CLEMSON UNIVERSITY COLLEGE OF AGRICULTURE, FORESTRY AND LIFE SCIENCES

# MOMENTUM

## 2026 *DEAN'S REPORT*

AGRICULTURE, FORESTRY AND LIFE SCIENCES

# ABOUT THE COVER

Within Clemson University's vegetable breeding program, plant geneticists are uncovering traits that can help crops survive some of South Carolina's toughest challenges: heat, disease and a changing climate. From disease-resistant leafy greens to heat-tolerant green beans, these discoveries are rooted in decades of grassroots seed collecting, patient trialing and collaborations across the state. Working closely with growers, Extension agents and farms large and small, this newly assembled research team is giving South Carolina a significant advantage in crop production — and strengthening the livelihoods of those who depend on it.

**Back row:** Stephen Kresovich, Robert and Lois Coker Trustees Endowed Chair of Genetics; Tom Bilbo, assistant professor and state vegetable entomologist; Karin Albornoz, assistant professor of postharvest; Sandra Branham, assistant professor of vegetable breeding and genetics; and Jerry Lee, director of agriculture at McCall Farms. **Front row:** Mark Farnham, research leader, U.S. Vegetable Laboratory (retired); Patrick Wechter, director of Coastal Research and Education Center; and Zack Snipes, area horticulture agent, assistant program team leader — horticulture.

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# Welcome to the College of Agriculture, Forestry and Life Sciences

The Clemson University College of Agriculture, Forestry and Life Sciences embodies the land-grant mission and vision of Thomas Green Clemson. The college's interdisciplinary programs in five departments offer 32 undergraduate and graduate degree programs that prepare students for challenges facing our state, nation and world. Cutting-edge research is conducted by faculty housed on campus and at the Experiment Station's six Research and Education Centers across the state.

True to our mission, the College's Cooperative Extension Service delivers the latest research-based information to South Carolinians through offices in every county. Additionally, Regulatory Services and Livestock Poultry Health play vital roles in protecting animal, environmental and human health. Together, these units extend the reach of CAFLS, supporting public health, economic development and environmental sustainability throughout South Carolina and beyond.

# Built to Serve

What distinguishes the College of Agriculture, Forestry and Life Sciences is not simply what we do, but how—and why—we do it.

Across this College, service is not an abstract ideal. It is a daily practice shaped by listening, collaboration and a responsibility to deliver work that matters. It guides how our faculty and staff teach and mentor, how our researchers pursue discovery and how our professionals engage with communities, industries and partners. This shared mindset is the driving force behind the momentum reflected in this report.

The stories that follow capture a college defined by people and progress. You will see students gaining experience that extends far beyond the classroom—learning to apply knowledge in real settings. You will meet new faculty and leaders who bring fresh expertise, perspective and energy to our work. You will see research and outreach efforts shaped by real needs and designed to strengthen South Carolina.

What unites these efforts is a commitment to relevance and impact. Discovery is only the beginning. The true measure of success is whether knowledge leads to better decisions, stronger communities and more resilient systems. This requires collaboration, trust and a willingness to test ideas in practice, often alongside those who will ultimately put them to use.

This work is made possible by a community that believes in shared responsibility. Faculty and staff bring dedication and creativity to their roles. Students bring curiosity and drive. Alumni, donors and partners bring insight, investment and long-term commitment. Together, we extend this College's reach and ensure its work remains responsive and relevant in a changing world.

Looking ahead, CAFLS is focused on preparing graduates who are ready to contribute from day one, supporting excellence and growth among our faculty and staff, and expanding the impact of our work in meaningful and measurable ways. The challenges ahead are complex and interconnected, but they also present opportunities for innovation, leadership and service rooted in purpose.

I am confident in this College and the people who define it. What you will see in the pages that follow reflects intention, collaboration and a shared commitment to meaningful impact. I invite you to explore these stories and see how CAFLS continues to move forward—through people, purpose and work that serves others.

**MATTHEW "MATT" HOLT**
DEAN, COLLEGE OF AGRICULTURE,
FORESTRY AND LIFE SCIENCES

by the numbers

## STUDENT SUCCESS

freshman retention **93.9%**

6-year graduation **85%**

GRADUATE ENROLLMENT

**248** Master's **179** Doctoral

**144** graduate student completions IN 2024-2025

## ENROLLMENT BY DEPARTMENT 2025-2026

| UNDERGRADUATE | 1,944 |
|---|---|
| AGRICULTURAL SCIENCES | 317 |
| ANIMAL AND VETERINARY SCIENCES | 655 |
| FOOD, NUTRITION AND PACKAGING SCIENCES | 413 |
| FORESTRY AND ENVIRONMENTAL CONSERVATION | 408 |
| PLANT AND ENVIRONMENTAL SCIENCES | 151 |

| GRADUATE | 434 |
|---|---|
| AGRICULTURAL SCIENCES | 37 |
| ANIMAL AND VETERINARY SCIENCES | 31 |
| FOOD, NUTRITION AND PACKAGING SCIENCES | 54 |
| FORESTRY AND ENVIRONMENTAL CONSERVATION | 203 |
| PLANT AND ENVIRONMENTAL SCIENCES | 102 |

## UNDERGRADUATE STUDENTS

first generation

COLLEGE **16.2%**

UNIVERSITY **14%**

pell grant recipients

COLLEGE **20.4%**

UNIVERSITY **17.4%**

in-state

COLLEGE **74%**

UNIVERSITY **58.5%**

**3,922** total college applications FALL 2025

**12:1** student:teacher ratio

**3.05%** average annual enrollement growth since 2021

# DEGREE PROGRAMS

## AGRICULTURAL SCIENCES

Agricultural Education (B.S., M.Ag.E., Post-B.S. Cert)
Agricultural Mechanization and Business (B.S.)
Agribusiness (B.S.)
Agriculture (M.S., Ph.D.)
Applied Economics and Statistics (M.S.)

## ANIMAL AND VETERINARY SCIENCES

Animal and Veterinary Science (B.S., M.S., Ph.D.)

## FOOD, NUTRITION AND PACKAGING SCIENCES

Food and Human Nutrition (B.S.)
Packaging Science (B.S., M.S.)
Food, Nutrition and Culinary Sciences (M.S.)
Food, Nutrition and Packaging Sciences (Ph.D.)

## FORESTRY AND ENVIRONMENTAL CONSERVATION

Environmental and Natural Resources (B.S.)
Forest Resource Management (B.S.)
Wildlife and Fisheries Biology (B.S., M.W.F.R., M.S., Ph.D.)
Forest Resources (M.F.R., M.S., Ph.D.)

## PLANT AND ENVIRONMENTAL SCIENCES

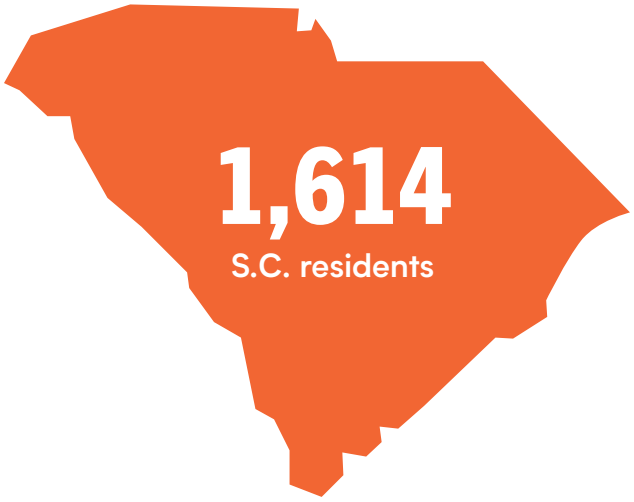
Horticulture (B.S.)
Plant and Environmental Sciences (B.S., M.S., Ph.D.)
Turfgrass (B.S.)
Entomology (M.S., Ph.D.)

**2,378**
total college enrollment

**657**
residents from other states

**30**
countries represented

**130**
international students




With a state resident **undergraduate enrollment of 1,476** students, the current college student body represents **45 counties** in South Carolina.

*For Fall 2025

# STATEWIDE IMPACT

Clemson University College of Agriculture, Forestry and Life Sciences is at the heart of South Carolina's growth and resilience, delivering tangible solutions that benefit the state's people, environment and economy. Through units like Clemson Cooperative Extension, Livestock Poultry Health and Regulatory Services, we address critical challenges in agriculture, natural resources and public health. Whether advancing sustainable farming practices, safeguarding food supply chains, or protecting animal health, our faculty, staff and students work collaboratively with communities and industry to drive progress. Together, we're shaping a prosperous and sustainable future for all South Carolinians.

## EXTENSION AT A GLANCE

**46**
county Extension offices

**10,714**
programs offered

**230K+**
participants served

**121K**
youth impacted through 4-H and FFA

**194**
agents and specialists

**324**
Master Naturalists volunteers

- Left: Ongoing efforts to eradicate the Yellow Legged Hornet resulted in close to 100 nest removals in 2025.
- Center: Each soil test from Clemson's Agricultural Service Laboratory delivers $115–$170 in estimated savings through science-based recommendations that save money and reduce environmental impact.
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# PREPARING FOR NEW WORLD SCREWWORM

Clemson University experts are actively preparing South Carolina livestock producers, veterinarians, meat processors and pet owners for the potential arrival of the New World screwworm (NWS), a parasitic blowfly whose larvae feed on the living tissue of warm-blooded animals and can cause severe injury or death if left untreated. Although no animal cases have been reported in the United States, recent outbreaks in Central America and Mexico have brought the pest closer to the U.S. border, prompting concern among animal health officials and agricultural stakeholders.

South Carolina State Veterinarian Michael Neault, director of Clemson's Livestock-Poultry Health division, said the Department is working with state and federal partners, including the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, to monitor NWS movements, implement trapping protocols and educate the public about early detection and reporting. Clemson's outreach emphasizes that early detection of NWS infestations dramatically improves treatment outcomes and can help prevent wider spread.

To support this readiness, Clemson has developed educational resources outlining the signs and symptoms of screwworm infestations, including visible maggots in wounds and foul-smelling discharge, and provides guidance on how to report suspicious cases involving domestic animals, wildlife or humans. While the risk to humans is considered low, recent travel-associated cases in the United States underscore the importance of vigilance.

Clemson's efforts are part of a broader, multi-agency preparedness strategy that includes state and federal surveillance, public outreach, and collaboration with animal health officials. By equipping producers and animal owners with the knowledge to recognize and respond to potential infestations, Clemson aims to safeguard South Carolina's agricultural economy and protect its livestock, pets and wildlife from this emerging threat.

# BUILDING CAPACITY

Building capacity means investing with intention. Through strategic hires and targeted facility improvements, the College strengthened its ability to educate, discover and serve. These investments ensure the people and infrastructure are in place to meet the needs of South Carolina now and into the future.

## PUNEET DWIVEDI

Glenn ’65 and Heather Hilliard Endowed Professor of Environmental Sustainability

Dwivedi advances interdisciplinary research and teaching focused on environmental sustainability while mentoring students and collaborating across units to strengthen Clemson’s research and academic impact.

Left: Grower groups, including the South Carolina Small Fruit Growers Association, have called for more research and Extension support for strawberries, blueberries, blackberries, muscadines and other specialty crops, which has led to expanded small fruit research at Musser Fruit Farm.

Left: New analytical lab at Edisto REC

## RAMESH JEGANATHAN

Chair, Department of Food, Nutrition and Packaging Sciences

Jeganathan brings more than 25 years of academic and leadership experience to the department, with a focus on strategic research growth, faculty development and expanded collaboration across food, nutrition and packaging disciplines.

## MALLORY MAHER

Program Coordinator, South Carolina Master Naturalist Program

Maher leads outreach and education efforts that prepare volunteers to support natural resource stewardship and environmental education programs across the state.

## M. SOLEDAD PERESIN

Director, Wood Utilization + Design Institute

Peresin guides research, education and innovation in wood science, engineered wood products and sustainable material design, strengthening Clemson's leadership in wood-based technologies.

## WAYNE PHILLIPS

Manager, Clemson University Forest

Phillips oversees stewardship of the Clemson University Forest, supporting its role as a living laboratory for research, teaching, outreach and sustainable land management.

# LEARNING IN ACTION

Our students are tackling real-world challenges with creativity, determination, and purpose, exemplifying the power of hands-on learning to create meaningful change. Whether revitalizing landscapes, contributing to food security, or engaging in cutting-edge research, CAFLS students turn their education into action. These experiences prepare them to lead with purpose, tackle the grand challenges of today and shape a brighter future for the world.

# FORESTRY SUMMER CAMP

Each summer, students in Clemson's forest resource management program step out of the classroom and into working forests across South Carolina, where learning happens by doing. Through an intensive forestry field camp, students spend seven weeks building the skills they will rely on in their future careers.

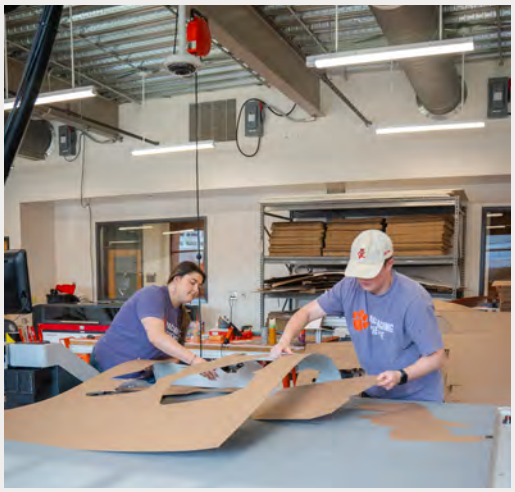
Days are spent measuring timber, conducting forest inventories, practicing prescribed fire planning and learning how management decisions shape forest health over time. Faculty members and forestry professionals guide students through real scenarios, helping them connect concepts from coursework to the realities of managing land. The experience builds technical knowledge while reinforcing problem solving, teamwork and decision making in the field.

For many students, the camp is a turning point. Senior Alex Lewis arrived unsure of his career direction and left confident that forestry was the right path. That clarity comes from being fully immersed in the work, seeing how science, management and stewardship intersect on the ground.

The camp also builds confidence. Students leave with hands-on experience that mirrors professional expectations, giving them a clearer understanding of the field and their role within it.

By placing students directly in forest environments, this experience shows how applied learning prepares graduates to enter the workforce ready to manage forests responsibly and contribute to the long-term health of South Carolina's natural resources.

Field instruction gives forestry students practical experience beyond the classroom.



Mackenzie Kelley and Broden Robinson begin assembly of a paper tiger sculpture created for Senior Week. The interactive installation was designed for the Division of Marketing and Communications and invited graduating seniors to decorate the tiger with notes, drawings and memories.

# REAL CLIENTS, REAL LEARNING

Packaging science students gain hands-on experience through the BrownBox Agency, a student-run packaging solutions program based in the Sonoco Institute of Packaging Design and Graphics. The agency was developed with support from Andrew Hurley, professor of packaging science, and Haley Appleby, co-director of the Sonoco Institute of Packaging Design and Graphics. Students operate in an environment that mirrors professional consulting, working directly with clients to design and prototype paper-based packaging solutions from concept through final delivery.

Through the agency, students apply classroom knowledge to package design, project management and client communication while responding to real constraints and expectations. They manage timelines, refine concepts through multiple iterations and deliver turnkey solutions that meet client needs, reinforcing accountability and professional standards.

The experience prepares students for the workforce by placing responsibility in students' hands. By graduation, participants have solved applied problems, worked as professional teams and delivered solutions shaped by industry practice.

# LEARNING ON THE FIRE LINE

For Chapman Warren, a forest resource management major, wildfire response was once a distant concept. That changed this summer when Warren worked as a seasonal wildland firefighter with the U.S. Forest Service at Pike-San Isabel National Forest in Colorado.

As a firefighter type 2, Warren gained hands-on experience supporting wildfire suppression and fuel management efforts. His work included station maintenance, thinning projects and preparing burn units for prescribed fires. The learning quickly moved from preparation to response when his crew was dispatched to large wildfires across multiple states, including the Jenkins Creek Fire in Minnesota and the Trout Fire in New Mexico's Gila National Forest.

Warren also participated in several initial attack fires, fast-moving incidents that require crews to respond quickly and contain fires while they are still small. The experience sharpened his technical skills, including chainsaw operation and prescribed burning, and exposed him to fire behavior on a much larger scale than he had previously encountered.

By the end of the summer, Warren had worked fires spanning tens of thousands of acres and gained clarity about his future. He plans to continue building certifications in wildland firefighting, including helicopter crew and leadership qualifications, as he prepares for a career protecting forests and communities.

# LEARNING THROUGH GLOBAL SERVICE

CAFLS alumna Grace Nammouz and doctoral student Noah Willsea earned 2025 NextGen Service Fellowships, a competitive national program recognizing students and recent graduates who paired academic learning with meaningful service.

As fellows, Nammouz and Willsea spent four weeks working with nonprofit and community-based organizations in Sub-Saharan Africa. Both served with the PHE Ethiopia Consortium in Addis Ababa, Ethiopia.

Nammouz, who graduated with a degree in environmental and natural resources, supported sustainable agriculture initiatives and community outreach efforts focused on strengthening local food systems. Willsea, a Ph.D. student in plant and environmental sciences, applied his horticultural expertise to projects aimed at improving agricultural resilience and food security.

CAFLS accounted for two of Clemson University's six fellowship recipients. The program, administered by the Institute of International Education and the Rockefeller Foundation, selected 52 fellows nationwide from just nine universities. Their selection reflected how CAFLS prepares students and graduates to translate learning into service that extends well beyond the classroom.

# FLOATING SOLUTIONS

Hands-on experience shaped every stage of Clare Escamilla's doctoral work at Clemson University, where she combined field research, laboratory experimentation and community engagement to address water quality challenges in coastal stormwater systems.

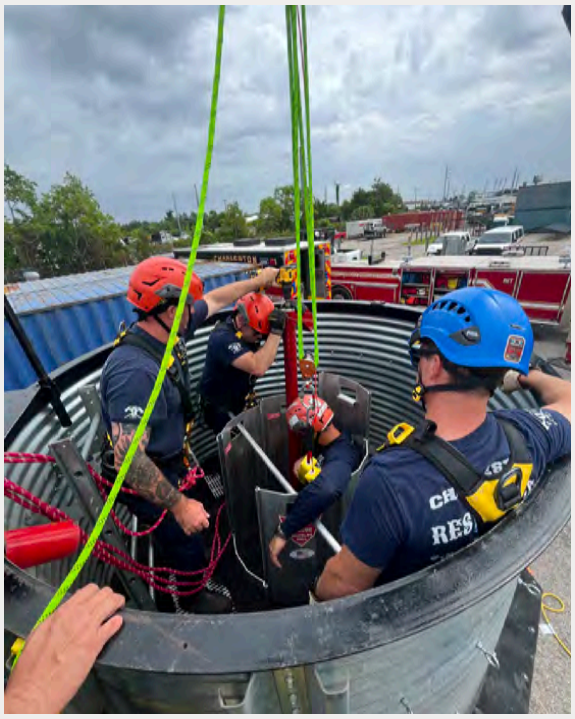
As a Ph.D. student in the Department of Plant and Environmental Sciences, Escamilla focused her research on floating treatment wetlands, vegetated platforms designed to improve water quality by removing excess nutrients such as nitrogen and phosphorus. Her work required direct involvement in every phase of the research process. She conducted greenhouse trials to evaluate how different plant species respond to salinity, installed and monitored floating wetlands in brackish ponds, and collected water quality data under real-world conditions.

Escamilla's research also extended beyond the water's edge. She worked with residents living near stormwater ponds to better understand how people perceive environmental infrastructure in their communities. Through focus groups and surveys, she explored how factors such as appearance, visibility and perceived benefits influence support for water quality projects. This experience gave her practical insight into how scientific solutions intersect with public values and local decision-making.

Throughout her doctoral program, Escamilla developed skills in experimental design, data analysis and interdisciplinary collaboration. She worked closely with faculty mentors and local partners, gaining experience adapting research methods to site-specific conditions and communicating results to both scientific and nontechnical audiences.

Now a faculty member at Utah State University, Escamilla continues to build on the applied foundation developed during her time at Clemson.

# LIFE-SAVING TRAINING



For Hunter Massey, a principal lecturer in Clemson University's Agricultural Sciences Department, and Shelley Lovern, an agricultural safety associate with Clemson Cooperative Extension, the impact of safety training is not always easy to quantify. A grain bin rescue training in Dillon County changed that.

Lovern led hands-on training with Dillon County Fire and Rescue, using Clemson's grain bin simulator and rescue panels to walk firefighters through real-world rescue scenarios. Two months later, the department responded to an actual grain bin entrapment. When responders realized they needed additional rescue panels, Lovern and Massey helped locate equipment at another fire department so the rescue could continue without delay. The victim was safely removed and later released from the hospital.

Since the rescue, requests for training have increased, particularly in South Carolina's row-crop regions. Lovern and Massey are also developing a statewide map of rescue equipment locations to help first responders act faster when seconds matter.

# PREPARING STUDENTS FOR CAREERS IN PUBLIC SERVICE

Clemson's Regulatory Services and the College of Agriculture, Forestry and Life Sciences are preparing students for professional careers through a hands-on internship program that supports both workforce development and the University's public service mission.

Led by Allison Bower, the Regulatory Services internship program places undergraduate students in paid roles across pesticide licensing, invasive species management, diagnostics, laboratory operations and regulatory support. Interns contribute directly to programs that protect agriculture, natural resources and public health across South Carolina.

Students from a wide range of academic majors participate, reflecting the interdisciplinary nature of regulatory work. In addition to on-the-job experience, the program emphasizes professional development through structured mentoring, job shadowing and opportunities to present their work to Clemson employees.

# MENTORING FUTURE SCIENTISTS

Clemson faculty are helping shape South Carolina's future scientific workforce through sustained mentorship and research leadership that extends beyond campus.

Sachin Rustgi, an associate professor of molecular breeding at Clemson's Pee Dee Research and Education Center, was recognized by the South Carolina Governor's School for Science and Mathematics (GSSM) for his long-standing commitment to student research and mentorship. Rustgi has guided high-achieving high school students through advanced research experiences in agriculture, biotechnology and molecular biology, helping them build confidence and skills that prepare them for careers in science.

Through Clemson's collaboration with GSSM and international partner programs, Rustgi has mentored students from across South Carolina and abroad, expanding access to hands-on research and strengthening pathways into STEM fields. His work connects young scholars with real-world scientific challenges, from crop improvement to human health.

Josh Witten, director of research and inquiry at GSSM, said student research programs depend on dedicated mentors who invest time, expertise and encouragement. Rustgi's approach emphasizes curiosity, collaboration and long-term impact, qualities students say make their research experiences meaningful and transformative.

By supporting the next generation of scientists, Rustgi's mentorship reflects Clemson's land-grant mission and its role in building research capacity and scientific leadership for South Carolina.

# WHAT THE PAST CAN TEACH US ABOUT FLOODING

Research led by Clemson archaeologist Reed Goodman is offering modern lessons on water management by examining the collapse of the ancient Mesopotamian city of Lagash more than 4,000 years ago.

Goodman, based at Clemson's Belle W. Baruch Institute of Coastal Ecology and Forest Science, worked with an international team to study how Lagash's extensive canal system supported agriculture and trade but also became a point of failure. Evidence suggests floodwaters were intentionally released through the canal network during a military conflict, overwhelming the city and triggering widespread destruction, economic collapse and population loss.

Goodman said the findings show how engineered systems that sustain communities can also create vulnerability when mismanaged or exploited. The study highlights the close connection between infrastructure, environmental conditions and social stability.

The research has direct relevance for South Carolina, where agriculture, communities and ecosystems depend on carefully managed water systems. From irrigation networks to levees, reservoirs and wetlands, modern infrastructure requires maintenance, coordination and long-term planning to reduce flood risk and protect livelihoods.

By examining how ancient systems failed, the study underscores the importance of resilient and adaptive water management strategies. Goodman said lessons from the past can help today's communities strengthen infrastructure, prepare for extreme weather and safeguard the systems that support agriculture and economic vitality.

# OUR GRADS IN FOCUS

During their time at Clemson University, College of Agriculture, Forestry and Life Sciences students fully immerse themselves in the tutelage of highly-skilled faculty so that when they eventually walk across the stage at commencement, they are prepared to represent the College well. Meet a few of our 2025 grads.


Addison Foster earned his degree in environmental and natural resources.

Shikha Dubey, with her advisor Bhupinder Farmaha, earned her doctoral degree in Plant and Environmental Sciences.

Both Sophia Downs (Animal and Veterinary Sciences) and Samuel Brandes (Environmental and Natural Resources) served as CAFLS Ambassadors during their time at Clemson.

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Call us biased, but CAFLS grads have the best headware at commencement.

# Serving South Carolina

# HOME-FIELD ADVANTAGE

Across South Carolina, vegetable growers contend with intense heat, heavy humidity, insect pressure and persistent disease. Those challenges are constant, but so is Clemson University's commitment to helping farmers meet them. Through a coordinated effort that links plant breeders, Extension agents and industry partners, Clemson's vegetable program is developing crops specifically suited to the state's climate and soils — creating a true home-field advantage for South Carolina agriculture.

At the center of this work are Clemson's Research and Education Centers, where scientists test vegetables under the same real-world conditions growers face every season. Sandra Branham, assistant professor of vegetable breeding and genetics at the Coastal Research and Education Center, focuses on leafy greens such as collards and turnips. By screening heirloom and commercial lines, she identifies natural resistance to diseases like bacterial leaf blight and black rot, then combines those traits with qualities growers and consumers value — large leaves, strong yields and consistent flavor.

At the Pee Dee Research and Education Center, Jenna Hershberger leads breeding efforts in crops such as butter beans and green beans. Drawing from national germplasm collections, she evaluates hundreds of varieties for heat tolerance, disease resistance and production performance under South Carolina conditions. The process takes years of careful selection and field trials, but the goal is clear: deliver cultivars that thrive where they are grown.

Clemson Cooperative Extension plays a vital role in ensuring this research remains grounded in the needs of producers. Agents such as Zack Snipes serve as trusted advisors in farming communities, identifying emerging issues and connecting growers with university expertise. Many farmers collaborate directly in on-farm trials, providing feedback that shapes future breeding decisions.

Industry partners also guide priorities through Clemson's vegetable research advisory board. Companies such as McCall Farms and WP Rawl, along with growers of all sizes, share insight into production, processing and market demands. Their collaboration — including significant private investment in vegetable breeding — strengthens research capacity and ensures solutions benefit the entire supply chain.

South Carolina consistently ranks among the nation's leaders in crops such as collard greens, turnip greens and Southern peas. That success is no accident. It reflects decades of partnership, local knowledge and science rooted in place. By developing crops designed for South Carolina's unique environment, Clemson is helping farmers remain competitive, resilient and prepared for the seasons ahead.

# TOOLS GROWERS CAN TRUST

South Carolina farmers can use a free mobile app to identify and manage pests and diseases in major row crops. MyIPM for Row Crops, developed through Clemson Extension, supports science-based pest management decisions in the field.

The app includes photos and descriptions of pests and diseases affecting corn, cotton, peanuts, sorghum, soybeans and wheat, along with integrated pest management strategies and registered pesticide options. Francis Reay-Jones, Clemson Extension integrated pest management coordinator at the Pee Dee Research and Education Center, said the app builds on existing Extension production guides by delivering practical information directly to growers.

Because the content is stored on the device, users can access the app without cellular service. Growers can search by crop, pest or disease and quickly find pesticide information, including active ingredients, trade names, usage rates and efficacy ratings.

Each pest profile includes chemical and nonchemical control options, resistance management guidance and safety details such as preharvest and reentry intervals. Information is maintained by Clemson researchers in partnership with scientists from universities across the Southeast and Mid-Atlantic and updated automatically.

MyIPM for Row Crops is part of the broader MyIPM app series launched by Clemson professor Guido Schnabel to support adoption of integrated pest management practices.

# PROTECTING POLLINATORS

South Carolina continues to confront the invasive yellow-legged hornet, a predatory insect that threatens honeybees and other pollinators vital to agriculture and ecosystems. Clemson's Department of Plant Industry is leading a coordinated response that combines early detection, surveillance, public reporting and nest eradication.

Since the species was first confirmed in the state, DPI inspectors and partner agencies have supported trapping and nest removal efforts across the Lowcountry. Proactive monitoring has led to the identification and destruction of numerous nests, including early-stage nests that could have produced new colonies. Inspectors have also captured adult hornets and queens that posed a risk of further spread.

Public participation plays a critical role in these efforts. Reports from beekeepers and landowners have directly led to new detections, reinforcing the importance of community vigilance.

# GROWING LEARNING OUTDOORS

Across South Carolina, school gardens are helping address two persistent challenges at once: student health and classroom engagement.

Through the School Gardening for South Carolina Educators program, Extension is equipping teachers with the knowledge, tools and support needed to use gardens as outdoor classrooms. The program is led by Amy Dabbs, statewide School and Community Gardening coordinator, who works with educators and partners to expand access to garden-based learning across the state. Garden-based instruction encourages physical activity, builds healthy eating habits and reinforces learning in STEM, literacy and environmental science.

Many educators want to use gardens but face barriers, including limited horticulture experience, uncertainty about supplies and difficulty integrating gardening into standards-based curricula. Since 2012, the program has helped remove those barriers through professional development, curated classroom materials and coordinated delivery of seeds, transplants and supplies.

School gardens are now established in all 46 counties, supported by partnerships with the South Carolina Department of Education, health organizations and Farm to School initiatives. This statewide network has helped schools launch new gardens, expand existing ones and sustain programming year after year.

# ADVANCING CEREAL CROPS

Clemson is strengthening cereal crop production in South Carolina through modern plant breeding that delivers practical solutions for farmers and regional agricultural systems.

At the Pee Dee Research and Education Center, Richard “Rick” Boyles leads applied breeding efforts focused on wheat, sorghum and oats, crops that are often underserved despite their importance to livestock feed, cover cropping and farm diversification. His work centers on developing varieties suited to South Carolina’s soils, climate and end-use needs, helping farmers improve resilience and productivity.

Clemson-developed varieties are already making an impact. Sorghum genetics from the program have been incorporated into commercial hybrids grown across thousands of acres, while an oat line developed through the program is widely used in regional cover crop and wildlife blends. Boyles works closely with the South Carolina Crop Improvement Association and private seed partners to ensure new varieties move efficiently from research plots into farmers’ fields.

Graduate student research plays a key role in guiding breeding priorities. Students in the Boyles lab are improving sorghum performance in sandy, dryland soils, strengthening disease resistance and enhancing grain traits for animal feed and poultry production. Their work helps address grain shortages in the Southeastern U.S. while supporting a growing regional livestock industry.

By combining long-term breeding, applied research and strong industry partnerships, Clemson’s cereal crop program is expanding options for farmers and building a more resilient agricultural future for South Carolina.

# TURNING DATA INTO DECISIONS

South Carolina farmers are turning to digital tools to make more precise decisions and Clemson Extension's Precision Agriculture Program is delivering free web-based apps that help producers manage inputs, control costs and protect natural resources.

Developed through the Clemson University Center for Agricultural Technology, or CU-CAT, the tools were shaped by direct feedback from growers. Kendall Kirk, director of CU-CAT, said the apps were created to simplify complex calculations related to fertilizer application, soil management and production planning.

The mobile-friendly tools automate decisions that once required spreadsheets or manual estimates, helping farmers apply nutrients accurately and reduce waste. Popular apps focus on fertilizer and soil management, including drip fertigation, fertilizer blending, lime rates and soil pH adjustment.

Additional tools support specific sectors. Peanut producers use apps to estimate yields and manage equipment settings. Grain producers rely on the EMC Calculator, developed with Aaron Turner from the Department of Agricultural Sciences, to guide grain storage decisions. Livestock producers use feed ration tools to balance custom mixes while meeting nutritional needs.

Based at Clemson's Edisto Research and Education Center in Blackville, the Precision Agriculture Program continues to develop new technologies that connect research with on-farm decision-making and support more efficient, sustainable agriculture across South Carolina.

# HEAT-TOLERANT PEANUTS

As temperatures rise, Clemson scientists are helping peanut farmers protect yields by identifying genetic traits that support reproduction under heat stress.

A research team led by Sachin Rustgi, a molecular breeder at the Pee Dee Research and Education Center, discovered a specific genetic region linked to pollen viability during high temperatures. Heat stress can disrupt peanut flowering, leading to fewer pods and reduced yields. Identifying this genetic marker gives breeders a practical tool to develop varieties better suited for warmer conditions.

The team evaluated peanut genotypes from around the world under elevated temperatures, measuring pollen viability and germination. Some varieties maintained strong performance, allowing researchers to pinpoint genes that are highly active in peanut flowers and may help protect reproductive tissues during heat exposure.

Researchers also examined seed quality traits, including oleic acid, identifying markers that support both productivity and nutritional value.

Peanuts are a key agricultural commodity in South Carolina and Rustgi said the findings provide breeders with tools to help farmers grow resilient, high-yielding crops as climate conditions continue to change.

# NATURAL SOLUTIONS FOR POULTRY HEALTH

As demand grows for poultry raised without antibiotics, Clemson researchers are helping South Carolina farmers identify natural ways to keep flocks healthy while maintaining productivity.

Research led by Vishal Manjunatha, a recent graduate in food, nutrition and packaging sciences, focuses on managing necrotic enteritis, a common gut disease that causes significant economic losses in poultry production. The disease is often treated with antibiotics, but Manjunatha's work explores natural alternatives that support bird health while reducing antibiotic use.

The research examines how gut bacteria influence chicken health and how natural feed additives can improve immunity and protect intestinal function. Manjunatha found that black cumin, kefir and bacteriophages show strong potential to reduce the effects of necrotic enteritis while supporting healthy growth. These alternatives help control harmful bacteria and encourage beneficial microbes, offering farmers practical options that align with consumer expectations.

Xiuping Jiang, a Clemson professor who collaborated on the project, said the findings provide a path forward for producers seeking effective disease prevention strategies without relying on antibiotics. The research was supported by the South Carolina Department of Agriculture's Agribusiness Center for Research and Entrepreneurship, or ACRE, which funds applied projects that strengthen agriculture across the state.

Kyle Player, ACRE's director, said the study reflects the program's focus on delivering solutions that benefit both producers and consumers.

# BRIDGING CARE AND COMMUNITY

Clemson's Health Extension for Diabetes program is strengthening health outcomes across the state by expanding access to diabetes education, care and community-based support, particularly in rural and underserved areas.

Developed through a collaboration between Clemson Extension and the Department of Public Health Sciences, the program works with health systems and community partners to help individuals manage diabetes and reduce barriers to care. Windsor Sherrill, associate vice president for health research, said the program combines research expertise with Extension's statewide outreach to reach communities that often lack health resources.

Through education, care coordination and local partnerships, Health Extension for Diabetes equips participants with practical tools to improve health and self-management. Program participants report improvements in diabetes knowledge, confidence and health-related behaviors.

The program has received national recognition through the Priester Culture of Health Award, which honors Extension initiatives that demonstrate leadership and measurable impact in public health. Roger Rennekamp, health extension director for the Cooperative Extension Association of Public and Land-Grant Universities, said the program serves as a national model for addressing chronic disease through Extension.

# IMPROVING FLOOD MONITORING

Clemson is partnering with the South Carolina Office of Resilience to improve flood monitoring and water-level tracking across key watersheds, providing public agencies and emergency responders with real-time data to better understand flood risk.

The effort uses BridgeBox sensors developed through Clemson's Intelligent River program. Installed on bridges and other structures, the sensors measure water levels at frequent intervals and transmit the information to a shared data platform accessible to state and local partners. The system works in coordination with the U.S. Geological Survey to strengthen flood awareness during storms and periods of high water.

Christopher Post, a professor in the Department of Forestry and Environmental Conservation, co-developed the project with Syed Mohammad Ovais, lead engineer for the Intelligent River program. Post said the sensors help close gaps in flood data and improve situational awareness for communities, transportation systems and emergency planning.

With support from the South Carolina Office of Resilience, the project is expanding sensor coverage across the Upper Savannah River and Upper Saluda River watersheds. Bryan Rabon, data coordination manager for the Office of Resilience, said the system strengthens the state's ability to plan for floods and reduce risk to people and infrastructure.

The project reflects a broader effort to build resilience in South Carolina by using science, data and partnerships to prepare communities for extreme weather and changing environmental conditions.

# HEALTHY LIVING IN ACTION

South Carolina 4-H is helping young people build lifelong skills in nutrition, teamwork and confidence through its Healthy Living Team Cooking Challenge, a hands-on program that blends culinary training with real-world problem solving.

The program guides teens through cooking summits and county-based camps where they learn food safety, knife skills, time management and teamwork. Margaret Condrasky, 4-H healthy lifestyles program specialist, said the challenge is designed to build culinary confidence while reinforcing healthy living practices.

After training, teams compete in a statewide challenge that requires them to plan and prepare a complete dish using a set of required ingredients, without recipes and under strict time limits. The format encourages creativity, adaptability and collaboration while mirroring the pace and pressure of professional kitchens.

Florence County and Spartanburg County teams earned top finishes at the state level and advanced to represent South Carolina at a national 4-H cooking competition. Their success reflects strong preparation by local 4-H agents and the depth of talent among youth participants across the state.

Through experiences like the Healthy Living Team Cooking Challenge, South Carolina 4-H equips young people with practical skills that support healthier lifestyles and prepare them to contribute confidently in their communities.

# BEATING BACK THE THREAT OF AVIAN INFLUENZA

Clemson's Livestock-Poultry Health (LPH) program plays a central role in protecting South Carolina's poultry and dairy industries from Highly Pathogenic Avian Influenza (HPAI) through monitoring, education, biosecurity guidance and rapid response. As the state's animal health authority and veterinary diagnostic leader, LPH works with producers, veterinarians and state and federal partners to detect and contain emerging disease threats before they disrupt animal health or the agricultural economy.

South Carolina's $1.5 billion poultry industry remains commercially free of the most severe HPAI outbreaks, due in part to strong biosecurity practices promoted by Clemson animal health officials. However, recent cases of the Eurasian strain in backyard flocks highlight ongoing risk, especially as migratory waterfowl travel the Atlantic Flyway. In those instances, affected flocks were depopulated and tested at the Clemson Veterinary Diagnostic Center to prevent further spread.

State Veterinarian Michael Neault and Clemson's veterinary team continue to urge flock owners to separate birds from wild species,

restrict access to ponds and lakes and report sick or dead birds promptly. Through surveillance, outreach and coordinated response efforts, LPH helps safeguard the health and economic stability of South Carolina's livestock and poultry sectors.

# A GREENER FUTURE

South Carolina farmers could benefit from new Clemson research that turns agricultural waste into valuable products, reducing pollution while supporting sustainable crop production.

Based at Clemson's Coastal Research and Education Center, Brian Ward is developing a system that uses natural bacteria to convert protein-rich farm waste, such as vegetable scraps and other byproducts, into ammonia-based fertilizer and renewable fuel. The approach offers an environmentally friendly alternative to traditional fertilizer production, which is energy-intensive and heavily reliant on petroleum-based inputs.

Ward said the technology allows waste materials to be repurposed into affordable, environmentally friendly nutrients that support crop growth and organic farming systems. Early results suggest the process could lower costs

for growers while reducing greenhouse gas emissions associated with conventional fertilizer manufacturing.

The project is being advanced through laboratory research and pilot-scale development, with interest from industry partners who see potential to expand access to organic fertilizer and support more resilient agricultural systems.

# SUSTAINED EFFORT TO STOP A DESTRUCTIVE FOREST PEST

The Department of Plant Industry continues a long-term effort to eradicate the invasive Asian longhorned beetle, a destructive pest that threatens hardwood trees across South Carolina. Working with the U.S. Department of Agriculture and other partners, DPI leads surveys, removals and quarantine enforcement to prevent the insect's spread.

Field teams conduct extensive tree inspections across regulated areas, identifying infested trees and removing high-risk hosts to eliminate breeding sites. These actions are designed to contain known infestations while protecting unaffected forests and communities.

Ongoing surveillance has proven essential. Observations by trained inspectors and reports from the public have helped identify new areas of concern, triggering expanded response efforts and updated quarantine boundaries to limit movement of infested wood and debris.

Education and reporting remain central to the strategy. DPI provides online tools and outreach materials to help residents, arborists and landowners recognize signs of infestation and report them promptly. Through sustained monitoring, coordinated removals and community cooperation, Clemson's DPI is working to protect South Carolina's forests and reduce the long-term economic and environmental impacts of this invasive species.

# MANAGING AN EMERGING PEST

South Carolina okra growers are confronting a new pest threat as the invasive two-spot leafhopper spreads across eastern counties, damaging crops and challenging traditional management practices.

The insect, also known as the cotton jassid, feeds on plant leaves and causes hopperburn, a condition marked by yellowing, curling and browning that can lead to reduced yields or complete crop loss.

While okra is typically resilient, the severity of this outbreak has surprised growers. Zack Snipes, a Clemson Cooperative Extension Service area horticulture agent, said the pest has also been observed on eggplant and sunflower, though damage has been most pronounced in okra.

Growers and Extension specialists are responding in real time. Chris Sumter, an okra grower in Sumter County, said the outbreak underscores the value of land-grant research and Extension support. As he plans future plantings, Sumter is exploring both chemical and cultural strategies, including spacing adjustments and protected production, to slow the pest's spread.

Scientists at the Pee Dee Research and Education Center launched the nation's first chemical efficacy trial focused on the invasive two-spot leafhopper, positioning Clemson as a regional hub for response to this emerging pest across vegetables, ornamentals and cotton.

# THE YEAR IN PHOTOS

Throughout the year, the CAFLS community is busy learning, discovering and serving. Big milestones and everyday moments alike reflect the purpose that drives the College forward. This collection offers a look back at a year of progress and impact.



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360

# year in photos


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# year in photos



1 Agribusiness major Frank C. “Cal” Stevenson Jr. celebrated a cherished family tradition when his grandfather, Edward “Ned” Stevenson ’55, turned his Clemson Ring after commencement. “My grandfather not only impacted my years at Clemson, but he has also been my biggest role model,” Cal said. “To make the moment even more memorable, we were celebrating 70 years since he walked across the same stage.”

2 With the conferral of 12 doctoral degrees at the August ceremony, CAFLS adds a new cohort of scholars prepared to tackle complex challenges in science, industry and society. Their work reflects the depth and impact of research taking place across the College.

3 The fourth annual Clemson Ag Tech Spotlight featured research posters, hands-on demonstrations, a keynote presentation and networking opportunities that highlighted innovation in agricultural technology at Clemson.

4 Students in Mike Ferro’s Insect Biology and Diversity course took their learning outdoors to the South Carolina Botanical Garden, where they explored native habitats and collected specimens as part of their coursework.

5 Adam Kantrovich presented at the 2025 Tigersphere event, “Exploring, Building and Connecting Research with Rural Community Practice.” Hosted by the Office of Research and Development, Tigersphere brings together researchers from across disciplines to share ideas and build collaborative partnerships around a central theme.

6 We are committed to ensuring our students graduate with the skills and knowledge needed to succeed.

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9 We are committed to ensuring our students graduate with the skills and knowledge needed to succeed.

10 At CAFLS Signing Day, students shared where their next chapter will begin, announcing jobs, internships and graduate school plans that reflect years of hard work. The celebration highlights the strong industry connections and career readiness that define a CAFLS education.

# year in photos

1 Packaging Science students attended PACK EXPO Las Vegas, the largest packaging and processing show in North America. They explored new technologies, connected with industry leaders and saw innovation in action. The experience brought classroom learning to life and prepared them for careers in a global industry.

2 Congratulations to Patricia Whitener, 4-H Natural Resources Program Leader, on earning her doctorate in Youth Development Leadership. Her accomplishment reflects her passion for empowering young people and her unwavering commitment to strengthening 4-H across South Carolina.

3 Leadership Roundup, part of the South Carolina 4-H Pinckney Leadership Program, brings together middle and high school students and adult volunteers for a day of connection, growth and inspiration. The event features engaging sessions, expert speakers and interactive workshops designed to build confidence and strengthen leadership skills. Participants leave equipped to lead with purpose in their schools, communities and beyond.

4 The ClemsonLIFE Agricultural Field Day brought together ClemsonLIFE studets, the Clemson Agricultural Safety Program, Clemson Extension, the CU Ag Mech Club and SC AgrAbility for a day of hands-on learning and connection.

5 The South Carolina Botanical Garden plant sale welcomed gardeners from across the region to explore a wide selection of plants grown and curated by Garden staff and volunteers. Proceeds support the Garden's education, conservation and community outreach efforts.

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# JIM EDWARDS

Clemson University alumnus Jim Edwards ’71 has donated $650,000 to the University to be split between Clemson Libraries and the College of Agriculture, Forestry and Life Sciences.

The portion of the gift for the Libraries — $150,000 — will establish the Beatrice “Bea” Squires Edwards Library Endowment in memory of Edwards’ late wife, Bea, who was a librarian and media specialist. Her career in library science began at Cooper Library when the two were newlyweds and Edwards was still an undergraduate working towards his B.S. degree in agricultural economics and serving in Army ROTC to become a commissioned officer.

The Edwards were high school sweethearts in their hometown of Aynor, South Carolina, and married when Jim was a junior at Clemson. At the time, Bea was attending Spartanburg Junior College but put her education on hold after they were married.

“Bea sought employment to help pay some of our expenses, so she applied to a job at the library. She was hired to work in government documents at Cooper Library, and she loved it,” said Edwards. “Clemson became our new home, and the library was a special place for Bea.”

After graduating, Edwards was commissioned and served in the Signal Corps for the Army at Fort Gordon in Georgia. After his time in the Army, the Edwards moved to Statesboro, Georgia, where Jim was employed by International Minerals and Chemical Corporation. Bea pursued her career at Georgia Southern University working in the library. Jim spent the majority of his career with Elanco/DowAgrosciences. Bea eventually returned to school, completing her library science degree at Eastern Carolina University and becoming an elementary school librarian. She later went on to complete a master’s degree from Nova Southeastern University.

Jim’s career provided multiple opportunities for assignments in the midwest, southeast, and mid-south, as well as an international assignment in Europe for four years. Bea worked for several school libraries along the way. The Edwards had two sons — Adam and Kris — and the family settled in Zionsville, Indiana, where Bea served as head librarian and media specialist for Zionsville Community Schools. In that role, she was responsible for developing and building libraries for two brand new middle schools.

Bea passed away in 2012 after two bouts of cancer. Edwards wanted to honor her memory by supporting the place where she started her quest for a successful career.

“She absolutely loved her work, and she loved the students. She loved that she got to work with all of the kids instead of just one classroom,” he said. “She made a major difference in a lot of people’s lives, and it all started with that job at Cooper Library.”

The remaining $500,000 of the gift will be split between the James K. Edwards ’71 Scholarship Endowment, which provides assistance to CAFLS students, and the James K. Edwards ’71 Endowment for Student Success, which will support experiential learning opportunities such as internships, study abroad and other educational opportunities outside of the classroom.

Growing up in a small town on his family’s farm, Edwards said his time at Clemson “opened my eyes to the world,” and he hopes his gift will help provide that same opportunity to students today.

“My Clemson education was the catalyst for me to pursue agricultural business around the world. You can build a great career if you start with a strong foundation. Clemson was that foundation for our lives, and it’s why I wanted to establish these endowments,” he said.

Edwards is now retired and lives in Bluffton, South Carolina, with his wife Marsha.

# CLAYS FOR CAFLS

Alumni and friends of the College came together for the annual Clays for CAFLS shooting tournament, an afternoon of fellowship and friendly competition. Proceeds from the event support the Alumni and Student Activities Fund, providing vital resources for alumni engagement and student-focused initiatives across CAFLS.

# ALUMNI GOLF TOURNAMENT

The 2025 CAFLS Alumni Golf Tournament was a tremendous success, bringing together alumni and friends in support of student achievement. Proceeds from the tournament benefit the Thomas E. Skelton Endowed Scholarship, which has generated more than $200,000 over the years.

# ALUMNI TAILGATE

CAFLS alumni, students, parents and friends gathered at the Fike Recreation Center for the College's annual tailgate, a game day tradition that brings the CAFLS community together. The event offers opportunities to connect with departments and student organizations while celebrating all that is happening across the College.

# OUTSTANDING ALUMNI

Each year, the College of Agriculture, Forestry and Life Sciences pauses to recognize alumni whose careers reflect the very best of our land-grant mission in action. From advancing agricultural innovation and environmental stewardship to strengthening communities and industries across South Carolina and beyond, these leaders exemplify the impact of a CAFLS education. Their achievements are not only personal milestones but powerful reminders of how our graduates continue to shape the world around them.

## PAT EARL

### DISTINGUISHED SERVICE AWARD

Earle is a two-time Clemson graduate ('78 agricultural education, '80 master's in agriculture) who has been a champion for agricultural education in South Carolina and across the nation for more than 40 years. He has served as a teacher, mentor and leader, inspiring thousands of students to pursue careers in agriculture, while helping grow the South Carolina Future Farmers of America program to historic levels.

As a legislative liaison for agriculture for the South Carolina FFA, Earle was instrumental in bridging the gap between agricultural education and policy, making sure the voices of young agricultural leaders were heard at the legislative level.

Earle has served as president of the CAFLS Alumni Board and has led several selection committees, hosted alumni gatherings and sponsored scholarships in honor of his father, a 1948 Clemson graduate. He was inducted into the National Teachers Hall of Fame.

## EMILY COPE

### 2025 PROFESSIONAL ACHIEVEMENT AWARD

Cope received both her bachelor's ('97) and master's ('99) degrees in fisheries and wildlife biology. She went on to become the first woman to serve as deputy director for the South Carolina Department of Natural Resources Division of Wildlife and Freshwater Fisheries. In that role, Cope oversaw programs that manage fish and wildlife populations, expand outdoor recreation and steward more than 1.2 million acres of land across the state.

Her leadership helped secure millions in funding and forged partnerships that strengthen habitat protection, conservation research and species monitoring. Cope represented South Carolina in national policy discussions and through her work with the Association of Fish and Wildlife Agencies.

After retiring from SCDNR, Cope accepted a position with Ducks Unlimited as the managing director of development for the South Atlantic region. She helps bring students, faculty and professionals together for networking and collaboration.

## TY WOODARD

### 2025 PROFESSIONAL ACHIEVEMENT AWARD

Woodard, a 2007 graduate, is the owner of Woodard Farms and co-founder of Covered in Cotton, a company that produces 100% locally grown and manufactured cotton textiles.

He has worked closely with Clemson Cooperative Extension Services and the Pee Dee Research and Education Center, hosting tours, research projects and educational events on his farm. In 2024, Woodard was named South Carolina's Sunbelt Ag Expo Farmer of the Year.

Since graduating, Woodard has been an active member of the Darlington County Farm Bureau Board, serving as vice president (20014-16) and president (2016-18). At the state level, he has served on the Young Farmers and Ranchers committee and was named the South Carolina Farm Bureau Federations Achievement in Agriculture winner in 2017, placing in the top 10 nationally. He also serves on the board of directors for Cotton Incorporated.


## JESSICA EGAN

### 2025 YOUNG ALUMNI AWARD

Egan graduated in 2019 with a degree in environmental and natural resources. She began as an intern with Clemson Cooperative Extension Services and the South Carolina Department of Natural Resources.

After graduating, she took a position with SCDNR and eventually became a social media manager, transforming the agency's platforms into tools for education and outreach.

Currently, Egan serves as the East Piedmont District coordinator for SCDNR's soil and water conservation districts, supporting 23 counties across the state. Egan promotes conservation partnerships, provides education and technical assistance, and advocates for new and emerging practices that strengthen South Carolina's natural resources.

## MCCAULEY FRIERSON

### 2025 YOUNG ALUMNI AWARD

Frierson is a two-time graduate of CAFLS, earning his bachelor's degree in agribusiness in 2016 and receiving his master's in agricultural education in 2019. He served three years as the college's student recruitment coordinator. Frierson connected numerous families to programs at Clemson, helping them to find their place in CAFLS.

Frierson currently serves as a loan officer with AgSouth Farm Credit where he manages a loan portfolio of more than $60 million. He also is active in the community, sponsoring and participating in agricultural events, supporting youth programs and investing time and resources back into Clemson.

# Beyond South Carolina

## TECHNOLOGY PROTECTING TIGERS

CAFLS research is helping protect one of the world's most iconic species through applied technology that supports wildlife conservation and community safety across India.

Hrishita Negi, Ph.D. '25, helped develop a first-of-its-kind artificial intelligence camera system that allows forest officials to track wild tigers in real time. Raised on India's Kanha Tiger Reserve, Negi brought both personal experience and scientific training to her work through Tigers United, a Clemson-led international conservation consortium.

Working with fellow researchers and government partners, Negi helped deploy an AI-enabled trail camera system in a corridor connecting major tiger reserves. Unlike traditional camera traps, the system instantly identifies tigers and transmits images to park managers within seconds, enabling officials to monitor animal movement and respond quickly to emerging threats.

The technology has had immediate impact. In addition to tracking tigers, the system has helped forest officials identify and apprehend poachers, contributing to more than 20 arrests. The cameras' efficiency and long battery life allow them to operate discreetly in remote landscapes, improving both wildlife protection and human safety.

Beyond technology, the work emphasizes coexistence. As tiger populations recover, interactions with nearby communities have increased. Tigers United partners with local villages, conservation agencies and community leaders to support education, outreach and economic opportunities that reduce conflict and discourage poaching.

Greg Yarrow, director of Tigers United, said the work reflects a broader conservation model that balances science with community engagement. Lessons from tiger conservation also inform wildlife management challenges closer to home, where balancing human activity and wildlife populations remains a shared concern.

By combining research, technology and partnerships, this work extends our applied science beyond national borders and demonstrates how innovation can protect biodiversity while supporting communities worldwide.

# ADVANCING GLOBAL RESEARCH WITH LOCAL IMPACT

In its first full year, CAFLS Global Research Initiatives is helping position South Carolina agriculture for long-term success by connecting local needs with global expertise.

Led by Jagger Harvey, Global Research Initiatives focuses on building partnerships in regions that share biophysical and cultural similarities with South Carolina. By aligning applied research, Extension knowledge and international collaboration, the initiative is generating solutions that strengthen food security, sustainability and economic opportunity at home and abroad.

Harvey began the year by listening. Through direct engagement with South Carolina farmers, industry leaders and technical experts, he worked to better understand the challenges facing the state's agri-food system. Those conversations helped shape interdisciplinary global teams and informed the development of competitive, impact-driven research proposals.

Early progress includes a South Carolina Corn Board-funded study addressing aflatoxin contamination in corn. The project draws on Harvey's prior international research and includes Michael Plumblee, Extension corn and soybean specialist at the Edisto Research and Education Center, as co-investigator. The first-year study is examining how aflatoxin varies across locations and production practices to inform future intervention strategies tailored to South Carolina growers.

Global Research Initiatives has also supported applied food systems work closer to home, including efforts that align with Marsh Hen Mill's food safety practices and regional grain supply chains.

One of the year's most significant milestones was securing a $1.2 million Gates Foundation grant to develop a tissue culture and hydroponic propagation system for bananas. Led by Jeffrey Adelberg in the Department of Plant and Environmental Sciences, the project focuses on producing clean planting material at scale for Africa while developing technologies adaptable to South Carolina crops such as strawberries and sweet potatoes.

The project also advances PhenoApps, a digital crop breeding platform developed by Trevor Rife at the Pee Dee Research and Education Center. These tools help breeders capture and manage data more efficiently, accelerating responses to pests, diseases and environmental stress.

Beyond research, Global Research Initiatives is expanding experiential learning and institutional partnerships. An Israel Institute-supported undergraduate program is strengthening student exposure to agricultural innovation, while visits to Israeli universities and farms are deepening research ties. A government-funded partnership with Senegal is shaping shared priorities based on similar agroecology and cultural connections, with long-term goals tied to productivity, conservation and trade.

Additional collaborations include work with Ukrainian universities to support agricultural recovery and a strategic plan presented to U.S. Central Command focused on rebuilding secure, resilient food systems in post-conflict regions.

During the year, Global Research Initiatives submitted or supported 20 grant proposals, with three funded and seven under review. Together, these efforts reflect growing momentum to position CAFLS as a leader in globally engaged, impact-driven agricultural research that delivers tangible benefits for South Carolina.

# GUIDING FOREST RECOVERY

Tropical Storm Helene caused unprecedented damage across the Southern Appalachians, triggering flooding, landslides and widespread forest loss that reshaped entire watersheds and disrupted ecosystems tied to local economies and recreation.

In response, the U.S. Forest Service selected Clemson to lead a large-scale ecological damage assessment and recovery effort across North Carolina's national forests. Supported by an $18.6 million federal award, the project reflects confidence in CAFLS's leadership in applied natural resource science and its ability to coordinate complex, multi-partner field efforts.

The work brings together expertise in forestry, wildlife, fisheries and watershed science to document storm impacts and guide long-term recovery. Kyle Barrett, interim chair and professor of wildlife ecology in the Department of Forestry and Environmental Conservation, said the collaboration combines scientific assessment with on-the-ground management needs.

Research teams will map storm damage, evaluate changes in habitat structure and identify areas where species have been displaced. The effort will also inform opportunities to restore native species and strengthen ecosystem resilience in landscapes significantly altered by the storm.

Thirteen CAFLS faculty members are contributing to the project, working closely with Forest Service staff and partner organizations. Graduate students will also play a key role, gaining hands-on experience in field surveys, data analysis and restoration planning that prepares them for careers in conservation and natural resource management.

By applying science at the scale required to address major natural disasters, this work extends our land-grant mission beyond state boundaries and supports recovery efforts in forested communities across the region.

# ADVANCING WATER-SMART AGRICULTURE

CAFLS researchers are leading a multi-year effort to improve water efficiency and crop productivity across the Southeast, helping farmers adapt to increasing environmental and operational challenges.

Led by Qiong Su in the Department of Agricultural Sciences, the project brings together expertise in agronomy, horticulture and natural resources engineering to address water scarcity, extreme weather and saltwater intrusion. Supported by the USDA Research Capacity Fund, the work focuses on delivering science-based, regionally tailored tools for irrigation scheduling, crop planning and long-term field management.

At the center of the effort is a multiscale modeling framework that integrates weather data, satellite and drone imagery, soil characteristics, crop performance and results from greenhouse and field experiments. Using artificial intelligence and process-based crop and hydrologic models, the framework translates complex data into practical guidance for producers and decision-makers.

The research advances three core priorities: improving high-resolution weather forecasting, refining evapotranspiration models to reflect real-world stressors and developing tools that guide crop selection and irrigation management. Together, these efforts support more precise water use, particularly in coastal and salt-affected systems.

By turning advanced modeling into accessible decision-support tools, this work extends our applied research beyond state boundaries. It helps producers across the Southeast manage water sustainably while protecting yields and long-term soil health.

# ECO-FRIENDLY FIBER COLORING

Christopher Saski is helping redefine the future of cotton through research that links advanced plant genetics with more sustainable textile production.

A systems geneticist in the Department of Plant and Environmental Sciences, Saski is leading efforts to overcome two major challenges in cotton: the difficulty of genetically transforming diverse varieties and the environmental impact of chemical dyeing. Supported by the Clemson University Research Foundation, his team is developing faster transformation methods and cotton fibers with built-in color.

Saski's group has created a new cotton transformation system that significantly improves efficiency. By activating genes that prompt plant stem cells to regenerate whole plants, the approach cuts development time to about six months. It works across elite and commercial cotton types, including Upland and Pima. The breakthrough opens the door to faster crop improvement and broader adoption worldwide.

The research also advances textile sustainability. By introducing natural pigment-producing genes from plants and microbes, the team aims to grow cotton fibers in shades of blue, eliminating the need for chemical dyes. Because dyeing is one of the most resource-intensive steps in clothing production, color-grown cotton could sharply reduce water and chemical use while delivering longer-lasting color.

Industry interest is already growing. A global patent has been filed, and the technology has potential applications for biotech companies, seed producers and fashion brands seeking traceable, low-impact materials.

By combining rapid genetic innovation with environmentally responsible fiber production, Saski's work shows how applied plant science can support rural economies and influence agricultural and textile systems far beyond the U.S.


# Boundless Impact

## 2025–2026 COLLEGE PRIORITIES

Our strategic plan is organized by a framework with six overarching priority areas to guide our focus, programs, activities and investments through 2035 and beyond. Each strategic priority includes a guiding imperative that defines the target we are working toward, along with key strategies and initiatives for how we intend to get there.

1 DELIVER INNOVATIVE, RESPONSIVE CURRICULA AND EXPERIENCES THAT POSITION STUDENTS FOR SUCCESS

2 ATTRACT, DEVELOP AND RETAIN EXCEPTIONAL FACULTY AND STAFF

3 LEVERAGE THE COLLEGE'S STATEWIDE FOOTPRINT TO DRIVE I NNOVATION AND ENGAGEMENT

4 CONDUCT HIGH-IMPACT RESEARCH THAT MEETS THE NEEDS OF SOUTH CAROLINA

5 FOSTER STRATEGIC ENGAGEMENT AND BUILD TRUST WITH STAKEHOLDERS AND PARTNERS TO SUPPORT COLLABORATION, INNOVATION AND IMPACT

6 PRIORITIZE OPERATIONAL EXCELLENCE AND DRIVE EFFICIENCY ACROSS THE COLLEGE


# SHARE YOUR NEWS

**We want to hear from you! Whether you're a student, faculty or staff member, or alum of the College of Agriculture, Forestry, and Life Sciences, your experiences and accomplishments matter.**

From career milestones and research breakthroughs to community projects and personal achievements, your story helps show the impact of the CAFLS community. By sharing your updates, you can help us highlight the work and successes of the people who make CAFLS what it is. Your story might inspire others, spark new ideas, or connect you with someone who shares your passion. Share your news today and let us help share it!

**Scan here to get started**

AGRICULTURE, FORESTRY AND LIFE SCIENCES

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