FORT VALLEY STATE UNIVERSITY

COLLEGE *of* AGRICULTURE, FAMILY SCIENCES *and* TECHNOLOGY

engage

2024 – 2025 RESEARCH REPORT

Feeding families, ending hunger

Students explore agriculture in Belize during an educational trip in 2024.

inside

On the Cover:

An illustration featuring hands holding kale, with the Earth in the background.

From the President

Greetings,

As we embark on 2025, a landmark year celebrating 130 years of Fort Valley State University's history, we are delighted to share the latest edition of ENGagE, the College of Agriculture, Family Sciences and Technology's (CAFST) annual research magazine. This special year provides a perfect opportunity to highlight the remarkable stories of success, scholarship, and sustainability that define our legacy and guide our future.

This publication showcases the impactful work of the CAFST, where our research addresses global challenges while providing exceptional learning opportunities for our students. The pages within vividly illustrate the dedication, expertise and hard work of our students, faculty and staff—reflecting the spirit of innovation and resilience that has sustained us for more than a century.

In this edition, you will discover stories of research that extend far beyond our campus. Learn about our partnerships in Puerto Rico that support educators through scientific collaboration. Explore how our researchers are using hydroponics to introduce K-12 students to the future of agriculture by growing food without soil. Read about the incredible achievements of our students who have earned full scholarships and internships with the U.S. Department of Agriculture (USDA).

As a proud 1890 Land-grant University, our faculty continue to excel, publishing their findings in prestigious peer-reviewed journals, presenting their research on national and international platforms and securing competitive external funding. Their scholarship is a testament to our commitment to driving innovation and it is captured beautifully in the published works section of this magazine.

I encourage you to share this publication with your network. By spreading the news of our accomplishments, you not only expand opportunities for our university but also help us connect with new and existing audiences who believe in the transformative power of education and research.

Thank you for your continued support and dedication to Fort Valley State University. I trust that the stories within these pages will not only inform but also inspire you to remain ENGagED with the groundbreaking work taking place at our institution.

Best Wishes,

Dr. Paul Jones, Ph.D.
President, Fort Valley State University

From the Dean

Greetings,

It is my distinct pleasure and annual honor to share the 2024-2025 EngAGE research magazine which highlights the many accomplishments of faculty, staff and students at Fort Valley State University! It illustrates and documents the many ways that our efforts impact agriculture, industry and students globally. Our cutting-edge research helps Georgia agriculture maintain its status as the leading industry in the state with an economic impact exceeding $74 billion dollars. Our collective ability to foster this impact is predicated on developing and growing the agricultural workforce through robust training and research experiences for our students.

As you read through this publication you will find our researchers using artificial intelligence (AI) to manage invasive plant weed species through advanced image recognition technologies. In addition, you will see our students traveling abroad and competing with students in their various disciplines and winning top awards. Moreover, you will see how FVSU researchers are contributing to food safety efforts through research aimed to sustain the thriving pecan industry. All these endeavors are a clear reflection of our award winning, hardworking, problem solving, scholarly students and faculty, who make up the College of Agriculture, Family Sciences and Technology.

I must say that we would be unable to do this unique work without support from our federal partners at the U.S. Department of Agriculture (USDA/NIFA). We thank them for their unwavering support. Likewise, we would not be able to assist our farmers or industries without the support of our many collaborators, partners and others working in a variety of roles to assist us in feeding America. As dean of the college, I am thankful for our outstanding staff, faculty and students, who are using their research capabilities beyond the classroom.

As you read through the pages of this magazine, share insights and discover ways to partner or collaborate if an opportunity arises.

I hope you enjoy the valuable stories told in this year's edition of EngAGe. As an 1890 Land-grant Institution, Fort Valley State University is here to serve not only students, but also communities through outreach programs and the latest research. We hope this publication reaches far beyond our Georgia campus and fosters more collaboration and opportunity.

Respectfully,

Keith Howard, Ph.D.
Dean, College of Agriculture, Family Sciences and Technology

From plants to pixels

Detecting sericea lespedeza with artificial intelligence

By Latasha Ford

Farmers are seeking cost-effective ways to improve the health of their animals and increase overall productivity.

One crop that is gaining popularity in many states is a warm-season perennial legume. Sericea lespedeza is a plant native to eastern Asia and landed in the United States in the early 20th century for erosion control. It has gained attraction among farmers with sheep and goats (small ruminants) due to its nutritional value and anthelmintic properties.

This beneficial forage resource is drought tolerant and can grow on acidic, infertile soils where other legumes cannot thrive. It also serves as biosecurity for its bioactivity against internal parasite infection in sheep and goats. Sericea lespedeza as a natural dewormer is the primary driver for producers' and scientists' recent renewed interest in the plant.

Because there is a high demand for sericea lespedeza, Thomas Terrill, Ph.D., a Fort Valley State University (FVSU) professor of animal science, and Aftab Siddique, Ph.D., a post-doctoral researcher, are developing an app to benefit farmers growing this desired crop in Georgia and beyond.

"Sericea lespedeza is a summer perennial. It is a small seed, and during establishment, it doesn't compete well with weeds. Many farmers will see a lot of weeds and think they had a planting failure. They cannot tell the difference, especially if they have never grown lespedeza before," explained Terrill, who specializes in this crop.

He added, "Those little lespedeza plants are under there. If they leave it alone for a season, they will have a nice, thick stand the second year."

Therefore, the FVSU duo's research involves artificial intelligence (AI) to manage invasive plant weed species through advanced image recognition technologies. The Multidisciplinary Digital Publishing Institute published their work, "From Plants to Pixels: The Role of Artificial Intelligence in Identifying Sericea Lespedeza in Field-Based Studies," in its Agronomy Journal at https://www.mdpi.com/2073-4395/14/5/.

Terrill said farmers are interested in selling sericea lespedeza as nutraceutical hay. The farmers he works with in North Georgia and South Africa are seeing the benefits. Thus, he and Siddique are developing an app to give farmers a simple way to use their cell phones to take pictures and identify if a plant is a weed or sericea lespedeza.

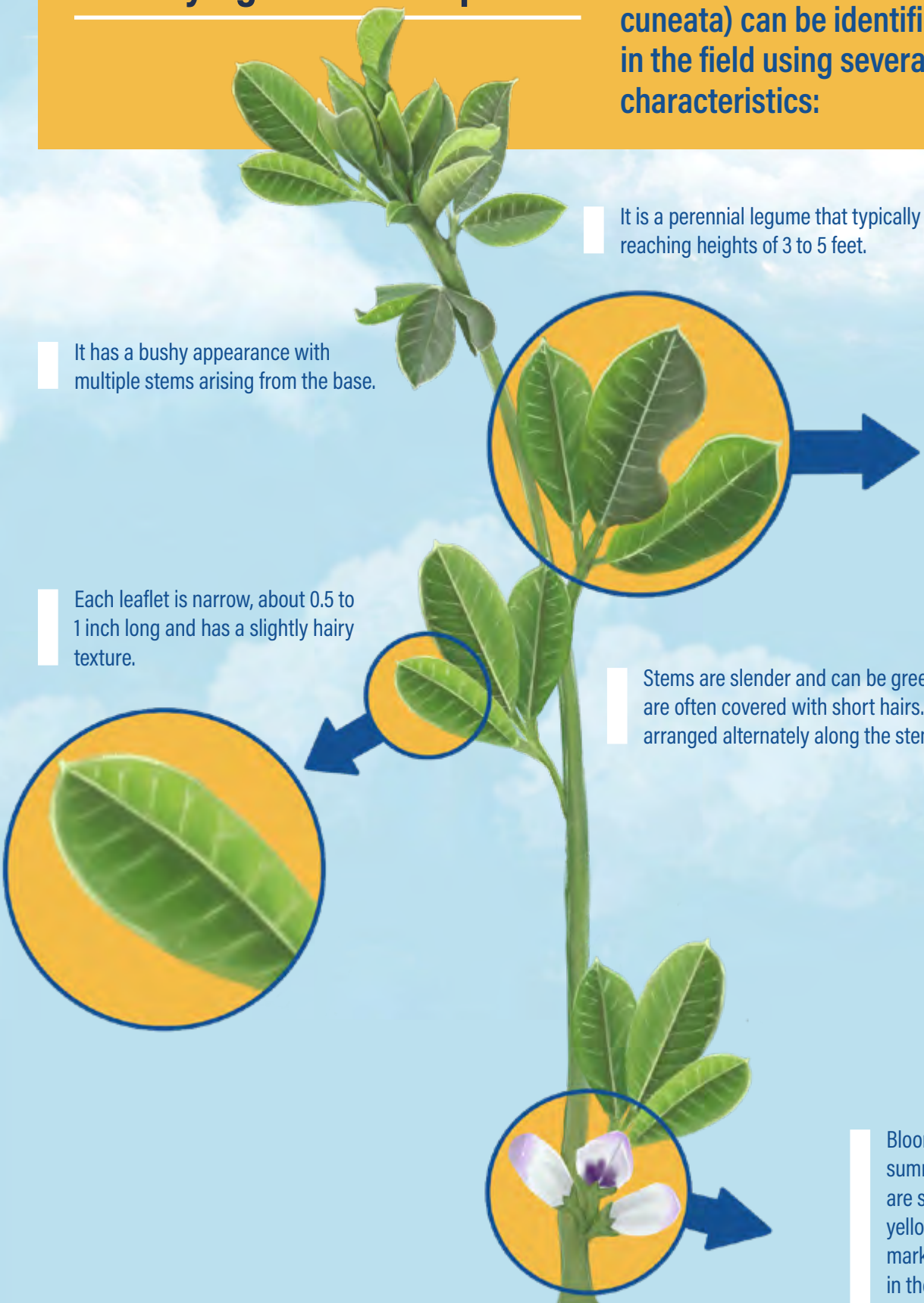
"It's a way to help them improve the development of this nutraceutical crop," Terrill said.

The longtime scientist and post-doc are growing 15 different species of lespedeza in an on-campus greenhouse for their research. Siddique said the process involves AI capturing thousands of images focused on intricate features of the plant, such as various angles, sizes, colors, lightning and conditions. This process involves a model

Researcher Aftab Siddique, Ph.D., uses a developing cell phone app to help farmers detect sericea lespedeza.

Identifying Sericea Lespedeza

Sericea lespedeza (Lespedeza cuneata) can be identified in the field using several key characteristics:



It is a perennial legume that typically grows upright, reaching heights of 3 to 5 feet.

It has a bushy appearance with multiple stems arising from the base.

Leaves are trifoliate (three leaflets per leaf), resembling those of clover but smaller and more pointed.

Each leaflet is narrow, about 0.5 to 1 inch long and has a slightly hairy texture.

Stems are slender and can be green to brown. They are often covered with short hairs. The leaves are arranged alternately along the stems.

Blooming occurs from late summer to early fall. Flowers are small, creamy-white to light yellow and may have purple markings. They appear in clusters in the leaf axils (where the leaf meets the stem).

Researcher Thomas Terrill, Ph.D., and Siddique visit Georgia farmer Hunter Jones of Cochran.

called convolutional neural network, which helps eliminate the complexity of identifying sericea lespedeza versus a weed. It has a 95% accuracy rate.

"When farmers have an app trained on that model, it becomes easier for them to get accurate results," Siddique said. He noted they are fine-tuning the model with assistance from a research connection in India and an FVSU computer science student, Sophia Khan. They are also working with 20 different farmers in Georgia, Alabama and South Carolina, who they plan to share this tool once established.

This research aims to provide farmers with more access to the expertise they need, all in their hands through an app. This will subsequently save them money, time and effort.

Georgia farmer Hunter Jones of Cochran owns J1S Ranch. The Byron native purchased 65 acres in Cochran in 2021 but didn't know what to do with it.

"I wanted to produce something to make a little money on the side. We looked into cattle but didn't have the finances to get everything it took to manage cattle the right way," Jones admitted.

He spoke with a friend who owns goats and decided this would be a better route. He purchased Boer goats, mostly in Georgia, and has been growing his herd ever since. He then connected with FVSU in early 2024 about growing sericea lespedeza.

"They love it," Jones said, referring to his goats. About 8 acres of his land is dedicated to the nutraceutical crop. "In the first two weeks, they had access to it 24/7. Their coats are now shinier."

He said the goats also appear healthier, and one black goat's coat looks like velvet when it didn't before. In addition, he has not had any parasite issues.

"The information I've gotten from Fort Valley State has been beneficial," Jones said. "Having direct contact to Fort Valley State or access to reliable resources, they'll tell you from experience rather than you just looking it up online."

A beginning grower of sericea lespedeza, Jones said the implementation of an app would have been helpful.

"Time is money, especially having a full-time job and trying to farm," he said. "Knowing when to plant and how to plant it – having that information on an app from Fort Valley State or an accredited school or any research team who are in the field and putting the knowledge in an app, you can be more productive with the time you are able to spend on the farm."

A U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA) 1890 Capacity Building Grant is helping Terrill and Siddique accomplish their goals to give farmers like Hunter a more accurate and quicker tool to enhance their operations. The duo also plans to develop a curriculum on this technology to benefit FVSU students.

Fort Valley State students awarded at biennial research symposium

By Latasha Ford

The recent 21st Research Symposium of the Association of 1890 Research Directors (ARD) had record attendance with more than 1,500 people, including a host of Fort Valley State University (FVSU) students, faculty and staff. Several participated in oral and poster presentations, with three FVSU emerging student scientists earning awards.

The goal of the biennial symposium is to provide a forum for interactions, knowledge sharing, building networks for expanded partnerships and to showcase the talents and achievements of the 1890 land-grant community. This year's conference was held in April at the Gaylord Opryland Resort and Convention Center in Nashville, Tennessee. The theme focused on "Climate, Health and Cultivating the Next Generation of Agriculture Leaders: Creating Solutions in Food, Agriculture and Natural Resources."

FVSU students Reginald Randall, Andrea Rubio Villa and Ramya Sri Kolikapongu took home top honors for their oral presentations.

Randall, an animal science graduate student, won first place in the Animal Health and Production and Animal Products category. The 25-year-old presented on the advancement of anemia detection in small ruminants (goats and sheep) using convolutional neural networks (CNN).

"CNN is a type of artificial intelligence (AI) that's able to identify anemia levels by analyzing images of eye conjunctiva from small ruminants," he explained.

He said the goal is to produce a smartphone application that will help farmers detect anemia in small ruminants in a quick, accurate and easy way.

Reginald Randall, Ramya Sri Kolikapongu and Andrea Rubio Villa, with FVSU administrators and research faculty, honored at the 21st Research Symposium of the Association of 1890 Research Directors in Nashville, Tennessee.

With former experience presenting at the ARD symposium, Randall said he enjoys engaging with new peers and learning more about their research. In addition, he is grateful for receiving an award.

"A lot of hard work has gone into this research, not only from me but from my advisers and teammates who helped me pursue and finish this project. Without their help, I don't know how I would have finished it," he expressed.

The Jefferson City, Missouri, native is interested in working in the medical field. He plans to pursue a doctorate in biology or animal science in the future.

Similarly, Kolikapongu won third place in the same category as Randall. The animal science graduate student said earning an award is a tremendous honor.

"This recognition serves as a testament to the significance and impact of the work I've been privileged to contribute to the academic community," she said.

Her research focused on "Comparative Analysis of Estrus Synchronization Protocols on Progesterone

Levels, Pregnancy Rates and Birth Outcomes of Dairy Goats After Natural Breeding."

"By optimizing estrus synchronization protocols, we can enhance reproductive efficiency, leading to improved pregnancy rates and healthier birth outcomes in dairy goat herds," she explained. "Ultimately, this contributes to increased productivity and sustainability in dairy farming, benefiting both farmers and consumers."

The 30-year-old appreciated the opportunity to share her research for the first time at the ARD symposium. She said this enriching experience fuels her passion for advancing knowledge in her field.

"Engaging with fellow researchers, exchanging ideas and receiving constructive feedback were all highlights of the event. Moreover, the opportunity to network with the experts in the field provided invaluable insights and potential avenues for future collaboration," Kolikapongu said.

A native of India, she hopes to continue contributing to the advancement of animal science and agricultural practices.

"I aspire to further explore reproductive biology in livestock and develop innovative solutions to enhance productivity and sustainability in farming," she said.

Furthermore, Villa, a senior animal science major, won second place in the Plant Health and Production and Plant Products category for her presentation on "Empowering Farmers with AI: Nutraceutical Forage Plant Identification."

"We use a convolutional neural network, which is a kind of deep learning AI algorithm that is specifically for image classification. In this research, we wanted to identify between sericea lespedeza, a warm-season legume that is popular in small ruminant production, and weed," she explained.

Through her research, a CNN model was developed for farmers to take a picture of a plant to quickly and accurately identify if it is lespedeza or a weed.

Villa said this research can help farmers have healthier animals since sericea lespedeza contains nutritional content and unique anthelmintic properties, thus saving them money.

She said receiving an award for her research meant a lot. "It was a moment of validation for all the hard work and dedication I had put into making my oral presentation come out well and being able to convey what I wanted to present. More than anything, the support I received from my mentors was a fundamental part of the success of the research. I am grateful for their mentoring and encouragement," she said.

The 21-year-old expressed this was her first time presenting at the ARD symposium.

"I learned a lot from the different research and sessions that were presented at the symposium, especially in a session where they talked about convolutional neural networks since we used this in our research," she said, noting she also made valuable connections.

"Overall, it was a great opportunity to learn, network and feel inspired about my career path," she said.

The Palmetto, Georgia, native always had a deep love for animals and their well-being. She said thanks to this passion, one of her career aspirations is to become a veterinarian.

"Ultimately, my goal is not only to fulfill my passion for working with animals but also to contribute positively to the veterinary profession and the broader community," she declared.

Emerging Scientists

Hear from four Fort Valley State University Wildcats – Kumudini Talari, Eric Enoch, Jordan Brown and Kaitlyn Garland – who presented their agricultural research at the 2024 Association of 1890 Research Directors (ARD) Research Symposium. Learn more about the innovative work of our emerging scientists and what made this experience rewarding for them. Watch our students grow!

https://youtu.be/Cp_tjzhGX2M

High school students discover ag at Fort Valley State

High school students from across the country engaged in agricultural activities and discovered career opportunities through Fort Valley State University's AgDiscovery program in June.

Students recognized for their participation in AgDiscovery.

By LATASHA FORD

Eighteen high school students from around the United States are adding animal health and welfare to their learning experience after participating in Fort Valley State University's (FVSU) AgDiscovery program.

AgDiscovery is a free summer outreach program sponsored by the U.S. Department of Agriculture (USDA). The purpose is to help teenagers explore careers in agricultural sciences. For two weeks in June, the FVSU group learned from professors and USDA experts, including plant and animal scientists, biotechnologists, veterinarians, administrative professionals and others. Students toured various Georgia locations such as FVSU's Dairy and Meat Technology Centers, the USDA National Detector Dog Training Center in Newnan, the USDA Plant Inspection Station in Atlanta and the Okefenokee Swamp Park in Waycross.

Hailing from Puerto Rico, Bianca Gomez-Reyes knew as a young child that her career path would lead to equine veterinarian. The 16-year-old senior of Saint Francis School aspires to study animal science at the University of Puerto Rico. She said her mother encouraged her to apply to FVSU's AgDiscovery program after learning about another student's experience.

Gomez-Reyes spoke highly of her visit to the USDA National Detector Dog

Training Center. "I did not know it was part of that department. It was interesting to see how they don't breed the dogs. They adopt them," she noted.

Her advice to students interested in AgDiscovery is to try it. She admitted she was initially nervous that she would not be accepted into the program. Shadowing a veterinarian at home, she can now add this new learning opportunity to her experiences.

Additionally, Laurel Howard, 15, of Huntsville, Alabama, was searching for a summer program related to her interest in animal science and zoology. The Grissom High School 11th grader, who has always loved animals, found FVSU's AgDiscovery online and was excited to apply.

"I would really love to either become a zookeeper or a zoological veterinarian when I am older, helping wildlife and endangered species," she said, grinning. "I am also very interested in sustainable agriculture like self-contained systems that mimic natural ecosystems to grow things more efficiently without damaging the natural environment."

Bianca Gomez-Reyes joyfully cradles a rabbit in her arms.

Given her love for animals, it was only natural that the highlight of her AgDiscovery experience was working with the animals. Students explored the Veterinary Science building on campus. Howard said this tour was enjoyable because she engaged in drawing blood and listening to the rabbits and Guinea pigs' heartbeats with a stethoscope gifted to the participants. After graduation, she plans to pursue a degree in animal science or a related agricultural program in her home state or Georgia.

Her advice to students interested in future AgDiscovery programs is to "absolutely apply; it is fun." She added, "You will be happy you did. I have already made a lot of friends."

For 11th grader James Spears, making good friends, living on campus and learning about the agriculture field were valuable takeaways from the program. Two highlights were learning how to draw blood and visiting the USDA National Detector Dog Training Center, where he and his peers saw firsthand the operations of this facility.

Spears, who resides in Virginia, said he heard about FVSU's AgDiscovery program when attending a college fair. The 15-year-old attends a high school biomedical program. He strives to study at Duke University and become an anesthesiologist but is open to other career possibilities.

Moreover, Leonel Orozco-Escalante, of Arizona, has always been captivated by animals and their health. Becoming a FFA member helped increase his curiosity. This is how the 17-year-old junior from Chandler High School learned about AgDiscovery. He and his friend, also

James Spears excitedly examines a Guinea pig with help from Dr. Saul Mofya, head of FVSU's Veterinary Science and Public Health Department.

from Arizona, researched locations and both decided to attend FVSU's program.

Orozco-Escalante aspires to become a veterinarian but first plans to specialize in veterinary technology. He currently attends East Valley Institute of Technology in Arizona, studying to become a veterinary assistant.

A highlight for him participating in the summer program was working with the baby goats on campus. He fed the small ruminants and learned how to make FVSU's distinguished goat's milk soap. Also, Orozco-Escalante said it was fun connecting with other students. He advises for those interested in applying to be open-minded.

"You get to see and hear people's different experiences with agriculture," Orozco-Escalante emphasized.

Laurel Howard smiles as she learns how to draw blood.

Leonel Orozco-Escalante beams as he carefully holds a rabbit.

To learn more about the AgDiscovery program, visit https://bit.ly/agdiscoveryfvsu.

Science educators from Puerto Rico train in Fort Valley State's laboratory

Educators from Puerto Rico work alongside Fort Valley State University researchers in the plant science-biotechnology laboratory at the Stallworth Biotechnology Building.

By LATASHA FORD

High and middle school educators from Puerto Rico trained in Fort Valley State University's plant science-biotechnology laboratory during summer 2023.

For a week, Nancy Barbosa De la Cruz, Laura Rivera Ortiz and Adam Ramos Santana learned various aspects of plant tissue culture. The visiting science educators worked with FVSU research assistant Samantha Sherman, biotechnology graduate student Birat Sapkota and FVSU plant science-biotechnology professor Dr. Nirmal Joshee. They participated in preparing and dispensing culture media and subculturing sterile plant materials into the tissue culture vessels, which they were able to take home and share with their students.

FVSU is not new to working with educators in Puerto Rico. Joshee established a scientific partnership with Inter American University of Puerto Rico, Barranquitas more than a decade ago. He said this training and prior research opportunities benefit FVSU and academic institutions in Puerto Rico.

"It opens the door for a whole new suite of people to look at Fort Valley State University as a place to come for any degree and at other schools in the state to pursue a Ph.D.," Sherman emphasized. She added that schools such as the Inter American University of Puerto Rico, Barranquitas offers doctoral programs and could attract FVSU students.

When asked about their experience at FVSU, the three educators commended Sherman for her passion and love for agriculture and science. De la Cruz, whose teaching career spans 30 years, also expressed her love for education and helping others.

"Everything I can learn in my life is not just good for myself," she said. The science teacher, who works at Juan Ponce De Leon High School in San Juan, Puerto Rico, added that engaging in research at FVSU's College of Agriculture, Family Sciences and Technology was a new and exciting experience.

De la Cruz further shared that her father, who grew his own food, valued agriculture. With her knowledge and agricultural upbringing, she noted the advanced techniques she gained at FVSU are progressive toward preparing students for future success.

In addition, Ortiz beamed about working in FVSU's plant science-biotechnology laboratory. "Being in the lab is like a dream," she said. "This place is like a family, and everyone is always willing to help. The best experience is helping others to make their dreams come true."

Ortiz teaches at a science, technology, engineering and mathematics (STEM) middle school in San Juan, Puerto Rico. After 10 years of teaching, she said her involvement at FVSU was an opportunity to grow as an educator and share information with her students. She also mentors high school students to help prepare them for science fairs.

Ortiz described how her students' eyes lit up after wearing something as simple as a lab coat. She stressed the monumental impact it had on changing their perspective about the possibilities of science and agriculture. She is looking forward to continuing the partnership with FVSU to benefit students' growth and expose them to various technologies.

Furthermore, Santana expressed how educating young minds is very important. He teaches animal health at the Superior Vocacional Antonio Reyes Padilla in Utuado, Puerto Rico. The 12-year veteran educator said the key takeaway working in FVSU's laboratory was the state-of-the-art equipment. Exposed to agriculture by his father and grandfather, he is fortunate to engage in research projects such as helping to create a digital game to expose more young people to agriculture and science.

> ***"It opens the door for a whole new suite of people to look at Fort Valley State University***
>
> – Samantha Sherman, FVSU research assistant

Dr. Alok Arun, associate professor for the Institute of Sustainable Biotechnology at the Inter American University of Puerto Rico, Barranquitas, served as principal investigator of this educational experience. The U.S. Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA) funded the training.

Pecan safety

Harnessing novel technologies to reduce contamination

By LATASHA FORD

Tree nuts like Georgia's pecans are economically important food products worldwide.

Graduate Vera Arthur and researchers from the Southeastern Fruit and Tree Nut Research Station of the U.S. Department of Agriculture's Agricultural Research Service work in the lab on Fort Valley State University's campus.

According to a 2024 report by the U.S. Department of Agriculture's (USDA) Economic Research Service, the global tree nut market has grown exponentially in the last 20 years. The United States exported more tree nuts than any other major producers, with almonds taking the lead.

Researchers at Fort Valley State University are contributing to sustaining this thriving industry for the safety of consumers.

Ajit Mahapatra, Ph.D., professor of food engineering, and Rabin Gyawali, Ph.D., food scientist, use nonthermal technologies like intense pulsed UV light and essential oils in the FVSU Food Engineering Laboratory. They are studying the effectiveness of pulsed UV light in killing *E. coli* on pecans, aided by research assistant Hema Degala.

The FVSU duo reports an increase in foodborne illnesses associated with low-moisture foods has led to growing concerns regarding the safety of nuts and nut-based products. Nonthermal techniques, antimicrobial agents and different packaging solutions provide an alternative to thermal processing that can achieve microbial safety and preserve the quality of nuts.

"The popularity of nuts as heart-healthy snack foods is growing," Mahapatra said. "It is important that they are handled safely and free from harmful microorganisms before consumption."

However, originally considered microbiologically safe, nuts and nut-based products have been consistently contaminated with foodborne pathogens. As a result, food safety is becoming a serious concern in the nut processing industry. *Salmonella* is the primary pathogen of concern.

The FVSU scientists found that with pulsed UV light, they reduced the decontamination of pecans to 99.9% within 40 seconds.

"Nonthermal processing technologies can be used to enhance the safety and quality of nuts while keeping the loss of product quality to a minimum," Mahapatra explained.

He said with the increasing demand for nonthermal processing, energy-based technology will be a promising way to reduce microbial load without leaving toxic chemical residue.

"Pulsed UV light is a highly intense pulse and kills bacteria within seconds. Also, it doesn't need water and doesn't leave any residue. So, it's environmentally safe," Gyawali added. "The installation cost for producers may be high, but it will ultimately save them money and make food safer and cheaper for consumers."

To further this research, Mahapatra and Gyawali collaborated with Cameron Bardsley, Ph.D., research food technologist; Kaicie Chasteen-Ko, food technologist; and Samantha Sherman, plant physiologist and FVSU alumna. The three partners are with the Southeastern Fruit and Tree Nut Research Station of the U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) in Byron, Georgia.

Bardsley said their research focuses on identifying potential alternatives for food safety and pecan shelling facilities.

"We want to make sure that we find alternative processes that also maintain quality so that it's not going to impact spoilage, color or shelf-life," Bardsley said.

The USDA ARS Byron Food Safety Lab works with cold plasma, which is a low-cost and efficient nonthermal method, Bardsley noted.

"I think it's important to explore novel technologies," Chasteen-Ko said. "The producers care about what can make their products reasonably safe but also want to be able to run their businesses."

Sherman, who earned her Master of Science in biotechnology at FVSU in 2021 and worked as a research assistant, said FVSU prepared me to take on new challenges and be open to exploring new technologies.

"I've been very grateful to see what other research is out there being done," Sherman said. "I hope I can help farmers make more money, which in the end also makes the food that we eat more affordable."

In addition to Sherman, Vera Arthur, who also earned her Master of Science in biotechnology at FVSU in 2024, gained experience working at the USDA ARS Byron Research Station. She conducted research on pecan safety under the supervision of Mahapatra. She will pursue a doctorate in food science at the University of Arkansas in the spring of 2025.

Bardsley commended Arthur's work and emphasized the importance of connections.

"She helped progress our research, as well as the research here at Fort Valley," Bardsley said.

This $432,000 research project, "Enhancing Food Safety in Pecan Processing," is supported by the USDA's Research Education and Economics (No. 440662). Recent studies on pecan safety have been published in food science journals by Elsevier.

Researchers Ajit Mahapatra, Ph.D., Rabin Gyawali, Ph.D., and Hema Degala use intense pulsed UV light to decontaminate pecans in the FVSU Food Engineering Laboratory.

Deputy secretary of agriculture, congressman visit Fort Valley State

Fort Valley State University President Dr. Paul Jones, Deputy Secretary of Agriculture Xochitl Torres Small and Congressman Sanford Bishop Jr. pose with students.

By Latasha Ford

Deputy Secretary of Agriculture Xochitl Torres Small and Congressman Sanford Bishop Jr. made an important stop at Fort Valley State University (FVSU) to meet with campus leaders and students interested in pursuing a career in agriculture.

Small, the first Latina to hold her position, and Bishop kicked off their visit by joining FVSU President Dr. Paul Jones and representatives from the university and U.S. Department of Agriculture (USDA) for a roundtable discussion.

Jones thanked Small and Bishop for their continued support of FVSU and other Historically Black 1890 Land-grant Universities.

"The 1890 land-grant system is a critical system for the United States," Jones said. "We have been able to move the needle forward because of your support of the Farm Bill."

When discussing workforce development, Small commended FVSU's efforts in this area. She mentioned the NextGen program, an initiative by the USDA to enable institutions to engage, recruit, retain, train and support students to build and sustain the next generation of the food, agriculture, natural resources and human sciences workforce. FVSU is a subrecipient of a recent NextGen grant.

Bishop, a member of the U.S. House Appropriations Committee, emphasized that the 1890 universities play a tremendous role in the agriculture industry. In addition, he saluted Secretary of Agriculture Tom Vilsack and the Biden-Harris Administration for supporting the next generation of agriculture by pushing policies that will elevate everyone in this country.

As the conversation continued, Small wanted to know how FVSU is attracting students to the university to pursue a degree in agriculture.

Dr. Keith Howard, dean of the College of Agriculture, Family Sciences and Technology, shared, "We focus on experiential learning and provide internships and dynamic curricula in alignment with industry and USDA needs. It's about engaging students and mentorship. We work with students and show them why ag is so important."

Jones added that scholarships, including the USDA 1890 National Scholars Program and FVSU 1890 Scholarship Program, have made a tremendous difference by removing some financial barriers for students.

"Our enrolment has increased double digits in the last couple of years, so that's exciting. I don't think we would have that kind of growth without those scholarships," Jones said.

Furthermore, Dr. Mark Latimore Jr., associate dean for Extension, shared the importance of alumni, who interact with current students to inform them of many opportunities with the USDA. He also noted the important role small farmers play in working with students to help advise them on how to operate farming equipment and care for animals.

Dr. Govind Kannan, vice president of economic development and land-grant affairs, discussed the various ways FVSU is reaching communities and supporting small and mid-size farmers. This includes projects such as the Center for Agriculture Innovation and Entrepreneurship, broadband expansion, a new Mobile Health Unit and precision agriculture.

Also, FVSU's formation of external advisory groups to meet industry needs has been instrumental, which benefits student recruitment and fundraising, added Howard.

In addition to meeting with leadership, Small and Bishop took the time to visit with more than 20 agricultural students. Some of the students' questions included USDA's priorities to support historically Black colleges and universities and careers in agriculture through USDA. Small also had an opportunity to share her story when asked about her career journey.

"I never thought I was going to work with USDA," she admitted.

Her grandparents immigrated from Mexico, her dad was a school bus driver and her mom was a teacher. A scholarship allowed her to spend the last two years of high school in southern Africa, which gave her a chance to study with people all over the world. She studied international development in college and found that she wanted to make lasting change. This led to her serving as a field representative and then becoming a U.S. representative for the fifth largest district in the country. She is the first woman and first person of color to represent New Mexico's second congressional district.

Before her current role, Small served as under secretary for rural development. She oversaw loans and grants to provide infrastructure improvements, business development, affordable housing, community facilities, and high-speed internet access in rural, Tribal and high-poverty areas.

Small, noting that risks are worth taking even if you fail, told the students, "Representing people matters. Each time you think about your role in agriculture, I hope you know the people you represent and the ideas you bring to the table, experiences matter and will have an impact and make a difference."

Small and Bishop address students during an afternoon meeting.

Puerto Rican educators participate in research workshop at Fort Valley State

By Latasha Ford

Three science educators from Puerto Rico enhanced their research skills at Fort Valley State University during the summer of 2024. They trained alongside faculty and graduate students in the College of Agriculture, Family Sciences and Technology.

Dr. Nirmal Joshee, FVSU plant science-biotechnology professor, and his graduate students worked with the 11th-grade teachers Natcha Leòn Lugo, Iriana Rosario Fontànez and Monica Pagàn Ortega on plant reproductive biology. For a week, the trio conducted experiments on pollen germination in Joshee's laboratory. The educators learned various techniques, including preparation of plant tissue culture media and fluorescent staining of trichomes using a microscope.

Lugo, a general science and engineering educator, teaches at a science and math specialized school. With 13 years of experience in the classroom, she has also conducted teacher workshops on topics relating to science, technology, engineering and mathematics (STEM) at the University of Puerto Rico.

Ortega teaches at the same school as Lugo and has 15 years of experience. She specializes in multiple subjects such as chemistry, physics, biology and microbiology. She also teaches at the University of Puerto Rico. Fontànez is a chemistry teacher at a specialized agriculture school. Fifteen years of experience under her belt, she taught biology for the first five years of her career.

The three educators visited Georgia to work in the lab with Joshee after learning about the opportunity in the summer of 2023 while at a workshop in Puerto Rico. Their coordinator filled them in on the island's connection with FVSU. Joshee has an established partnership with the Inter American University of Puerto Rico, Barranquitas.

"I am extremely grateful for the experience and opportunity to be here to take back what I've learned to teach my students the process of this research and motivate them," Ortega said.

Fontànez and Lugo echoed these sentiments. "It is amazing to see the structure of the pollen in its natural state," Fontànez said about this new learning experience. "I understand the student's point of view of learning new things and the 'Oh, wow. I did this!' feeling. I like to see that moment from my students when I teach."

Although they don't have the same equipment in their classrooms, Ortega looks forward to transferring the knowledge of all that she has learned into her lesson plans so that her students can emulate the procedures. She also wants to encourage and inspire her fellow teachers to incorporate these learning experiences into their classrooms.

"One thing that has been a tipping point is that we usually collaborate on projects," Lugo noted, referring to Ortega.

Their students participate in science fairs nationally and internationally. Lugo said the workshop at FVSU is helping her teach her students the method of replication in the right way. All three educators agreed that the research faculty and graduate students provided an impactful and rich experience.

Science educators Natcha Leòn Lugo, Iriana Rosario Fontànez and Monica Pagàn Ortega from Puerto Rico visit with students, Agricultural Communications staff and researcher Nirmal Joshee, Ph.D., in the lab.

Educator looks through a microscope.

Educator experiments in the lab.

Educators engage with a Fort Valley State University student.

Fort Valley State graduate student wins grand prize for research

Vera Arthur, a Fort Valley State University (FVSU) biotechnology graduate student, took home the grand prize award for her cutting-edge research at the recent ninth annual Historically Black Colleges and Universities (HBCU) Climate Change Conference in New Orleans.

Vera Arthur, Fort Valley State University biotechnology graduate student, holds a certificate recognizing her grand prize win at the ninth annual Historically Black Colleges and Universities (HBCU) Climate Change Conference in New Orleans.

By LATASHA FORD

Her poster presentation focused on the use of pulsed ultraviolet (UV) light and cold plasma to control *E. coli* on pecans. Arthur conducted her research in the Food Engineering Laboratory on FVSU's campus under the guidance of adviser Dr. Ajit Mahapatra, research assistant Hema Degala and post-doctoral researcher Dr. Rabin Gyawali.

"They have been very supportive. Their reviews and suggestions are the reason I was able to do it," she said about the win while also acknowledging Dr. Beverly Wright, coordinator of the conference.

"Vera is one of the brightest students I have ever had. She is self-driven and has done a truly exceptional job in both her research and course work," Mahapatra commended. "I hope she

Arthur uses the pulsed UV light equipment in the Food Engineering Laboratory to decontaminate E. coli on pecans.

continues to pursue research, because I think she has the potential to be a great food scientist. I am so proud of her."

Arthur received $500 and a certificate for the grand prize at the conference. Approximately 25 students competed. She explained that the theme focused on climate change and how industries are contributing to the problem.

"We cannot advocate for a close-down of industries because they offer a lot of benefits for the country," she noted. "With science and technology, there are so many activities that can be done in a safe and efficient way. I introduced my research methods on decontaminating pecans that can be used without polluting the environment."

Pecans are a top commodity in Georgia. According to the Georgia Pecan Commission, Georgia is the nation's top producer of pecans, producing an estimated 100 million pounds of pecans annually. Pecans add between $200 million and $300 million each year to the state's gross domestic product.

Therefore, to help farmers in the state increase the quantity and quality of this essential product, Arthur's objectives included using a safe and effective procedure to disinfect pecans. The student scientist explained that the industry uses various methods for decontamination such as chlorinated water or thermal treatment by dipping pecans in boiling water around 100 degrees.

Although these methods work, Arthur noted there are adverse effects.

"Some countries have banned using chlorinated water, and the hot water treatment affects the quality of the nut. It's darker, and the fat content produces an unpleasant odor," she said. In addition, she noted thermal treatment uses natural gases, which is a source of pollution to the environment.

To resolve these problems, Arthur and the FVSU research team is looking at safer and more

effective techniques to decontaminate *E. coli* on pecans. Like thermal treatment, pulsed UV light can disinfect by compressing electrical energy, but the light pulses are short and environmentally friendly.

Arthur is also studying the effects of using cold plasma alone and in conjunction with the pulsed UV light. Part of her research is done in the U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) laboratory in Byron, Georgia, which is near FVSU's campus. She commended the USDA ARS team for allowing her to use their cold plasma technology and for funding her project.

"The research is ongoing. So far, the pulsed UV light and cold plasma are both effective individually at decontaminating *E. coli*," Arthur revealed. Further research will involve examining the duration of using these methods to kill more bacteria and any visible effects on the product.

Arthur looks forward to continuing her exploration on an issue that she hopes to solve. "I would be happy if we are able to introduce this to the food industry to help scale up farmers' production," she declared.

Her passion for science stemmed from her desire to be a doctor after graduating high school. The Ghana native said her father, who she admires, recommended that she attend medical school, which diverted to food science being the best fit for her.

Always interested in the lab, she recalled traveling five hours to another location in Ghana to use a tester analyzer equipment to conduct research while pursuing her undergraduate degree in food science. She is appreciative of the opportunity to have access to advanced equipment and labs at FVSU.

"I have seen a lot of improvement in myself," the Wildcat said, beaming.

Upon obtaining her master's degree in biotechnology, Arthur plans to pursue a Ph.D. and continue her scientific journey as a researcher in the academic arena or food industry.

> ***"With science and technology, there are so many activities that can be done in a safe and efficient way. I introduced my research methods on decontaminating pecans that can be used without polluting the environment.***
>
> – Vera Arthur, biotechnology graduate student

Arthur experiments with decontaminating pecans.

AgSPOSURE

Agricultural Communications is excited to introduce a new show, AgSposure, to highlight the major role that Fort Valley State University plays in agriculture through education, research and Extension. *Watch Us Grow!*

https://bit.ly/agsposure-ep1

https://bit.ly/agsposure-ep2

FORT VALLEY STATE UNIVERSITY

COLLEGE of AGRICULTURE, FAMILY SCIENCES and TECHNOLOGY

Feeding families, ending hunger

Researcher Bipul Biswas, Ph.D., picks a peach from his experiment plot on the Fort Valley State University campus farm

By LATASHA FORD

In the United States, people waste 92 billion pounds of food and throw away more than $473 billion worth of food annually, according to Feeding America.

To combat this national issue, the Society of St. Andrew brings people together to harvest and share healthy food, reduce food waste and build caring communities by offering nourishment to hungry neighbors. It is a national nonprofit that has existed for more than 44 years.

Fort Valley State University (FVSU) connected with two representatives from the Georgia office in Macon in 2024 to support the organization's mission. As an 1890 Land-grant University, FVSU is also committed to empowering underserved communities through educational programs like food preservation and community gardens.

Angela Partain, Georgia regional director of the Society of St. Andrew, said they partnered with FVSU in the past before meeting longtime researcher Dr. Bipul Biswas.

"He loved the idea of what we do, which is to share abundance with people in need, such as marginalized communities and families facing food insecurities. We bonded quickly," she said. "I had been wanting to get into the agriculture side of this school."

Angela Partain of the Society of St. Andrew pours a bucket of freshly picked peaches into a sack.

The Society of St. Andrew in Macon gleans and distributes fresh produce to feed Georgia communities. In 2024, through September, they gleaned and distributed 1,192,228 pounds of food, shared 4,768,912 servings of fresh food and held 102 events to rescue and share food. Also, 537 volunteers engaged in hands-on service, and the organization connected with 99 recipient agencies and partners.

The partnership with Biswas came about due to his established peach orchard on FVSU's campus to conduct in vitro studies for short-life evaluation and his experience with hydroponics gardening. He invited Partain and Anna Foreman, Georgia program coordinator, to visit the research plot to glean peaches.

"I've worked with Fort Valley farmers. We are also a charitable partner at the

Partain and Anna Foreman, also with the Society of St. Andrew, harvest peaches on the Fort Valley State University campus farm.

Southeast Produce Council. This was the final connection of the loop," said Partain, who has been the director for three years.

She emphasized the importance of capturing food waste and redistributing it back into the community. She said this waste happens in the fields, transportation, supermarkets and restaurants.

"Our mission is to end agriculture waste and hunger," Partain said. "This is our first partnership with a research farm. We are hoping to be educated on the value of hydroponics and take that information to surrounding communities interested in starting community gardens. With hydroponics, you can harvest all year long, so it is a sustainable program."

Partain noted a lot of marginalized people do not have access to fresh fruits and vegetables. Their goal is to improve the quality of the food going into the charitable food system.

"While they do get fresh fruits and vegetables, there oftentimes is a storage problem. With our organization, we don't store it. We do direct distribution. Produce goes from the farm to the fork within 24 to 48 hours," she said.

The peaches she and Foreman gleaned on FVSU's campus amounted to 65 pounds. They planned to share them with approximately 16 families facing food insecurity. That would give each family around 4 pounds, which equals 16 servings. They also returned to visit the specialty crop greenhouse to harvest fresh lettuce and kale growing in the hydroponics system.

"We identify food deserts, commercial farmers, backyard farmers and farmers markets, as well as recipients like churches and food banks. The food is given away at no cost," Partain said.

Hydroponic system in the Specialty Plants Greenhouse.

The organization is funded by support from fundraisers. "The more funding, the stronger and larger the program," she said. "Those relationships are critical."

Foreman, who works with the volunteers and farmers, serves as the primary liaison with gleaning and moving products. She has been with the organization for a year.

"It has been a really rewarding experience because we get to make a tangible change," Foreman said.

Although a small staff, they have more than 500 active volunteers.

"We partner with so many nonprofits to get food moved, which is amazing. We need the influence of people who have the same heart as we do with the mission to end hunger and prevent waste," Foreman said.

To volunteer, donate or collaborate, visit *https://endhunger.org/georgia/.*

Family and Consumer Sciences program granted full accreditation

The American Association of Family and Consumer Sciences (AAFCS) recently awarded full accreditation to Fort Valley State University's (FVSU) Family and Consumer Sciences (FACS) program for the next 10 years ending in 2034.

By Russell Boone Jr.

AAFCS is a professional organization dedicated to professionals and students in FACS. It also provides them a platform to share knowledge, research and promote a high quality of life to families and communities with experts in the FACS field.

"This accomplishment is a testament to the hard work, dedication and commitment of our faculty, staff and students. Achieving accreditation signifies that our program meets rigorous standards of quality and excellence in education," said Dr. Francine Hollis, chair, of FVSU's Family and Consumer Sciences Department.

Furthermore, the FVSU faculty member said that meeting the mark for accreditation only confirms the effectiveness of the program's curriculum and teaching methods. Hollis added that accreditation also promotes the relevance of the program in preparing students for successful careers in the field.

Dr. Francine Hollis, chair of Fort Valley State University's Family and Consumer Sciences Department, displays letter confirming accreditation from the American Association of Family and Consumer Sciences (AAFCS).

"Personally, I feel a deep sense of pride and gratitude. This achievement reflects the collaborative effort of our entire department. I am thankful for the support of our university community and the AAFCS, who believe in the quality of our program," Hollis said.

Some of the certification criteria include mission and goals, curriculum, learning outcomes,

assessment and evaluation, faculty qualifications, diversity and inclusion and community and professional engagement.

Hollis elaborated more on the advantages of having a fully certified program. Some of them include improved chances for employment, increased networking opportunities and students being recognized as products of a quality educational program. "Employers often look for graduates from accredited programs because it assures them that students have completed a rigorous curriculum from qualified faculty," she said.

"Graduating from a fully accredited AAFCS Family and Consumer Science program at FVSU not only enhances a student's qualifications but also prepares him or her to make meaningful contributions to their careers and communities," the FVSU professor said.

With the program garnering accreditation, Hollis said that FVSU FACS will not stand idle.

"Now that the program has achieved accreditation, my vision is for us to maintain our status by implementing recommendations approved by the AAFCS. This will allow us to further enhance our program and continue to work on strategies identified in our strategic plan," she said.

Currently, some of the strategies include the acquisition of more full-time faculty and the recruitment and retention of more students, which Hollis said is a top priority.

"We will also focus on enhancing curriculum relevance, strengthening community partnerships, expanding efforts on research and innovation and building on alumni relationships. This will assist us in marketing and recruiting for the program," Hollis said.

Fort Valley State's FACS program offers one major with two concentrations, food and nutrition along with infant and child development. Currently there are more than 20 students enrolled in the program.

> ***"Graduating from a fully accredited AAFCS Family and Consumer Science program at FVSU not only enhances a student's qualifications but also prepares him or her to make meaningful contributions to their careers and communities.***
>
> – Dr. Francine Hollis

For more information about FVSU's Family and Consumer Sciences program, visit *https://bit.ly/3TjoXbk.*

Fort Valley State agricultural sciences chair graduates from University System of Georgia's Executive Leadership Institute

Dr. Hari Singh, chair of Fort Valley State University's Department of Agricultural Sciences for the College of Agriculture, Family Sciences and Technology, is a graduate of the University System of Georgia's 2023-24 Executive Leadership Institute.

By Latasha Ford

Fort Valley State University's (FVSU) chair of the Department of Agricultural Sciences for the College of Agriculture, Family Sciences and Technology recently graduated from the University System of Georgia's (USG) 2023-24 Executive Leadership Institute (ELI).

Dr. Hari Singh is among 34 faculty and staff members from 23 USG institutions and the University System Office to earn this achievement. This year's cohort convened on Aug. 29, 2023, and is the 14th group to complete the program.

"This group includes some of the best among our faculty and staff across Georgia," USG Chancellor Sonny Perdue said. "As one of the top public university systems in the nation, we are invested in supporting and growing the people already working hard right here in the university system. With this professional development, USG wants to help them reach their full potential."

Since 2009, USG has hosted ELI for faculty and staff to develop new leaders within the university system and offer professional development opportunities to help them grow their careers in Georgia. University presidents nominate academic and staff leaders to participate. From the nominees, individuals are selected for the program and participate in a leadership development curriculum that includes content, personal reflection, job shadowing and cross-mentoring.

Singh expressed his key takeaways from participating in the leadership program, describing the experience as enriching.

"It provided a comprehensive framework for understanding and improving my leadership capabilities," he said. "The program's design allowed for deep self-reflection, helping me to identify my strengths and areas for growth."

The FVSU researcher and professor noted he gained a renewed understanding of himself as a professional, the identification of his potential for success, and the preparation for assuming leadership roles.

"The opportunity to shadow an established leader offered invaluable insights into effective

Researcher Hari Singh, Ph.D., is among 34 faculty and staff members from 23 University System of Georgia institutions and the University System Office to graduate from the 2023-24 Executive Leadership Institute.

> ***"The opportunity to shadow an established leader offered invaluable insights into effective leadership practices, further enhancing my ability to lead with confidence and competence***
>
> – Hari Singh, Ph.D.

leadership practices, further enhancing my ability to lead with confidence and competence," he added.

To enhance his role at FVSU, Singh plans to promote respect and openness within his team by actively listening and fostering inclusivity. He also looks forward to developing his strategic thinking skills through leveraging data and technology. Furthermore, he is prepared to set and communicate clear goals and expectations and build high-performance teams by providing mentorship, fostering accountability and promoting collaboration.

His aspiration to participate in ELI was driven by his desire to enhance his leadership skills and professional growth.

"I recognized the need to deepen my understanding of effective leadership practices to better serve my team and organization. The USG offered this unique opportunity, and I am thankful to President Dr. Paul Jones and Provost and Vice President for Academic Affairs Dr. Olufunke Fontenot for recommending my candidacy from the university's applicant pool," he commended.

Singh advises for those interested in ELI to approach the program with an open mind and a commitment to self-reflection.

"Be ready to embrace learning opportunities and actively engage in networking with peers and mentors," he said. "Fully commit to the program's activities and assignments to maximize your growth."

He added, "Plan to implement the knowledge and practices you acquire in your current role to see immediate benefits. ELI offers a transformative experience for those dedicated to enhancing their leadership skills."

The agricultural professor declared he was deeply impressed by the commitment and time dedicated by Perdue, whose presence and vision on the institute were truly inspiring. He is also grateful to Dr. Brendan Kelly, president of the University of West Georgia, for providing an outstanding shadowing experience and Dr. Wendi Jenkins, USG's associate vice chancellor for Leadership and Institutional Development, for her exceptional leadership in guiding the institute's activities.

Fort Valley State alumna nominates Master of Public Health Program coordinator for diversity, inclusion award

Dr. Oreta Samples, Fort Valley State University assistant professor and Master of Public Health Program coordinator, smiles as she holds her award by the National Environmental Health Association.

By LATASHA FORD

Seeing her students succeed in their field of study is the hallmark of Dr. Oreta Samples' teaching career. One recent graduate is now praising her for the impact she has made in her life while studying at Fort Valley State University (FVSU) in the Master of Public Health (MPH) Program.

Alumna Caroline Obi nominated Samples, FVSU assistant professor and MPH Program coordinator, for the National Environmental Health Association's (NEHA) Dr. Bailus Walker Jr. Diversity and Inclusion Awareness Award. NEHA is the accrediting body for FVSU's MPH Program.

This prestigious award honors faculty members involved in environmental health sciences who have made significant achievements in the development and enhancement of a more culturally diverse, inclusive and competent environment.

"During my studies at FVSU, I had the honor of working with Dr. Samples as a graduate assistant. She left a lasting impact on me, much like a 'good teacher' as defined by my parents. Not only did she focus on academics, but she also recognized and nurtured my strengths, challenging me to grow

beyond my academic and background limitations," Obi said, describing her mentor.

She is grateful for Samples' positive influence on her professional development. Obi said as her graduate supervisor, Samples provided her with the first opportunity to professionally challenge herself as an international student.

"As program coordinator, she demonstrated an unwavering commitment to all students, ensuring that they received equal support in their personal, academic and professional pursuits," Obi added. "Thanks to her efforts, I was able to secure my first internship through a mass email she regularly sent out about opportunities. This experience proved to be a significant milestone in my public health career."

Because of Samples' impact, the 2023 FVSU graduate said it was a fulfilling moment in her career when NEHA notified her of nominations for the Dr. Bailus Walker Jr. Diversity and Inclusion Awareness Award.

"I am delighted to hear that Dr. Samples has received a well-deserved recognition for her dedication and tireless work ethic," Obi expressed. "I remain grateful for her positive influence on my life and career."

Caroline Obi conducts research in the lab as a student.

Caroline Obi conducts research on a white-tailed deer specimen for a tick-borne disease while studying at FVSU in the MPH Program.

For Samples, who is a triple FVSU graduate, Obi is a testament of her purpose as an educator. To receive an award for what she enjoys doing every day since 1995 and to be nominated by an esteemed student brought tears to her eyes.

"My faculty and I try to put our best foot forward and give our students the best that we can give them," Samples said. "But, how do you know if your best is what they needed to get ahead?"

She declared that Obi is a perfect example. Obi was hired six months before graduation in 2023 to work as a lead specialist with the Georgia Department of Public Health's North Central Health District in Macon, Georgia, examining lead in water for the safety of children. The Wildcat now serves as the district lead and healthy homes coordinator. Samples is proud of her former student's success.

"The fact that she has done so well so quickly and is so well thought of, that is what makes this job fun. It's for the success stories and the people who can be a success if you just give them a little help," she said.

As a historically Black university, FVSU is serving diverse students from around the world. Samples noted approximately 60 students are enrolled in the MPH Program with a 10% international student body from Nigeria.

"We are so proud of our international students, which they promote the program mainly through word of mouth. We have built a good community here at FVSU. My name may be on the plaque, but the program won," she said, referring to her award. "We have a good program, and it is growing by leaps and bounds."

For more information about FVSU's MPH Program, visit *https://bit.ly/fvsupublichealthdegree.*

Growing future agricultural scientists

First graders at Alexander II Math and Science Magnet School in Macon, Georgia, experienced growing vegetables in materials other than soil for their annual project.

By Latasha Ford

Dr. Bipul Biswas, a Fort Valley State University (FVSU) professor and researcher, lent his skills to this educational and fun opportunity during the summer of 2024. The distinguished scientist, specializing in research on specialty plants like stevia and turmeric, initially connected with first-grade teacher Carissa Howard in 2023.

Howard, who oversees science, technology, engineering and mathematics (STEM), coordinated a problem-based learning activity for the year, where first graders explored ways to increase healthy food options while living in a food desert.

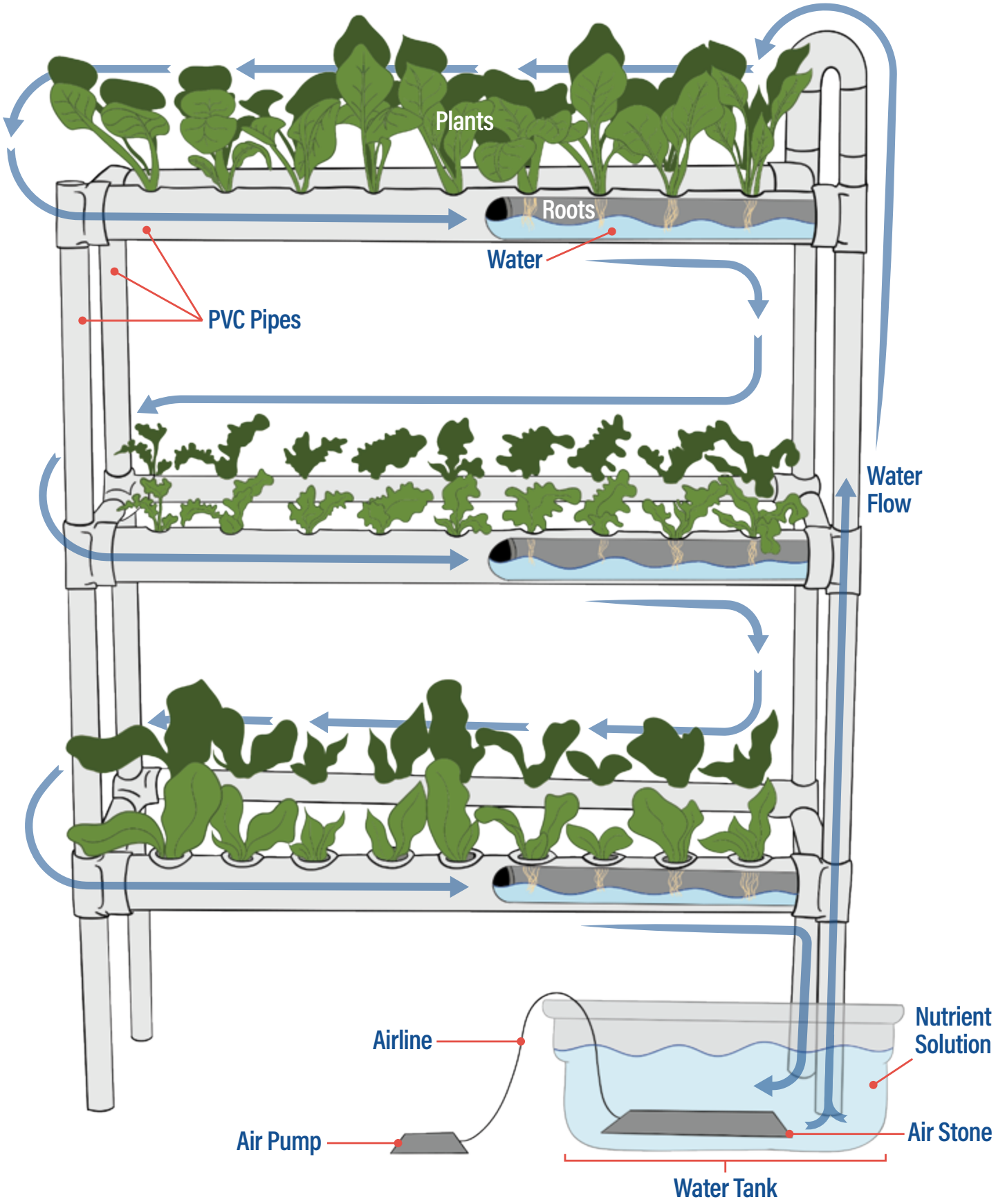
To help expose students to the process of growing food without soil, Howard needed a specialist in hydroponics. She came across FVSU research articles about Biswas' work after doing a Google search and invited him to visit the school.

For four weeks this summer, Biswas introduced Howard's class of 21 students to various methods of growing romaine lettuce. First, Biswas showed them the makeup of a plant – the stem, roots and leaves. Then, the young researchers compared the efficiency of using daylight versus blue, red and white lights. Biswas said the students discovered that daylight and red lights are similar in how effectively they grow plants. He taught them simple growing methods using red and clear Solo cups. He also showed them how to grow plants using the deep water culture (DWC) hydroponic system. This method involves the plant's roots being suspended in a well-oxygenated solution composed of water and nutrients.

"Hydroponics uses no pesticides and takes less time," Biswas noted, applauding

Researcher Bipul Biswas, Ph.D., smiles with first graders at Alexander II Math and Science Magnet School.

Deep Water Culture Hydroponic System



Biswas and teachers at Alexander II Math and Science Magnet School showcase one of the hydroponic systems the students are working on.

the students for their interest and diligence. "Our future generation is realizing through this kind of program that agriculture can be done indoors, dirt-free and faster."

Furthermore, Biswas emphasized the significance of agriculture and youths learning how to care for their plants with love.

"Plants understand. When you love and talk to them, they will grow well," he recalled telling the first graders. "This helps ease the students' frustration and shows empathy. This is more than about just agriculture."

Howard remarked the students were thrilled to engage in this type of research with Biswas, who provided many of the materials.

"He was the blessing I knew I needed," she said. "He was all of that and more."

Howard, who visited FVSU's Specialty Plant House, added she has a bulletin board highlighting their yearlong project. The students also created a book dedicated to Biswas about all that he taught them.

"It was insightful," Howard chimed. "Oftentimes, they don't correlate that food doesn't just appear. It was interesting to see how little they knew where food came from. They knew that plants grow, but they had to make the connection that plants are food. They now explain to other students how to use hydroponics and that it helps save water."

Like Biswas, as part of her curriculum, Howard taught her class the different parts of various plants such as the sunflower, celery and spinach.

"The exercise gave them the foundation they needed," Howard said. "They shifted their thinking. That one activity showed them to look at plants as food. They now look at French fries as potatoes."

To celebrate their new gardening skills, the students made chicken wraps using their harvested lettuce from the DWC system. Howard wants to continue partnering with Biswas for future classroom projects because of his genuine commitment to educating students.

"We are learning how to provide for ourselves and families in ways to benefit many people in a short amount of time," she said.

Biswas returned to the school in August to work with four additional classes, totaling approximately 80 students. He helped each group set up similar hydroponic systems.

Students embark on transformative trip to Belize

Fourteen Fort Valley State University (FVSU) students embarked on an enriching study-abroad trip to Belize from Nov. 23 – 30, 2024.

This educational adventure was made possible by the U.S. Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA) Nextgen grant, "NEXTGENeration Inclusion Consortium for Building the Food, Agriculture, Natural Resources and Human Sciences Pipeline (FANHP)."

FVSU project directors Drs. Mohammed Ibrahim and Hari Singh said this immersive experience was designed to provide students with hands-on learning in sustainable practices, cultural heritage and agricultural innovation. The week-long journey was packed with diverse activities that offered students insights into the interconnectedness of human, animal and environmental health.

Alayna Jakes, an engineering technology major, expressed her gratitude for the opportunity to engage in such a multifaceted learning experience.

"This trip has been incredibly eye-opening," Jakes said. "It has deepened my understanding of sustainable practices and the importance of cultural heritage. The hands-on activities and expert lectures have truly enriched my academic journey."

The student group also included Bryan Hallman and Marisha Towner (plant science majors); Andrea Villa, Katelin Coleman and Layla Watkins (animal science majors); Aquila Kerr, Asharaya Selah, Kennedi Brazil, Raven Edwards and Khadia Walker (agricultural economics majors); Shayna Jake (engineering technology major); Jordan

Gallemore (family and consumer sciences major); and Setene Green (veterinary technology major).

Highlights of the trip included:

- Organic Farm Visit, Natural History Center and Butterfly Farm Tour: Students explored sustainable agricultural practices and the critical role of biodiversity in maintaining ecological balance.
- Guided Tour of Cahal Pech Archaeological Reserve: This tour provided a window into the ancient Maya civilization, enhancing students' appreciation for historical preservation and cultural heritage.
- Sustainable Development Goals - Life on Land: Students gained valuable knowledge about organic farming and micro-processing within a Yucatec Maya community, aligning with global sustainability goals.
- Belize Botanic Garden Tour - Agroforestry: The tour showcased the integration of human, animal and environmental approaches in agroforestry, emphasizing sustainable land use.
- Tour of Processing Facilities at Central Farm: Students observed modern agricultural processing techniques, bridging theoretical knowledge with practical applications.
- Guest Lecture by Salvador Mesh on Conservation Stewardship in the Vaca Reserve: This lecture provided expert insights into environmental conservation efforts and stewardship practices.
- Service-Learning with Farmers in the Vaca Reserve: Students actively participated in light farm maintenance and reforestation programs, contributing to local sustainability initiatives.
- Tour of The Creole Africa Diaspora: This exploration of Belizean patriotism and the contributions of local national heroes deepened students' understanding of the country's cultural and political landscape.
- Visit to The Goldson House for Democracy & Patriotism in Belmopan: The visit offered a

Students work together to maintain the field.

historical perspective on Belize's democratic values and political history.

- Marie Sharp's Factory Tour: Students learned about the production and international distribution of renowned pepper sauces, gaining insights into successful agricultural entrepreneurship.
- Eco-Farm Tour with the Kekchi Mayas: This tour provided a firsthand look at organic cocoa farming practices and the cultural significance of chocolate production within the Ketchi Maya community.
- Virtual Guest Lecture on Agriculture Trade Policy: The lecture broadened students' understanding of agricultural trade and policy, highlighting global market dynamics.

The study abroad program not only provided students with valuable academic insights but also fostered a sense of global citizenship and cultural appreciation. By participating in this program, students demonstrated their commitment to making a positive impact in the fields of food, agriculture, natural resources and human sciences.

Ibrahim and Singh praised the students' enthusiasm and engagement throughout the trip.

For more information about the USDA NIFA Nextgen grant and study abroad program, contact Singh at singhh@fvsu.edu or Ibrahim at ibrahimm@fvsu.edu.

"Our goal was to provide a comprehensive learning experience that integrates academic knowledge with practical applications," Singh said. "We are proud of the students for their dedication and active participation."

The two FVSU researchers emphasized the study abroad trip to Belize stands as a testament to the university's commitment to experiential learning and its dedication to preparing the next generation of leaders in the FANHP fields.

Students learn essential gardening practices.

Fort Valley State student selected as USDA/1890 National Scholar

Jalil Jones, a freshman agricultural engineering major at Fort Valley State University, is a 2023 U.S. Department of Agriculture/1890 National Scholar.

By Latasha Ford

Students seeking higher education could benefit from scholarships to help overcome any financial barriers to focus on their learning, college experience and career aspirations.

Jalil Jones, a Fort Valley State University (FVSU) freshman, is one among 103 students selected nationwide for the 2023 U.S. Department of Agriculture (USDA)/1890 National Scholars Program.

The USDA partners with 1890 Land-grant Universities to provide scholarship recipients with full tuition, fees, books, and room and board. The scholarship also includes work experience through USDA summer internships. USDA's Office of Partnerships and Public Engagement manages the 1890 National Scholars Program. It is aimed at increasing the number of students from rural and underserved communities, who attend one of the 19 1890 Land-grant Universities and pursue

degrees in agriculture, food, natural resource sciences or related academic disciplines.

The USDA/1890 National Scholars Program has awarded many FVSU students, who have applied over the years. Currently, there are 12 scholars at FVSU being sponsored by five USDA agencies and nine states.

Jones is grateful to receive funds to go toward his education. "Being able to maintain a scholarship is something I am prepared to do," he affirmed.

Once interested in building rockets, the 18-year-old Wildcat is studying agricultural engineering. He aspires to use his artistic abilities to design and build machinery as an agricultural engineer for the USDA.

"I want to create something from what I have learned from school and work experiences," Jones said.

The Oakland, California, native will intern for the USDA's Natural Resources Conservation Service (his sponsoring agency) in the summer of 2024 in Arizona. An FVSU alumnus selected him for this opportunity. Putting in the work, Jones is looking forward to the experience.

He said his time on FVSU's campus as a freshman has been welcoming. He knew that he wanted to attend a historically Black university when considering his options. His parents are Tuskegee University graduates. They exposed him to various colleges by taking him to a college fair in Oakland while in high school. This is where he learned about FVSU and the USDA/1890 National Scholars Program.

"I know that I must do certain things to progress in life," Jones said about the choices he has made.

His advice to students interested in attending FVSU and applying to the USDA/1890 National Scholars Program is: "If you want to work toward something, you should not give up on it because you may miss opportunities you don't take."

The agricultural engineering major strongly suggests that students also give themselves more grace. "Take a moment to appreciate the things you have accomplished," he said.

USDA awarded more than 100 1890 scholarships in Fiscal Year 2023. The 2024 application cycle opened in December 2023. For more information, visit https://bit.ly/USDA1890scholar or contact Karla Hollis, USDA liaison, at karla.hollis@usda.gov.

Fort Valley State University's U.S. Department of Agriculture/1890 National Scholars shown with Karla Hollis, USDA liaison.

Published Work 2023 – 2024

Research at Fort Valley State University is published and presented through scholarly journals, and shared through presentations at scientific conferences globally. Below is a list of published work and presentations of FVSU agricultural research faculty and staff from 2023 – 2024.

Sarwan Dhir, Ph.D.

RECENTLY FUNDED PROPOSALS:

1. Sarwan Dhir (PI) Institutional Project: Retention of Minority Education in Biotechnology (STEM) at the Fort Valley State University (RMEB at FVSU), MSEIP, DoE October 1, 2024-September 30, 2027.

PUBLICATIONS, PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

1. Mohammad, T.; Ghogare, R.; Morton, L.B.; Dhingra, A.; Potlakayala, S.; Rudrabhatla, S.; Dhir, S.K. Evaluation of Parameters Affecting Agrobacterium-Mediated Transient Gene Expression in Industrial Hemp (Cannabis sativa L.). Plants 2024, 13, 664. https://doi.org/10.3390/plants13050664.
2. Basak S, Parajulee D, Dhir S, Sangra A, Dhir SK. Improved Protocol for Efficient Agrobacterium-Mediated Transient Gene Expression in Medicago sativa L. Plants (Basel). 2024 Oct 26;13(21):2992. doi: 10.3390/plants13212992. PMID: 39519910; PMCID: PMC11547841.
3. Suma Basak* and Sarwan Dhir (2024) Somatic Embryogenesis, In vitro Plant Regeneration, and Assessment of Natural Sensitivity in Alfalfa (Medicago sativa L.) American Society of Plant Biology, June 22-26 Honolulu, Hawaii.
4. Dipika Parajulee*, Suma Basak, Terri Brearley, and Sarwan Dhir (2024) Factors Influencing the Agrobacterium-mediated Transient Gene Expression in Medicago sativa L. American Society of Plant Biology, June 22-26 Honolulu, Hawaii.
5. Lauren B. Morton* and Sarwan K. Dhir (2024) Plant Regeneration and Agrobacterium-Mediated Transient Gene Expression in Industrial Hemp (Cannabis sativa L.) American Society of Plant Biology, June 22-26 Honolulu, Hawaii.

Ramana M. Gosukonda, Ph.D.

RECENTLY FUNDED PROPOSALS:

1. Building AI Capacity for Research and Teaching at FVSU (NIFA, $750,000): An integrated approach to enhance daylily hybrid prediction using artificial neural networks. Principal Director | 2024 – 2027.

USDA OR INDUSTRY COLLABORATIONS AND PARTNERSHIPS:

1. Established a collaboration with the University of California- Davis

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

1. Gosukonda, R.M., Siddique, A., Mahapatra A.K. 2024. Comparative performance analysis of machine learning and regression models for predicting the angle of repose of Sericea Lespedeza seeds. Annual conference, Thai Society of Agricultural Engineering and Asian Institute of Agricultural Engineering, May 22 – 24, Bangkok, Thailand (under review).
2. Talari, K., Degala, HL., Mahapatra, AK., Gyawali, R., Gosukonda, R.M. 2024. Pulsed light decontamination and modeling of Salmonella on pecan halves. Annual conference, Thai Society of Agricultural Engineering and Asian Institute of Agricultural Engineering, May 21 – 26, Bangkok, Thailand. (under review).
3. Gosukonda, J., Degala, V., Singh, H., Gosukonda, R.M. 2024. Effects of cellulosic microfiber hydrogels as soil amendment on pepper growth. American Society of Plant Biologists, June 21 – 26.
4. Talari, K., Mahapatra, A. K., and Gosukonda, R.M. 2024. Prediction of pulsed UV Salmonella inactivation on pecans using artificial neural networks. 21st 1890 Association of Research Directors biennial research symposium, Nashville, TN. April 6 – 10.

Ajit K. Mahapatra, Ph.D.

RECENTLY FUNDED PROPOSALS:

1. Enhancing Food Safety in Pecan Processing, USDA-Research, Education, and Economics, 2024-2026, $631,934.00.
2. US-Ghana Collaboration: Developing FVSU's Capacity in Ag Research, Education and Extension to Enhance Faculty and Students' Experiential Learning, USDA-NIFA, 2023-2026, $599,130.00.

USDA OR INDUSTRY COLLABORATIONS AND PARTNERSHIPS:

1. USDA-ARS, SE Fruit and Tree Nut Research Station, Byron, GA
2. USDA-ARS, Crop Genetics and Breeding Research Station, Tifton, GA
3. USDA-ARS, Eastern Regional Research Center, Wyndmoor, PA
4. University for Development Studies, Tamale, Ghana
5. Purdue University, West Lafayette, IN
6. University of North Georgia, Gainesville, GA

PEER-REVIEWED JOURNAL ARTICLES:

1. Gyawali, R., H. L. Degala, A. K. Biswal, C. A. Bardsley, and A. K. Mahapatra. 2024. Effects of intense pulsed light on inactivation of Salmonella Typhimurium and quality characteristics of pecan halves. LWT - Food Science and Technology 203 (116344): 1-8.
2. Gyawali, R., A. K. Mahapatra, C. A. Bardsley, and B. A. Niemira. 2024. Nonthermal techniques, antimicrobial agents, and packaging methods to improve the microbial safety of nuts. Trends in Food Science and Technology 146 (104363): 1-14.
3. Panda, S. S., T. H. Terrill, A. Siddique, A. K. Mahapatra, E. R. Morgan, A. A. Pech-Cervantes, and J. A. VanWyk. 2024. Development of a decision support system for animal health management using geo-information technology: A novel approach to precision livestock management. Agriculture 14 (696): 1-19.
4. Siddique, A., S. S. Panda, S. Khan, S. T. Dargan, S. Lewis, I. Carter, J. A. Van Wyk, A. K. Mahapatra, E. R. Morgan, and T. H. Terrill. 2024. Innovations in animal health: Artificial intelligence-enhanced hematocrit analysis for rapid anemia detection in small ruminants. Frontiers in Veterinary Science 11(1493403): 1-17.
5. Siddique, A., K. Cook, Y. Holt, S. S. Panda, A. K. Mahapatra, E. R. Morgan, A. A. Pech-Cervantes, J. A. VanWyk, and T. H. Terrill. 2024. From Plants to Pixels: The role of artificial intelligence in identifying sericea lespedeza in field-based studies. Agronomy 14 (992): 1-18.
6. Panda, S. S., T. H. Terrill, A. K. Mahapatra, E. R. Morgan, A. Siddique, A. A. Pech-Cervantes, and J. A. VanWyk. 2023. Optimizing sericea lespedeza fodder production in the southeastern U.S.: A climate-informed geospatial engineering approach. Agriculture 13 (1661): 1-15.

BOOK CHAPTER:

Mahapatra, A. K., H. L. Degala, and P. M. de Souza. 2024. Processing of food using light sources. In: Future Crops and Processing Technologies for Sustainability and Nutritional Security, PP 1 - 22. 1st Ed. S. R. Purohit, V. Sharma, M. Kumari, K. Muthukumarappan, J. Kane-Potaka (eds.). Boca Raton, FL.: CRC Press.

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

1. A. K. Mahapatra*, V. Arthur, H. L. Degala, R. Gyawali. 2024. Modeling the Inactivation Kinetics of Escherichia coli on Pecan Halves Treated by Intense Pulsed Light. 2024 Conference of Food Engineering, August 25-28, 2024, Seattle, WA.
2. R. Gyawali*, K. Talari, H. L. Degala, A. K. Mahapatra. 2024. Intense Pulsed Light Treatment for Microbial Safety of Fresh Lettuce. 2024 Conference of Food Engineering, August 25-28, 2024, Seattle, WA.
3. R. Gyawali*, H. L. Degala, A. K. Biswal, C. A. Bardsley, A. K. Mahapatra. 2024. Effects Of Intense Pulsed Light on Inactivation of Salmonella Typhimurium and Quality Characteristics of Pecan Halves. International Association for Food Protection Annual Meeting, July 14-17, 2024, Long Beach, CA.
4. V. Arthur *, H. L. Degala, R. Gyawali, and A. K. Mahapatra. 2024. Efficacy of Intense Pulsed Light and Cold Plasma Technologies for Escherichia coli Inactivation on Pecan Halves. International Association for Food Protection Annual Meeting, July 14-17, 2024, Long Beach, CA.
5. A. K. Mahapatra*, K. Talari, H. L. Degala, R. Gyawali, R. M. Gosukonda, T. H. Terrill. 2024. Pulsed Light Decontamination and Modeling of Salmonella on Pecan Halves. 2024 AAAE International Agricultural Engineering Conference May 22-24, 2024, Bangkok, Thailand.
6. K. Talari*, A. K. Mahapatra, R. Gosukonda. 2024. Prediction of Intense Pulsed Light Salmonella Inactivation on Pecans Using Artificial Neural Networks. Association of 1890 Research Directors (ARD) Biennial Research Symposium, April 6-9, 2024, Nashville, TN.
7. R. Gyawali*, H. L. Degala, A. K. Mahapatra. 2024. Inactivation of Salmonella Typhimurium on Pecan Halves Using Intense Pulsed Light. Association of 1890 Research Directors (ARD) Biennial Research Symposium, April 6-9, 2024, Nashville, TN.
8. S. Afrin*, H.L. Degala, R. Gyawali, and A.K. Mahapatra. 2024. Potential Application of Essential Oil as a Natural Preservative on Pecan Halves. Association of 1890 Research Directors (ARD) Biennial Research Symposium, April 6-9, 2024, Nashville, TN.
9. V. Arthur *, H. L. Degala, R. Gyawali, and A. K. Mahapatra. 2024. Effects of Intense Pulsed Light and Cold Plasma

Published Works 2023 – 2024

Treatments on Spot Inoculated Escherichia coli (ATCC 8739) on Pecans. Association of 1890 Research Directors (ARD) Biennial Research Symposium, April 6-9, 2024, Nashville, TN.

10. R. Gyawali, H. L. Degala, and A. K. Mahapatra*. 2023. Pecan halves subjected to pulsed UV light: Microbial Safety and Quality. Institute of Food Technologists (IFT)-European Federation of Food Science and Technology (EFFoST) International Nonthermal Processing Workshop & Short Course, October 15-17, 2023, University of Minnesota, MN.
11. V. Arthur* and A. K. Mahapatra. 2023. Pulsed-UV light and Cold Plasma Technologies for Inactivation of Escherichia coli (ATCC 8739) Pecan Halves. 9th Annual Historically Black Colleges and Universities (HBCU) Climate Change Conference, October 11-15, 2023, New Orleans, LA.
12. S. Afrin* and A. K. Mahapatra. 2023. Potential application of clove bud essential oil as a natural preservative on pecan halves. 9th Annual Historically Black Colleges and Universities (HBCU) Climate Change Conference, October 11-15, 2023, New Orleans, LA.
13. K. Talari* and A. K. Mahapatra. 2023. Effect of Pulsed UV Light on Quality Characteristics of Pecans. 9th Annual Historically Black Colleges and Universities (HBCU) Climate Change Conference, October 11-15, 2023, New Orleans, LA.

George N. Mbata, Ph.D.

RECENTLY FUNDED PROPOSALS:

1. USDA-NIFA NEX GEN Research Grant
   Year of Grant: 07/10/2023 -06/30/2028
   Grant #: NEXTGEN Proposal #2022-11878
   Grant Title: Training next generation Entomologists
   Grantees: Florida A & M University, Fort Valley State University, University of Florida.
   Subaward amount: 494,000.00
2. USDA –Agricultural Research Service
   Year of Grant: 09/10/2021 -09/30/2028
   Grant #: 58-6066-0-061
   Title: Sustainable conservation of pollinator
   Grantees: George Mbata and David Shapiro-Ilan
   Amount: $122,642
3. USDA-ARS: Grant #: 58-6080-9-006
   Title: Managing Whiteflies and Whitefly-Transmitted Viruses in Vegetable Crops in the Southeastern U.S.
   Year of Grant: 09/10/2019 -09/30/2028
   Grantees – UGA, FVSU (George Mbata and Somashekhar Punnuri) USDA ARS South Carolina
   Subaward Amount: $3,332,800

USDA OR INDUSTRY COLLABORATIONS AND PARTNERSHIPS:

1. Active collaborations on the use of entomopathogens in the management of whitefly. Collaborator names: Shapiro-Ilan, D (USDA-ARS, Bryon), Towes, M. (UGA), Simmons, A. (USDA-ARS, Savannah), Perier, J. (USDA-ARS, Bryon).
2. Active collaboration with Premium peanuts, Douglas, GA, on the mitigation of aflatoxins in peanuts
3. Active collaboration with Dr. Lambert Kanga, Florida A & M University on the recruitment and training of NEXTGEN entomologists.

PUBLISHED WORK:

1. Mbata, G.N., Danso, J. K., and Holton, R. L. 2024. Peanut Aflatoxin: Impact of postharvest insect infestation and storage systems. Insects 2024, 15, 836.*https://doi.org/10.3390/insects15110836*.
2. Quarshie1, M., Asare, S. K, Ewusi, S. D, Mbata, G. N. and Osekre, E. 2024. Toxicity and protectant potential of linalools (Monoterpenoid) against Sitophilus zeamais Motschulsky (Coleoptera: Curculionidae) infestation in stored maize. Journal of Entomology and Nematology 16, 24-33.
3. Mbata G.N., Li, Y., Warsi, S., Simmons, A. S., 2024. Susceptibility of Yellow Squash and Zucchini Cultivars to the sweet potato Whitefly, Bemisia tabaci Gennadius (MEAM1), in the Southeastern United States. Insects 2024, 15, 429. *https://doi.org/10.3390/insects15060429*
4. Danso, J. K., Mbata, G.N. and Holton, R. L. Preharvest insect pests of peanuts and associated aflatoxincontaminants in Georgia, USA. J. Econ. Entomol. *https://doi.org/10.1093/jee/toae074*
5. Li Y., Mbata G.N., Simmons, A. M., Shapiro-Ilan D.I., Wu S. (2024). Management of Bemisia tabaci onvegetable crops using entomopathogens. Crop Protection.
6. Wu S., Li Y., Toews M.D., Mbata G.N., Shapiro-Ilan D.I. (2023). Novel formulations improve the environmental tolerance of the entomopathogenic nematodes. Biological Control. *https://doi.org/10.1016/j.biocontrol.2023.105329*.
7. Ofuya, T. I., Okunlola, A. I., Mbata, G. N. 2023. A review of insect pest management in vegetable crop production in Nigeria.

Insects 2023, 14, 111. *https://doi.org/10.3390/insects14020111*

8. Li, Y., Mbata, GN., Simmons, A. 2023. Population dynamics of insect pests and beneficials on different snap bean cultivars. Insects 2023, 14, 230. *https://doi.org/10.3390/insects14030230*

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

Scientific Conferences (2023-2024)

1. Mbata G.N., Danso, J.K., Holton, R.L.2024. Integrated strategies for managing insect pests and aflatoxin contamination in peanuts. 2024 Aflatoxin Research Update. University of Georgia Tifton Campus, Tifton, GA. November 20, 2024. Ten (10) Minutes Oral Presentation.
2. Danso, J.K., Mbata, G.N., Holton, R.L.2024. Impact of storage structures on peanut quality: Insect pests and aflatoxin risks in peanuts. 2024 Entomological Society of America Annual Conference, Phoenix, AZ. November 10-13. Ten (10) Minutes Oral Presentation.
3. Issah J.I., Warsi, Mbata, G.N. 2024. Evaluation of developmental stages of the parasitoid Habrobracon hebetor for interaction with entomopathogenic nematodes. 2024 Entomological Society of America Annual Conference, Phoenix, AZ. November 10-13. Poster
4. Mbata, G.N, Danso, J.K. 2024. Preharvest and postharvest losses in peanuts as impacted by insect infestation along the supply chain in Georgia State, USA. Integrated Protection of Stored Products. IOBC-WPRS Bulletin Vol. 173, 2024, pp. 9-12. September 23, 2024.
5. Mbata, G.N., Danso, J.K., Holton, R.L.2024. Postharvest Insect Pests of Peanuts and Associated Aflatoxin Contaminants in Georgia, USA. Association of 1890 Research Directors (ARD) Biennial Research Symposium. Gaylord Opryland Resort & Convention Center, Nashville, TN. April 6-9, 2024. Ten (10) Minutes Oral Presentation.
6. Danso, J.K., Mbata, G.N., Holton, R.L. 2024. Insect Pest and Aflatoxin Surveillance for Enhanced Quality Management in Peanut Storage. 2024 Southeastern Branch Meeting Entomological Society of America (ESA). Augusta Marriott at the Convention Center, Augusta, GA. March 17-20, 2024. Ten (10) Minutes Oral Presentation.
7. 2024 Southeast Regional Fruit and Vegetable Conference. Savannah Convention Center, Savannah, GA. January 11-14, 2024.
8. Warsi, S. LI, Y. Mbata, G. and Simmons, A. Impact Assessment of Weather Variability on Sweetpotato Whitefly (Bemisia tabaci, MEAM1) Infestations on Snapbean, Yellow Squash and Zucchini Cultivars. Entomological Society of America Southeastern Branch Meeting; Augusta, Georgia, March 2024.
9. Warsi, S. LI, Y. Mbata, G. and Simmons, A. Understanding Pest Population Dynamics in Squash: The Role of Cultivar Selection and Weather Conditions. Entomological Society of America National Meeting; Phoenix, Arizona November 2024.

POSTER PRESENTATIONS:

1. Warsi. S, Ivey. C, Li, Y. Mbata, G. and Shapiro-Iian, D. Evaluating the Long-term Efficacy of Beauveria bassiana Wettable Powder on Jute Bags for Controlling Sitophilus zeamais in Maize Storage. Association of 1890 Research Directors (ARD) Symposium, Nashville, Tennessee, April 2024.
2. Issah, J. Warsi, S. Danso, J. Garland, K. and Mbata, G. Integration of the Parasitoid Habrobracon hebetor with Entomopathogenic Nematodes for the Control of Plodia interpunctella. Entomological Society of America Southeastern Branch Meeting; Augusta, Georgia, March 2024.
3. Issah, J. Warsi, S. Danso, J. Garland, K, and Mbata, G. Integration of Entomopathogenic Nematodes and Parasitoid for Managing for Managing Plodia interpunctella (Lepidoptera: Pyralidae). Association of 1890 Research Directors (ARD) Symposium, Nashville, Tennessee, April 2024.

Somashekhar Punnuri, Ph.D.

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

1. Students presentation at at American Society of Agronomy (ASA) Crop Science Society of America-(CSSA) Soil Science Society of America (SSSA) annual meeting 2023-October 28-November.
2. Manoj Kumar Reddy Sangireddy-Poster presentation title-Developing Microsatellite Markers Associated with Aphid Resistance in Sorghum
3. Varun Kumar Reddy Cheruku-Poster presentation title- Intercropping Sorghum and Peanut: Harnessing Rhizobiome Dynamics. Varun Kumar Reddy Cheruku received second place for poster presentation
4. Society: Crop Science Society of America
   Session title: Genomics, Molecular Genetics, and Biotechnology Poster II
   Session date/time: October 31, 2023, 4 – 6 p.m.
   Category: Graduate students (Master's and Ph.D.)
   Title: Intercropping Sorghum and Peanut: Harnessing Rhizobiome Dynamics

Published Works 2023 – 2024

POSTER PRESENTATIONS:

Plant & Animal Genome Conference 2024 (PAG 31) San Diego, CA January 12 – 17, 2024

- Punnuri et al., (2024) Integrating High-Throughput Phenotyping and GWAS for Sorghum Plant Height and Stem Thickness: A Comparative Analysis of Manual, Robot, and Drone-Based Measurements.
- Poster presentation at Sorghum Improvement Conference of North America (SICNA) meeting held in Oklahoma City, OK.
- Punnuri et al., A Comparative Analysis of Manual, Robot, and Drone-Based Measurements for Sorghum Plant Height and Stem Thickness in Identifying Genomic Loci Underlying these Traits.- Oklahoma City, OK SICNA 2024 April, 1-5.
- Poster presentations at the Association of Research Directors (ARD) meeting held in Nashville, TN. From our lab four students (Manoj Sangireddy, Varun Cheruku, Anvesh Sankuratri, and Sairam Vutla) presented posters at this meeting.

Poster presentations at the National Association of Plant Breeders (NAPB) meeting in St. Louis, MO.

- Students Anvesh Sankuratri and Sairam Vutla and one postdoc (Dr. Mahendar Thudi) presented posters during the NAPB meeting held in St. Louis, MO, July 2024
- Poster presentation at Genome Editing and Plant Genomics meeting in Raleigh NC, October 21-23, 2024. Students Anvesh Sankuratri and Surakshya Ghimire presented posters at this meeting.

Poster presentations at American Society of Agronomy (ASA) Crop Science Society of America-(CSSA) Soil Science Society of America (SSSA) Tri-Society Annual meeting- 2024-Nov1- 5, San Antonio, TX

- Anvesh Sankuratri and Sairam Vutla presented a poster during this meeting.
- Sairam Vutla, a graduate biotechnology major won a prize in the poster competition at the 2024 ASA, CSSA, SSSA Tri-Society annual meeting. This prestigious event, held in San Antonio, TX, was competitive with both master's and doctoral students presenting their research in various sections. The meeting was attended by more than 4,000 participants from around the world.
- Sairam presented his poster titled "Genome-Wide Association Study Reveals Genetic Architecture of Panicle Morphology Traits in Sorghum" in the C07 - Genomics, Molecular Genetics, and Biotechnology division. His outstanding work earned him a second place award with a $200 cash prize.

PUBLISHED WORK:

1. Dr. Punnuri along with other scientists and co authors from their review paper were recently featured on a podcast released from @fieldlabearth, where they talked about managing sorghum aphid and about the comprehensive review paper published from Punnuri's lab. Listen to the podcast at *https://lnkd.in/ePrrKQCj*
2. Boatwright et al*., (2024) GWAS analysis for plant height and stem diameter in sorghum using multiple phenotyping approaches-The Plant Phenome Journal, accepted October 2024.
3. Naik et al., (2024) Bioinformatics for Plant Genetics and Breeding Research. Frontier Technologies for Crop Improvement pp 35–64, 35–64 Springer, Singapore (book chapter).
4. Gupta et al*., (2024) Meta-QTL analysis reveals the important genomics regions for biotic stresses, nutritional quality and yield related traits in pearl millet. CABI Agriculture and Bioscience 5, 1-36.
5. Thudi et al*., (2024) Invasive sorghum aphid: A decade of research on deciphering plant resistance mechanisms and novel approaches in breeding for sorghum resistance to aphids. 2024 Crop Science 64-5, 2436-2458.
6. Punnuri et al*., (2024) High-Density Genotyping for Pearl Millet Linkage Map Improvement with Next-Generation Sequencing Data. In The Pearl Millet Genome edited by Srivastav et al., 2024-97-105 Springer International Publishing Cham (book Chapter).
7. Jha et al., (2024) Major abiotic stresses on quality parameters in grain legumes: impacts and various strategies for improving quality traits. Environmental and Experimental Botany 105978-Elsevier.
8. Kumar et al., (2024) Genome-wide association mapping reveals novel genes and genomic regions controlling root-lesion nematode resistance in chickpea mini core collection. The plant genome-e20508.
9. Vutla, Sairam; Sankuratri, Anvesh; Harris-Shultz, Karen; Joseph, Knoll; Thudi, Mahendar; Punnuri, Somashekhar M*; Genome-Wide Association Study Reveals Genetic Architecture of Panicle Morphology Traits in Sorghum, Sorghum Bicolor 2024 ASA, CSSA, SSSA International

Annual Meeting Poster ASA-CSSA-SSSA

10. Punnuri et al*.; (2024) Integrating High-Throughput Phenotyping and GWAS for Sorghum Plant Height and Stem Thickness: A Comparative Analysis of Manual, Robot, and Drone-Based Measurements 2024 PAG 31 Jan 12-17 31 Poster-at Plant & Animal Genome International Plant and Animal Genome Conference (PAG 31).
11. Elango et al., (2024) New Breeding Trends in Sorghum 2024 Omics and Biotechnological Approaches for Product Profile-Driven Sorghum Improvement 377-394 Springer Nature Singapore Singapore (book chapter). *Punnuri corresponding author

Dr. Punnuri also conducted a R-based bioinformatics workshop in collaboration with Dr. Jason Wallace from the University of Georgia October 23, 2024 at Fort Valley State University's Agricultural Technology Conference Center. Graduate and undergraduate students along with faculty and staff learned the basics of R programming language.

Oreta Samples, Ph.D.

GRANTS:

1. Evans-Allen Grant (5th year): Investigation into Potential for Zoonotic and Interspecies Disease Transmission to Livestock via white-tailed Deer in Georgia
2. Morehouse School of Medicine CECAN Grant: Improving Health Behavior of Hunters to Prevent Zoonotic Disease Transmission During Hunting Activities Involving White-tail Deer - An Intervention

USDA OR INDUSTRY COLLABORATIONS AND PARTNERSHIPS:

1. USDA-NIFA (Evans-Allen)
2. Morehouse School of Medicine, CECAN group

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY): PLEASE NOTE THAT ALL STUDENTS LISTED BELOW WERE RECIPIENTS OF EITHER EVANS-ALLEN FUNDING (INTERNATIONAL) OR DR. JOSHEE'S DOE GRANT FUNDING (DOMESTIC STUDENTS).

January – September 2024

1. Student Poster Presentation/competition (Georgia Environmental Health Association Annual meeting 2024): Brian Ashley: Monitoring Freshwater Fish for Microbial Sprouts and Zoonotic Pathogens (tied for 1st place in student poster competition). Mentor: Wesey, S and Samples, OM.
2. Student Poster Presentation/Competition (Georgia Environmental Health Association Annual meeting 2024): Milo Ra'oof: Does the Biophilic Design of K-1 Building Affect Student Happiness? Mentor: Samples, OM, Wesey, S.
3. In a shared collaboration with Morehouse School of Medicine, the MPH program received three mini-grants over the course of the past 2 years. These grants were to identify a public health problem (Mini-grant 1), identify a population affected (Mini-Grant 2) and then design an implementation strategy to mitigate that threat (Mini-Grant 3). We chose to utilize some of the work we have done with my Evans-Allen project and identify zoonotic diseases associated with White-tailed Deer (Odocoileus virgianus) which were Anaplasmosis and COVID-19 which would be a danger to the vulnerable populations of deer hunters, wild game processors and DNR technicians in Georgia (vulnerable population) and then put together an educational intervention which was promoted for three days at the recent Perry Buck-a-Rama hunting show. Our team was made up of the following: Faculty: Samples, O, Wesey, S, and Terrill, T and MPH Students: Arowola, Jeremiah, Omotosho, Sodiq, Ashley, Brian, Ra'oof, Milo. During the three day event, the students and Dr. Wesey and Samples interacted with over 300 Georgia hunters to disseminate information on carcass handling safety and avoidance of Anaplasmosis and COVID-19 in White-tailed deer.
4. Student Poster Presentation (ARD, Nashville): Eric Enoch: A Study of the Status of Pathology in 25 Georgia Raccoons as Related to Zoonotic Disease Spread. Mentor: Samples, OM.
5. Student Poster Presentation (ARD, Nashville): Macdonald Aloh: Intervention Against Zoonotic Transfer of Disease Between North American Racoon and Ga. Department of Natural Resources Technicians During Necropsy Mentor: Samples, OM.
6. Student Poster Presentation (ARD, Nashville): Jeremiah Arowolo: Academics Afield- A Student Perspective Mentor: Samples, OM.
7. Student Poster Presentation (ARD, Nashville): Milo Ra'oof: Does the Biophilic Design of the K-1 Building on Georgia Tech's Campus Affect Student Happiness? Mentor: Samples, OM, Wesey, S.
8. Faculty Publication: NAVTA Journal: Fall 2024: World Rabies Day: Time for a Refresher, Samples, OM.
9. Faculty Publication: Environmental Health International Journal, Volume 24, No. 1 May 2024: Timeline of Toll-like Receptor Expression During and After an Exercise Bout, Wesey, S, Samples, OM, McLester, L.
10. Faculty Publication: NAVTA Journal: Spring 2024: GPS Col-

Published Works 2023 – 2024

lars: An electronic Pet Advocate, Samples OM.

11. Faculty Oral Presentation: Researchtopia Virtual Conference – Chamberlain University (9/11/2024): The Potential for Zoonotic Transmission of Disease Among Recreational Anglers in Georgia, Samples, OM.
12. Faculty Oral Presentation: Writing to Publishing: AVTE Webinar: Invited Speaker: Crafting a Worthy Manuscript, Samples, OM (2/2024).

January – December 2023

1. Student Poster Presentation: FVSU Research Day: Eric Enoch: Why It Is Important for Anyone Handling Racoon Carcasses to be Careful and Self-Aware? Mentor: Samples, OM.
2. Student Poster Presentation: Auburn University CETL Virtual Conference: Jill Reade and Jeremy Robinson: South Health Dstrict Septic Installer Field Proficiency Exercise. Mentor: Samples, OM.
3. Student Poster Presentation: Auburn CETL Virtual Conference: Matthew Turner: Revising the OSSMS Filled Site Certification Form. Mentor: Samples, OM.
4. Student Poster Presentation: Auburn University CETL Virtual conference: Sharone Lloyd: EV Batteries and Recycling. Mentors: Samples, OM, Wesey, S.
5. Student Poster Presentation/Competition: Georgia Environmental Health Association Annual Meeting: Eric Enoch: A Study of the Status of Pathology in 25 Georgia Racoons as Relates to Zoonotic Disease Spread to DNR Technicians. Mentors, Samples, OM, Wesey, S.
6. Student Poster Presentation: Georgia Public Health Association Convention: Sherone Lloyd: EV Batteries and Recycling. Mentors: Samples, OM, Wesey, S.
7. Faculty Poster Presentation: Samples, OM, Buck, B: Use of LMS Formatted Assignment to Fulfill Accreditation Requirements to Veterinary Technician Students.
8. National Association of Veterinary Technichans in America (NAVTA) Journal, November 2023: Foxtails, Sticklers for Distress, Samples, OM.
9. Faculty Publication: Environmental Health International, Vol. 23, No 2, October 2023: Evidence-Based Practices to Increase Participation in Prostate Screening in Black Men in Southern Urban Environments, Wesey, S, Samples, OM
10. Faculty Publication: Georgia Environmental Health Association Journal September 2023: Fish Anyone...A Case Study, Dykes, G, Samples, OM
11. Faculty Publication: Journal of the Association of Veterinary Educators, Winter 2023: Wristwatch: Archaic Timepiece or Medical Necessity, Samples, OM, Kalu, K.
12. Faculty Publication: Frontiers in Public Health, June 19, 2023: The Community Engagement Course and Action Network: Strengthening Community and Academic Research Partnerships to Advance Health Equity, Akintobi, TH, Barrett, R, Hoffman, L, Scott, D, Davis, K Jones, T, de Veauuse-Brown, N, Fraire, M, Fraire, R, Gerner, J, Gruner, A, Hill, J, Meckel, R, Obi, C, Omunga, P, Parham, Q, Rice, T, Samples, O, Terrill, T
13. Faculty Publication: Environment and Health International, Congress Edition, January 2023: Examination of the Incidence of COVID-19 Among White-tailed Deer and Potential for Interspecies (Zoonotic) Transmission in Georgia, Kupolati, K, Meckel, R, Terrill, TH, Stose, L, McCommon, G, Spikes, TR, Moseley, YY, Naikare, H, Samples, OM
14. Faculty Publication: NAVTA Journal, January-March 2023: Polypharmacy, Samples, OM

Hari Pratap Singh, Ph.D.

Undergraduate students Sierra Cloud secured third place in the Undergraduate STEM Poster Presentation. Srinivas Voruganti secured first place in the Graduate Poster Presentation during the 13th FVSU Annual Research and Creative Works Symposium, April 19 – 20, 2023. Cloud and Voruganti are mentored by Dr. Hari P. Singh.

Mahipal Singh, Ph.D.

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

Peer Reviewed Publications by faculty and students:

1. Singh M., C. Henry, X. Ma, A. Abolude, A. Moawad, T. Stephens, and R. Chandra. Effect of different cryopreservation temperatures on recovery of goat skin derived fibroblast cells. Journal of Biotech Research (2023) 15: 355-359.
2. Singh, M & X Ma. Recovery of proliferative fibroblast cells from refrigerated sheep skin after different postmortem time intervals and their characterization Journal of Biotechnology and Biomedicine (2024) 7(1): 93-100.

ABSTRACTS OF PRESENTATIONS BY STUDENTS AND FACULTY:

1. Singh, M, X. Ma, J. Brown and C. Sharma. Effect of different concentrations of curcumin on in-vitro proliferation of human dermal fibroblasts. Presented in American Society of Plant Biol-

ogy Annual Meeting, June 22-26, 2024, Honolulu, Hawaii.

2. Singh, M, Irving, A, Abolude, A, Moawad, A, Ma, X and Kouakou, B. Effect of melatonin supplementation during in vitro embryo culture on cleavage rates following in vitro maturation and fertilization of bovine oocytes. Journal of Animal Science, Volume 102, Issue Supplement_3, September 2024, Page 717, https://doi.org/10.1093/jas/skae234.807. Published: 14 September 2024. PSXIII-14
3. Singh, M. Cloning and analysis of target-specific CRISPR RNA and screening primers to create β-lactoglobulin knock-out goat fibroblast cell lines for nuclear transfer. Journal of Animal Science, Volume 102, Issue Supplement_3, September 2024, Page 659, https://doi.org/10.1093/jas/skae234.748 Published, 14 September 2024.
4. Brown, J*, X. Ma and M. Singh. How effective is adult goat serum compared to traditional fetal bovine serum in mammalian cell cultures. Presented in 21st Biennial Research Symposium of the Association of Research Directors, Tennessee, April 7, 2024. Abs. #38, page 103. Oral; Also presented in 14th Annual Research and Creative Works Symposium, April 25, 2024
5. Nelson, L*, C. Henry, X. Ma, J. Brown, A. Moawad and M. Singh. Effect of Varying Degrees of Cooling During Cryopreservation on Recovery of Mammalian Cells. Presented in 21st Biennial Research Symposium of the Association of Research Directors, Tennessee, April 7, 2024. Abs. #536, page 319. Poster. Also presented in 14th Annual Research and Creative Works Symposium, April 25, 2024
6. Narlagiri R*, S C Namani, K Kolikapongu, M Schauston, H Courtney, B. Kouakou, M Singh, and A. R Moawad. Exploring the impacts of coenzyme Q10 supplementation on the quality and fertility of cryopreserved goat semen. Presented in 21st Biennial Research Symposium of the Association of Research Directors, Tennessee, April 7, 2024. Abs. #558, page 328. Poster
7. Singh, M; C Henry, X Ma, A Abolude, A Moawad & T Stephens. Effect of Different Cryopreservation Temperatures on Recovery of Postmortem Goat Skin Derived Fibroblast Cell Populations. Biopreservation and Biobanking Vol.21(3), June 19, 2023. Abstr. PE-26. (https://www.liebertpub.com/doi/10.1089/bio.2023.29118.abstracts)
8. Abolude, A; A Irving, T Stephens, X Ma, AR Moawad, B Kouakou & M. Singh. Detecting Genetic Variability in Arylalkylamine N-acetyltransferase Gene of Capra hircus. 13th Annual Research and Creative Works Symposium, April 19-20th, 2023. [Second prize winner in Graduate poster category

Jacques Surrency, Ph.D.

RECENTLY FUNDED PROPOSALS:

1. The Phytoremediation Potential of the Bracken Fern and Paulownia for Arsenic and Lead In Contaminated Soil and Water of the Woolfolk Chemical Works Site, $217,900, GEOX-5225, June, 1, 2023 - September 1, 2028.
2. Climate Change: Impacts for Socially Disadvantaged Farmers, Landowners & Communities of Color, $316,360, October 1, 2022 – September 20, 2027.
3. Extending Academic Afield to Advance Equity in College R3 Programming Hunter Safety, $25,000, January 1, 2022 – December 31, 2025.

USDA OR INDUSTRY COLLABORATIONS AND PARTNERSHIPS:

1. Natural Resources Conservation Service (NRCS)
2. Environmental Protection Agency (EPA)

PRESENTATIONS, ABSTRACTS, (WITH STUDENTS AND FACULTY):

1. The Phytoremediation Potential of the Pteridium aquilinum and Paulownia elongata for Arsenic and Lead In Contaminated Soil and Water of the Woolfolk Chemical Works Site, Poster Presentation, Association of Research Directors (ARD) Symposium, April 6-9, 2024, Nashville, Tennessee.
2. The Phytoremediation Potential of the Pteridium aquilinum and Paulownia elongata for Arsenic and Lead In Contaminated Soil and water of the Woolfolk Chemical Works Site, Poster Presentation, FVSU Research and Creative Works Symposium, April 24-25, 2024, Fort Valley, Georgia.
3. *Paulownia elongata* and *Pteridium aquilinum* for Phytoremediation of Heavy Metals, Poster Presentation, The American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America (ASA, CSSA, SSSA) Meeting, November 10-13, 2024, San Antonio, Texas

AGRICULTURAL RESEARCH STATION
FORT VALLEY STATE UNIVERSITY
1005 STATE UNIVERSITY DRIVE
FORT VALLEY, GA 31030-4313

FORT VALLEY STATE UNIVERSITY

COLLEGE *of* AGRICULTURE, FAMILY SCIENCES *and* TECHNOLOGY

ag.fvsu.edu