute materials related to nutrition, wellness, and the ServSafe food safety certification program. She also provides training and technical assistance to all Extension agents with nutrition education responsibilities.

Madkin is a registered and licensed dietitian with more than 17 years of experience working with health, wellness promotion, and nutrition coordination in community, private, clinical, and academic settings. Madkin is a certified diabetes care and education specialist, and she completed training in the Commission on Dietetics' Adult Weight Management Program.

She credits her diverse background for her ability to engage people and help them make healthy changes.

"My focus is always on the individual, family, or community and what their needs are," Madkin said. "I want to help people better understand how to be healthier, not just how to lose weight. I believe approaching a lifestyle change must be doable and relatable. So, my goal is simple: provide folks with reliable information they can use that fits their lifestyles and meets their needs."

Madkin said Extension's model is ideal for understanding and providing what people need.

"Extension agents know their counties, their clients, what the needs are, and what works," she explained. "I support them by providing the most up-to-date, evidence-based resources that are specific to or can be customized to Mississippians."

Madkin is working to develop new statewide nutrition programs, Extension-developed recipes, and other educational materials to focus specifically on local needs. She leverages Facebook, Twitter, and the Extension for Real Life blog to share research-backed messages about nutrition and healthier lifestyles—something she believes is critical to reach people.

"More and more people use social media as their go-to for all information, and there is a lot of misinformation about nutrition and health out there," she said. "Through social media, Extension can provide trusted information related to nutrition."

Dr. Paula Threadgill, who retired as associate Extension director of 4-H and Family and Consumer Sciences in 2020, said Madkin's varied work experience makes her the perfect fit for this role.

"Qula has worked with a variety of clients on several nutritional issues, and that gives her a great deal of perspective for developing and evaluating our food and nutrition programs," Threadgill said. "I am excited about having her in this position and look forward to what she can help bring to our communities across the state."

BY SUSAN COLLINS-SMITH
PHOTOS BY MICHAELA PARKER

CVM Offers Expert

Animal Reproductive Care

Dr. Heath King demonstrates a technique for fourth-year veterinary students taking his class.

Farmers know reproduction is vital to any animal agriculture operation, but reproductive issues can become important to other animal owners, as well. And they all have a team of veterinarians prepared to help at the MSU College of Veterinary Medicine (CVM).

Dr. Heath King is one of a four-member team of veterinarians who practice obstetrics, gynecology, and andrology in the CVM theriogenology department. While they treat all species, these veterinarians most often work with cattle producers.

"The most important services we provide are assessing fertility and breeding soundness of livestock and restoring fertility in animals that have suffered injury or disease of the reproductive tract," King said. "All animal agricultural production begins with reproduction. Reproductive efficiency is paramount to sustainability of animal agriculture."

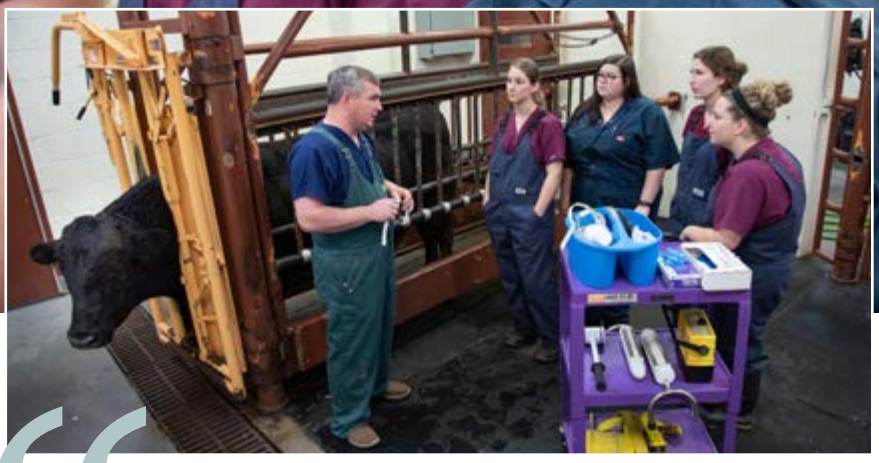
King, along with Dr. Kevin Walters, Dr. Darcie Sidelinger, and Dr. Cari Chisholm, provide services in the clinic on campus and at clients' homes and farms. They work closely with practicing veterinarians to solve their clients' reproductive problems. Treatments run the gamut from fertility assessment to assisting with difficult births. The most common services are breeding management of females, pregnancy diagnosis, breeding soundness examinations of males, and semen freezing.

Horses and dogs make up the second largest group of patients. Sometimes, the team also treats small ruminants, including goats and sheep.

"We have a diverse clientele," King said. "We work with anyone. We have commercial livestock producers along with people who are preparing to raise their first foal or first litter of puppies. We do a significant amount of canine reproduction work, which includes artificial insemination."

Animal owners don't need to rely completely on nature when they breed their animals. However, artificial insemination requires expert management for the best results.

"The ability to ship refrigerated and frozen semen opens up the mating possibilities for owners looking to breed their female animals," King said. "The timing of insemination is critical to the success of these breedings. We manage the female to ensure that breeding or insemination occurs at the most opportune time for successful conception. This is one of our main services for our canine and equine patients."



The team also teaches fourth-year veterinary students who elect to take their courses, and several graduates offer advanced reproductive services in their veterinary practices, King said.

"Working with students and teaching really makes the job more fulfilling," he said. "We love to teach students, and we make sure they are able to perform virtually every technique and procedure we do."

> "We love to teach students, and we make sure they are able to perform every technique and procedure we do."
>
> DR. HEATH KING

Although the veterinarians focus mostly on clinical work and teaching, they also collaborate on research projects. King and Sidelinger are working with Dr. Amelia Woolums and Dr. Merrilee Thoresen to study whether antibody production can be triggered in bulls with trichomoniasis, a sexually transmitted disease that can cause infertility and pregnancy loss in cattle.

"There is currently no effective legal treatment for trichomoniasis in bulls, which means that infected bulls can only be culled from the herd, leading to a significant loss for the cattle producer," said Woolums, a professor in the CVM Department of Pathobiology and Population Medicine. "Our ongoing research is aimed at testing an entirely new treatment approach to induce bulls to rapidly produce antibodies that could help them clear infection. While we are at a very early stage in this research, results of initial tests have been promising."

BY SUSAN COLLINS-SMITH
PHOTOS BY TOM THOMPSON

Research Quantifies Effects of

Paraquat Drift on Rice

Paraquat is frequently used in soybean production, but rice is extremely susceptible to damage from this herbicide. Environmental conditions or improper spraying can allow the chemical to drift from the intended fields onto nearby rice fields. (Photo by Ben Lawrence)

Producers are learning how to manage rice fields when paraquat drifts onto them early and late in the season, but what impact this herbicide has on grain quality and what happens when drift occurs midseason are still unknowns.

These questions are at the heart of doctoral research Tameka Sanders is doing at the MSU Delta Research and Extension Center in Stoneville. Her work began in the 2019 growing season and will conclude after the 2021 season.

Paraquat is frequently used to burn down weeds in soybean fields before planting and again to dry the plants in preparation for harvest. Rice is extremely susceptible to damage from this herbicide. In the Delta, rice fields are frequently located adjacent to fields where paraquat is used. Environmental conditions or improper spraying can allow the chemical to drift from the intended fields onto rice fields, causing damage.

"The problem is that oftentimes, rice is grown right across the turnrow from soybean fields or other crops," Sanders said. "When you are spraying the soybeans, paraquat can move onto the rice. It depends on the rate and the growth stage, but this drift potentially can totally kill the rice or harm it so badly that the yield is greatly reduced."

Sanders, a Greenville native, is continuing a research project addressed by two other graduate students under the leadership of Dr. Jason Bond, a weed scientist in Stoneville who works with both the MSU Extension Service and the Mississippi Agricultural and Forestry Experiment Station.

"Paraquat can injure any crop when sprayed at the wrong time, but no matter when it contacts rice, it's not a good time," she said.

Wind, temperature, spray equipment, the height of the sprayer, and many other factors influence drift, or the chemical's unintended movement onto another crop. Previous research looked at paraquat drift during early- and late-season rice development.

"My project bridges the gap between the two," Sanders said. "We wanted to learn what happens to rice during its entire life cycle if it comes in contact with paraquat."

Data collection will reveal how rice responds to different rates of paraquat exposure, multiple paraquat exposures, exposure to both paraquat and glyphosate, and paraquat's effect on grain quality. Bond said the last part of the research is significant.

"The most unique part of this project is examining the effect of paraquat on the quality of the actual kernels of rice," he explained.

Once evaluated, this data will help inform growers' decisions on how best to manage crops when rice fields have been exposed to paraquat drift.

"A bad exposure may lead the farmer to back off spending money on inputs, while, if the field recovers from a mild exposure, that grower may decide to pour in inputs in hopes of helping the crop make up the yield difference," Bond said.

"When a drift event happens, we never know the rates and what the yield reduction will be, but this research will give us data on what kind of yield and grain quality losses are expected when rice is hit with drift at different points in the growing season," he said.

BY BONNIE COBLENTZ

Photo by Kenner Patton

Sky-High Aspirations

Extension Shares High-Tech Ag with Students

> "The gamers are natural pilots."
>
> LOUIS WASSON

Senior Extension associate Louis Wasson shows Dondeerick (D. J.) Jones and Monte Beckwith how to pilot an unmanned aerial vehicle during a technology demonstration at New Hope High School.

Early on a cool autumn morning, Louis Wasson drove to New Hope High School for an unusual guest speaking engagement.

Several times a year, the senior Extension associate visits high schools across the state to show students how their love for technology intersects with agriculture, the state's largest economic driver. But Wasson does not just talk tech, he puts unmanned aerial vehicles (UAV), commonly called drones, in the hands of young people who may be expert video-game players but cannot tell a soybean field from a cotton field.

"The gamers are natural pilots," Wasson observed. "I talk about how highly developed precision agriculture is, and how farming is not just riding around on a tractor in a field. Drones allow growers to see hundreds of acres in a matter of minutes, a convenience they haven't had in the past."

Before trying out the students' flying skills, Wasson shared the uses of remote sensing, such as scouting corn fields normally impenetrable from the ground level or assessing storm damage when fields are too muddy for vehicles to traverse. He hopes to inspire students to consider careers in precision agriculture.

"With the convenience of flying over a field at any time, ag professionals can investigate changes in crop canopy color that may indicate a fungus or insect infestation, nutrient deficiency, or damage from wild hogs or deer, or areas that need replanting—all from the images taken by the drone in just a few minutes and seen in real time on a phone or tablet," Wasson said.

Brennan Beaird, a freshman at New Hope High School who participated in Wasson's demonstration, was surprised by what he learned.

"I thought this kind of technology was only for the military and delivering stuff," Beaird said. "I didn't know it was used with the weather, finding people, fighting fires, agriculture, and more."

Freshman Caleb Balloon agreed.

"I never knew drones were used for actual jobs," Balloon shared. "I always thought they were just for fun."

Wasson encourages students to investigate scientific and technological careers they may not have considered before and points them to all Mississippi State has to offer. This opportunity includes a precision agriculture certificate program in the MSU College of Agriculture and Life Sciences.

Dr. Scott Willard, interim dean of the college, said a growing number of students are drawn to precision agriculture because of the technology involved and varied interests in unmanned or autonomous vehicles and their applications in agriculture.

"Precision agriculture is essentially using data and technology-driven decisions to put the right inputs in the field at the right place at the right time," he said. "Our precision agriculture certificate program, and other concentrations within agricultural and biological engineering, plant and soil sciences, agricultural economics, and disciplines in entomology and plant pathology in the College of Agriculture and Life Sciences, are designed to give students the tools within their major to engage these technologies in their future careers."

BY KERI COLLINS LEWIS
PHOTOS BY MICHAELA PARKER

New Seafood Lab

Builds on Vision of Industry's Recovery

The Experimental Seafood Processing Lab in Pascagoula is one way Mississippi State supports the state's $100 million seafood industry, but its capacity has long been exceeded.

Meanwhile, the industry is still reeling from three catastrophic setbacks: Hurricane Katrina, the Deepwater Horizon oil spill, and multiple openings of the Bonnet Carré Spillway due to Mississippi River flooding.

A new facility with room to grow and assist in the industry's recovery and future strength is on the way. The Mississippi Agricultural and Forestry Experiment Station (MAFES) has secured a site and funding to begin construction of the Northern Gulf Aquatic Food Research Center in 2021. The new facility will be in Jackson County.

> "This new facility is designed specifically to help our seafood industry bounce back."
>
> DR. JAMES HENDERSON

Phase one of the project will be supported by more than $6 million in grants from the Revived Economies of the Gulf Coast States (RESTORE) Act and other state and federal programs. The three-phase project will cost about $16 million overall.

Dr. Wes Burger, MAFES associate director, said the lab's mission will focus on three primary areas of the seafood industry: seafood safety, processing technology, and entrepreneurship.

"Phase one will support seafood safety testing and quality assurance," Burger said. "It will include biological and chemical safety labs and the capacity to do food-quality research and testing. Seafood is highly perishable, so anything we can do to maintain its freshness and quality from the time it is harvested until it gets to the consumer makes it safer and raises consumer confidence. If we can extend the product's shelf life by 2 or 3 days, that is a huge economic impact."

Acquiring federal certification from the Food and Drug Administration to conduct testing for foodborne pathogens has been an ongoing process in anticipation of the new facility. Such pathogens include vibrio, potentially fatal bacteria found in oysters.

"We have developed tests to detect vibrio at the dock or in a lab and processing technologies that do not affect the texture or taste or quality of the food but can eliminate the pathogens," Burger said. "Irradiation is an example of that. We are also working on extending shelf life using natural food additives that inhibit oxidation and microbial growth."

Phase two will include a pilot fish and shrimp processing plant, while the third phase will include an incubator space for industry partners to conduct product development and testing.

"There are valuable proteins in the wasted products like the fins, heads, and tails," he said. "The proteins and collagen that can be extracted from these waste streams could be used as food additives, animal foods, cosmetics, and fertilizer. The pilot plant would include advanced processing machinery that can extract and harvest more of the flesh that is on a fish carcass and reduce waste. This would help our processors increase yield and profitability."

Dr. James Henderson, director of the Coastal Research and Extension Center in Biloxi, said his hope for the new lab is to help assist in the recovery and improvement of marine agriculture.

"Seafood is a critically important part of the coastal economy, as well as the culture and cuisine of the Gulf Coast," Henderson said. "Each step of the supply chain, from harvesting to processing, retail, and consumption, has been damaged by a series of manmade and natural disaster events. This new facility is designed specifically to help our seafood industry bounce back."

BY NATHAN GREGORY • PHOTOS BY KEVIN HUDSON

“About 70 percent of my customers are individuals or small producers who want to make goat milk products.”

SCOTT JENKINS

Photo by Michaela Parker

Goats Galore

Dairy Goats More Popular Among Small Farmers and 4-H'ers

Dairy goats make up a niche market of the Mississippi livestock industry, but their popularity is growing across the state.

"That's been the case in the whole Southeastern United States," said Dr. Rocky Lemus, an MSU Extension Service forage specialist and Mississippi Agricultural and Forestry Experiment Station (MAFES) scientist who also raises dairy goats. "We've seen an almost 25 percent increase in dairy goats across our region in the last 10 years."

Interest has grown among 4-H livestock program members, people who participate in various other showmanship contests, and people who want goat-milk products. Lemus said producers account for most goat ownership in Mississippi, helping to meet the demand from inside and outside the state.

Scott Jenkins of Sturgis is one of those producers. He raises Nubian goats, a breed favored for its milk quality. High fat content results in more flavorful cheese, milk, and ice cream from these goats. Top milking breeds include Alpine, LaMancha, Nubian, Saanen, and Toggenburg. Each breed has its own aesthetic, personality, and milk-production characteristics.

Jenkins has been raising goats for 20 years, first as a herd manager for a North Carolina goat dairy for about 10 years and then with his own small herd for the past 10 years.

"I enjoy showing our goats and am a member of several state and national associations," said Jenkins, whose full-time job is teaching high-school history. "I have several customers who are 4-H'ers who want a project goat to raise and show. But about 70 percent of my customers are individuals or small producers who want to make goat-milk products."

Although people often make and sell nonedible items, such as soap and lotion, Mississippi regulations require goat dairies to be certified Grade A, which is very difficult to accomplish for small farms with small herds because of the financial investment. However, in other states, selling edible products is a growing business, Jenkins said.

"Artisan cheeses are becoming a big thing," he said. "There are a lot of people all over the country who are getting into that. I've been making ice cream and cheese for a while. I think if the Legislature makes some changes, we will see several goat dairies open in Mississippi."

Many young 4-H'ers choose goats because they are easier to handle and require less space to raise than larger animals. Goats also have endearing personalities and can form a bond with their owners, much like dogs. These same traits make goats desirable to those who raise them for their milk or to diversify their farm businesses.

Lemus said different breeds are suitable for different purposes. Although any breed of goat can be raised for meat, certain breeds are better for milking. For people who want goats for brush control, Boer, Spanish, and Kiko breeds are most suitable.

Dr. Leyla Rios de Alvarez works with producers to address research and outreach related to sheep, dairy goats, and meat goats, such as the one pictured here at the H. H. Leveck Animal Research Center (South Farm). (Photo by Kevin Hudson)

Goats are sometimes perceived as challenging to raise, primarily because of their susceptibility to parasites. But with a good operating plan, rotational grazing management practices, parasite control measures, and proper health care, goats will thrive, Lemus said.

Dr. Leyla Rios de Alvareza joined MAFES and Extension as the new small ruminant scientist and specialist in December 2020. A native of Venezuela, she will continue work on existing programs and establish new programs to help goat and sheep producers be more successful.

BY SUSAN COLLINS-SMITH

Changing Conditions

Studies Shed Light on Sea Level Rise Protection

Like sea levels, expenses related to flooding in communities and businesses along the Gulf Coast are rising.

One student spent summer 2020 investigating ways to mitigate these costs while enhancing approaches to shoreline protection during her time in the Mississippi State University Extension Undergraduate Apprenticeship program.

Camille Sicangco, a junior double majoring in botany and mathematics at the University of Florida, worked under the direction of MSU Extension instructor Renee Collini, who specializes in coastal climate resilience. She conducted cost-benefit analyses of living shorelines compared to traditional hardened shorelines.

Sicangco worked with personnel at Camp Wilkes in Biloxi to provide a customized cost-benefit analysis of the decision to implement a living shoreline rather than continually replacing a wooden bulkhead along the waterfront.

Camp Wilkes had a bulkhead installed to protect its 150-foot shoreline, but hurricane damage over time rendered it nonfunctional. The nonprofit organization had already worked with Dr. Eric Sparks, director of the MSU Coastal Marine Extension Program, to create a living shoreline. Sicangco conducted a cost-benefit analysis that covers a 60-year timeframe. It showed that the living shoreline will save the camp about $73,000.

"What we found was that living shorelines are more resilient and cost-beneficial than bulkheads," Sicangco said. "Most of that comes from the fact that you do not have to conduct as much maintenance on living shorelines."

The primary benefit of a living shoreline is its ability to grow higher as sea levels increase.

"Bulkheads are static," Collini said. "They cannot move or grow taller. As sea levels come up, the water will overrun them, and they eventually need to be replaced because they wear out. Living shorelines involve natural elements, whether it is a marsh or oyster beds or things that mimic those that would naturally be there to keep the shoreline in place.

"Because they are made to be in this location, they do not wear out," she added. "You do not have to replace them unless they sustain storm damage, which you would have to also do with a bulkhead. That is why we say living shorelines are a natural way to adapt to sea-level rise. When the sea changes, so does the shoreline."

> "What we found was that living shorelines are more resilient and cost-beneficial than bulkheads."
>
> CAMILLE SICANGCO

Another project Sicangco tackled was with the Jackson County Utility Authority (JCUA), which is planning to construct a new facility. She was tasked with identifying the merits of building a berm around it that would account for sea-level rise.

"We found that building a berm would be a beneficial investment," she said. "I think the best thing is that we were able to provide them with information that made them confident in going that direction."

Collini said these studies will be integrated into future Extension programming on sea-level rise resilience.

"This project represents a trend that we have been seeing over the past 4 to 6 years, which is that when we started this, people were not talking about sea level rise all that much, and when they were, it was sort of abstract," she said. "Being able to put numbers to these adaptations is a big step forward."

BY NATHAN GREGORY

Camille Sicangco shows a marsh sod that recently eroded from the shoreline behind her. (Submitted photo)

Graduate student Taylor Gibson (left) and junior Hunter Mentges band and weigh a male wood duck at the Sam D. Hamilton Noxubee National Wildlife Refuge for a 5-year collaborative research project. (Submitted photo)

The Best Nest

Undergraduate Studies Wood Duck Nest Preferences and Survival

Developing a greater understanding of the natural world and exploring a career pathway are worthy goals for a summer internship, but when daily tasks include watching wood-duck ducklings hatch and handling them in the name of science, it is a dream job.

"They're fluffy and cute!" confessed Hunter Mentges, a junior in the MSU College of Forest Resources (CFR). "We checked nest boxes daily from the time the hens laid the eggs and got to see the ducklings when they hatched. It was amazing to watch nature at work."

Under the supervision of graduate student Taylor Gibson and Dr. Brian Davis, James C. Kennedy Endowed Associate Professor in Waterfowl and Wetlands Conservation in CFR, Mentges took a variety of measurements designed to help scientists understand why female wood ducks, black-bellied whistling ducks, and hooded mergansers choose certain nesting boxes at the Sam D. Hamilton Noxubee National Wildlife Refuge and James Kennedy's Tallahatchie County property, York Woods.

"We took general measurements for each box, including dimensions and hole size," Mentges explained. "With every new nest, we counted eggs and estimated hatch dates, and we also examined canopy cover, water depth, and whether the nest box was on dry land versus water."

He and Gibson banded the hens and web-tagged the ducklings to observe survival into the next nesting season and determine whether hens return to the same nest box in subsequent years.

"Hens often return to the same area in which they hatched, so this will help us judge survival rate and behavioral patterns," Mentges said.

> "We are also studying the effects of micro- and macro-habitat characteristics, nest box dimensions, and how they influence nest selection and various reproductive parameters of breeding wood ducks."
>
> TAYLOR GIBSON

Gibson said 2020 was the first year of a 5-year collaboration between MSU and several universities, particularly Clemson, a primary funder of the work. Eight states are involved in the study: Mississippi, Louisiana, Georgia, Florida, North Carolina, South Carolina, Maryland, and Delaware.

"We want to examine the contribution of nest boxes to female wood-duck recruitment and estimate annual duckling production from nest boxes throughout all eight states," Gibson said. "We are also studying the effects of micro- and macro-habitat characteristics, nest box dimensions, and how they influence nest selection and various reproductive parameters of breeding wood ducks."

Mentges, who grew up hunting and fishing in rural Maryland, found MSU to be the perfect fit. He is a CFR student ambassador and enjoys talking to prospective students about career options in natural resources at MSU. He also appreciates the opportunity to mentor freshmen as they face the challenges of college life.

He is pursuing a degree in wildlife, fisheries, and aquaculture science, which he described as a general degree with a lot of electives to allow him flexibility in choosing his own professional path.

"Now that I've seen what it's like to work with waterfowl more closely, I hope to pursue opportunities related to that field," he said.

The Mississippi portion of this project is funded by the Mississippi Department of Wildlife, Fisheries, and Parks and the Nemours Wildlife Foundation of South Carolina.

BY KERI COLLINS LEWIS

Growing Gardeners

Community Garden Provides Food, Teaches Skills

Members of the Jackson chapter of Alpha Kappa Alpha sorority turned to Extension agent Kyle Lewis for advice and assistance to help get their community garden project back on track. Lewis (left) and Mississippi State Representative De'Keither Stamps (second from left) joined sorority members Lena Jones (third from left), Bobbie Brantley, Rosie Payton, and Catherine Walker in the effort to provide people fresh produce and teach them basic gardening skills.

When members of the Jackson chapter of Alpha Kappa Alpha sorority brainstormed ways to serve their community, they decided to start a gardening project.

With funds from a grant through the U.S. Department of Agriculture, the servant-leadership group's local Women's Health Committee planted an in-ground community garden at Fresh Start Church in north Jackson in spring 2020.

"We wanted a sustainable project, and we wanted to be good stewards of the funds we have," explained project leader Rosie Payton.

Their plan was twofold: (1) grow fresh produce for members of the community who could not get to the grocery store on a regular basis; and (2) get community members involved and teach them how to grow produce. But they soon discovered they were going to need some guidance.

"Once we got started, we realized we had no idea what we were doing," Payton said. "We also ran into problems with the weather and equipment availability, and interest and involvement began to go down."

That's when Payton contacted Kyle Lewis, an MSU Extension Service agent in Hinds County. She knew Lewis because he'd done other distance-education meetings for Fresh Start Church.

Although Extension offices were closed under the governor's shelter-in-place order at the time, Lewis conducted classes through Zoom, shared several Extension gardening publications with them, and communicated with them over the phone and through email during the shutdown. They also attended a series of distance-education classes on gardening offered by Keith Whitehead, an Extension agent in Franklin County.

> "Using raised beds is much easier than in-ground gardening, and that makes it easier to get community members to participate."
>
> ROSIE PAYTON

At Lewis's suggestion, the group decided to plant the garden in raised beds. Lewis also helped them install an irrigation system. The group of about 10 volunteers moved the garden to property in south Jackson owned by De'Keither Stamps, a former Jackson city councilman and current Mississippi legislator. Stamps has used the property for about 4 years to facilitate gardening education in the community.

"Part of their issue with the in-ground garden was keeping it weeded and watered," Lewis said. "Raised beds reduce weeding, and the irrigation system waters with a timer."

The group installed about 20 raised beds inside an existing high tunnel on the property. They grew several types of greens, Chinese cabbage, bok choy, and a few other fall vegetables.

"What Kyle has taught us helped us so much," Payton said. "Using raised beds is much easier than in-ground gardening, and that makes it easier to get community members to participate. We're also thankful to Mr. Stamps for allowing us to put our garden on his property. The high tunnel allows us to work out here even if it is raining."

Stamps said he is looking forward to what the group will contribute to the community.

"I'm excited about this project, and I'm happy to provide a place where they can carry out a large part of the project," Stamps said.

As part of the educational aspect of the project, the group helped some community members who installed raised beds at their homes learn how to grow some of their own food. The group plans to continue teaching others what they've learned.

"What we are most excited about is the opportunity to educate other community members of all ages," Payton said.

BY SUSAN COLLINS-SMITH
PHOTOS BY MICHAELA PARKER

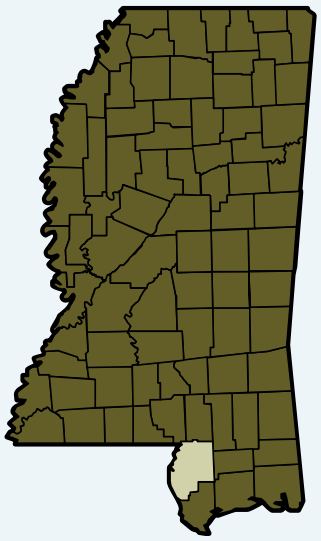
New Poultry Science Building Opens

PHOTOS BY MEGAN BEAN

Administrators, industry partners, faculty, staff, and students celebrated the opening of the Poultry Science Building with a ribbon-cutting ceremony on November 9, 2020. The 27,300-square-foot building and its 4,700-square-foot connector building adjoin the 34,500-square-foot Animal and Dairy Sciences Building.

In the top left photo, Dr. Gary Jackson (left), director of the MSU Extension Service; Dr. Scott Willard, interim dean of the College of Agriculture and Life Sciences; MSU President Mark E. Keenum; Dr. Mary Beck, poultry science department head; Dr. Reuben Moore, interim vice president of the Division of Agriculture, Forestry, and Veterinary Medicine and interim director of the Mississippi Agricultural and Forestry Experiment Station (MAFES); Justin Harrington, architect at McCarty Architects; and David Howell, MAFES engineer, participate in the ribbon cutting.

Award-winning architect E. Fay Jones designed the Pinecote Pavilion, an iconic structure built at the Crosby Arboretum in Pearl River County. (Photo by Michaela Parker)



1/82: Pearl River County

MSU in Pearl River County:
204 South Julia Street
Poplarville, MS 39470

> "Pearl River County is a great place to live, work, raise a family, and retire. It is conveniently located near the Stennis Space Center and is approximately 45 minutes from both New Orleans and the Mississippi Gulf Coast."
>
> DR. EDDIE SMITH, MSU Extension County Coordinator

County seat:	Poplarville
Population:	55,834
Municipalities:	Poplarville and Picayune
Communities:	Carriere, McNeill, Millard, Derby, Barth, Henleyfield, Crossroads, Caesar, Steephollow, Whitesand, Nicholson, Ozona, Millcreek, Salem, Silver Run, Gumpond, Juniper Grove, Savannah, Lumberton
Commodities:	timber, cattle, blueberries, vegetables, grains
Industries:	Pearl River Community College, Highland Community Hospital, Pearl River County Hospital and Nursing Home, Heritage Plastics, Avon Engineered Fabrication, Rheogistics, The Way Manufacturing, Aerotec, Datastar, Reflectech, Huey Stockstill, American Crescent Elevator
Attractions:	Blueberry Jubilee, Crosby Arboretum, Sweet Tea Festival
Natural resources:	forestry, wildlife, lakes, rivers, ponds
History notes:	Pearl River County got its name from the stream called the "River of Pearls" by French explorers in 1699. The county was formed in 1872, abolished in 1878, and reestablished in 1890 with roughly the original borders. Pearl River County's most famous son was Theodore G. Bilbo, who served as state senator, governor, and U.S. senator.
Did you know?	Pearl River County has been the home of notable writers such as novelist James Street, historian S. G. Thigpen Jr., and literary scholar Noel Polk. Television star Gerald McRaney spent much of his childhood in Picayune. Harry Connick Jr., singer/songwriter, actor, and television host, owns property in the county.

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

NewsNotes

Garner

Russ Garner, an Extension/research associate at the Southern Rural Development Center, recently graduated from the Delta Leadership Institute Executive Academy as one of three participants from Mississippi. The year-long program organized by the Delta Regional Authority equips graduates to improve the economic competitiveness and social viability of the Mississippi River Delta and Alabama Black Belt.

Measells

Marcus Measells, senior Extension associate in the College of Forest Resources Department of Forestry, is one of only 17 honorees nationwide recently named a fellow of the Society of American Foresters. One of the organization's highest accolades, fellows are honored for their extensive and long-standing dedication to the advancement of the forest industry at local, state, and national levels.

Buys

Dr. David Buys, Extension health specialist and associate professor in the College of Agriculture and Life Sciences (CALS) Department of Food Science, Nutrition, and Health Promotion, has been elected to serve on the board of directors for the National Board of Public Health Examiners.

Burdine

Dr. Bill Burdine, an Extension agronomic crops specialist based in Lee County, is serving as president of the National Association of County Agricultural Agents. He is the first president from Mississippi to serve since 1967 and the first national officer since 1980–1981.

Paz

Dr. Joel Paz, a professor in the CALS Department of Agricultural and Biological Engineering, was named the 2020 College of Engineering and Agro-Industrial Technology Distinguished Alumnus by the University of the Philippines Los Baños Alumni Association. Paz is a scientist in the Mississippi Agricultural and Forestry Experiment Station (MAFES).

Rangappa

Dr. Raju B. Rangappa, an assistant research professor in the CALS Department of Plant and Soil Sciences, was awarded the Early Career Agricultural Scientist Award by the Association of Agricultural Scientists of Indian Origin. Rangappa is a MAFES scientist.

Willeford

Dr. Bridget Willeford has been named university veterinarian and director of the MSU Office of Laboratory Animal Resources, a new position connected to both the Office of Research and Economic Development and DAFVM.


Photo by Michaela Parker

Climate Adaptation Leadership Award for Natural Resources

Renee Collini (second from right), Extension instructor and program coordinator for the Northern Gulf of Mexico Sentinel Site Cooperative, and Extension associates **Sonia Vedral** (from left), **Sara Martin**, and **Mikaela Heming**, accepted the Climate Adaptation Leadership Award for Natural Resources from the Association of Fish and Wildlife Agencies. The award recognizes individuals and federal, state, local, and nongovernmental organizations that work to protect natural resources from the effects of climate adaptation.


Street


Woolums


Baker


Sparks


Allen

The 2020 Regions Bank-DAFVM Superior Faculty Awards were presented to five faculty members: teaching—**Dr. Garrett Street**, College of Forest Resources (CFR)/Forest and Wildlife Research Center (FWRC); research—**Dr. Amelia Woolums**, College of Veterinary Medicine; Extension/outreach—**Dr. Beth Baker**, CFR/FWRC; service—**Dr. Darrell Sparks**, College of Agriculture and Life Sciences/Mississippi Agricultural and Forestry Experiment Station (MAFES); and international—**Dr. Peter Allen**, CFR/FWRC/MAFES.

DevelopmentCorner

Molpus Woodlands Group Scholarships

Encourage Future Workforce Diversity

Dominic Bowman-Carroll, *Molpus Scholarship Recipient*

Samantha Avery, *Molpus Scholarship Recipient*

For many years, the Jackson-based Molpus Woodlands Group (Molpus) has impacted MSU students by establishing and awarding scholarships. Now, the timberland investment management firm is increasing its efforts to help educate and bring a more prepared and diverse workforce to the forestry profession.

"Molpus has always been committed to education, and, through a new partnership with MSU and four other universities, we have expanded our scholarships as we target students in underrepresented populations within certain majors," said Michael R. Cooper, Molpus's senior director of client relations and business development. "We believe the Molpus Woodlands Group Annual Scholarship will help bring further diversity to the forestry management profession and encourage recipients to become good, lifelong stewards of forestry and the environment."

> "We have expanded our scholarhips as we target students in underrespresented populations within certain majors."
>
> MICHAEL R. COOPER

For the 2020–21 academic year, two new Molpus scholarships have been awarded at Mississippi State: one in the College of Forest

Resources (CFR) and another in the College of Arts and Sciences. Recipients are Samantha Avery, a forestry major from Foley, Alabama, and Dominic Bowman-Carroll, a geosciences major from Honolulu, Hawaii. They received $2,500 scholarships for their senior year of study.

"These scholarships are designed to help build diversity in the next generation of professionals within our firm and the entire forestry sector," said Molpus President Bob Lyle. "Molpus has a vertically integrated business structure, with most activities handled by in-house team members in fields including business, forestry, geographic information systems, and legal, and these academic disciplines are reflective of the rich diversity of the professionals in our company."

> "These scholarships are designed to help build diversity in the next generation of professionals within our firm and the entire forestry sector."
>
> BOB LYLE

Over time, Molpus has impacted the lives of a growing number of students, driven in part by the motivation of its founder and chairman, Dick Molpus, who has advocated education in Mississippi throughout his career. Accordingly, the former three-term Mississippi secretary of state personally established the Dick Molpus Foundation in 2008 as a private charitable organization to further his support efforts.

Since 2013, the Dick Molpus Foundation has supported minority annual scholarships at Mississippi State to encourage interest in forestry. The Dick Molpus Foundation Annual Scholarship within CFR fosters the recruitment and retention of minority students and encourages involvement with the Molpus summer internship program. It also promotes participation in the Society of American Foresters and requires recipients to maintain at least a 2.5 grade-point average in their majors.

"Mississippi State is grateful for the support of Molpus Woodlands Group, Dick Molpus, and the Dick Molpus Foundation," said Jeff Little, the university's senior director of development for CFR and the Bulldog Forest. "Scholarships from them are truly enabling students to seriously consider careers in fields they might not have considered otherwise."

One of the oldest timber-related companies in the United States, with a heritage that dates back to 1905, Molpus was founded in 1996 as a timber investment management organization. Today, Molpus is an SEC-registered investment adviser that acquires, manages, and sells timberland as an investment vehicle for pension funds, college endowments, foundations, insurance companies, and high-net-worth individual investors. It currently manages approximately 1.9 million acres of timberland investments in 17 states.

BY AMY CAGLE • PHOTOS BY MICHAELA PARKER

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A green buoy floats in the Gulf of Mexico to guide boats leaving Ocean Springs. Mississippi's Gulf Coast hosts numerous Mississippi State scientific studies and outreach programs. Learn more about the planned Northern Gulf Aquatic Food Research Center on page 16 and coastline resilience on page 20. (Photo by Kevin Hudson)