



**FORT VALLEY
STATE UNIVERSITY**
A State and Land-Grant Institution • University System of Georgia

FVSUag
**COLLEGE OF
AGRICULTURE,
FAMILY SCIENCES
AND TECHNOLOGY**

RESEARCH

2017





Dr. Jacques Surrency (far right) and Master of Public Health students Oluwatumininu Aboyeji (center) and Ovigueroye Ojarikre take soil samples in Fort Valley.



**FORT VALLEY
STATE UNIVERSITY**
A State and Land-Grant Institution • University System of Georgia

Dr. Paul Jones
President

Dr. T. Ramon Stuart
Provost and VP for Academic Affairs

Dr. Govind Kannan
*Dean and Research Director
College of Agriculture, Family Sciences and Technology*

Dr. Mark Latimore, Jr.
Extension Administrator


CONTENTS



**THE AGBOT:
Bringing Precision
Agriculture to
Peaches**
4



**An Environmental
Concern Hits Close
To
Home**
6



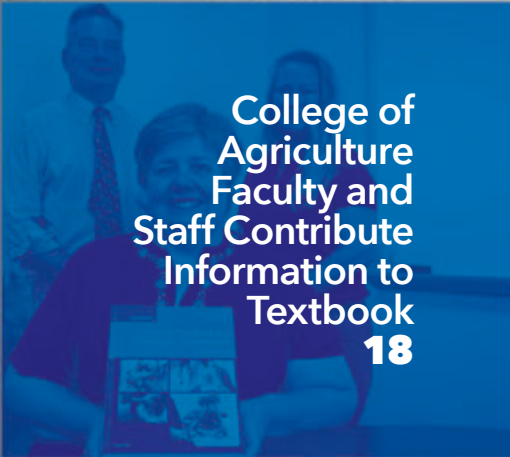
**Making a Better
World with Goat
Milk**
8



**Improving Food
Quality One Light at
a Time**
11



**The Plant Breeders'
Hidden Hero**
14



**College of
Agriculture
Faculty and
Staff Contribute
Information to
Textbook**
18



**Fort Valley State
University Professor
Earns \$100,000 Grant
to Conduct Research**
20



**Graduate Student
Profiles**
22



News & Notes
24

AGRICULTURAL
COMMUNICATIONS
DEPARTMENT

Marquinta Bey Gonzalez
Director

ChaNaè Bradley
Senior Communications Specialist

Russell Boone Jr.
Public Information Editor/Writer

Latasha Ford
Research Communications Specialist

Donn Cooper
Contributing Writer

Jeff Brothers
Graphic Designer

Agricultural Communications
Fort Valley State University
P.O. Box 4061
Fort Valley, Georgia 31030-4313
478-825-6345
ag.fvsu.edu

FROM THE PRESIDENT

Greetings,

Fort Valley State University's role as Georgia's only 1890 Land Grant University is one of our most meaningful public trusts. It means that we have a unique responsibility to use education to benefit all of humanity, both by producing graduates in fields in which there is an immediate, practical need, and in engaging in research that can have ramifications for every living being on earth, and for the earth itself. We take great pride in the discoveries and innovations made possible by our outstanding faculty in agriculture, family sciences and technology, and are equally proud of the collaboration our faculty engages in with undergraduate and graduate students. Even as our faculty make meaningful breakthroughs, they are also preparing students to be consequential scientific thinkers and practitioners.

This publication is part of our effort to share our work with you. I hope that it serves as a catalyst for idea-sharing, and that the stories, concepts, methodology and theories contained within spark expanded scientific energy in the areas explored. Moreover, I hope that it stokes our belief in what is possible through intellectual conquest, doggedness and intellectual cooperation.

Of particular note is the way in which our research has looked at agriculture, among the first of the world's academic and occupational fields, in the context of technological advances only now beginning to emerge. In this way, we are helping fulfill the most basic human needs in more efficient and effective ways. At that same time, the work we are doing has the potential to improve the economic outlook in impoverished areas of the world, help people lead healthier lives and improve the standard of living for many. We fully expect the knowledge we are generating to have a global impact.

We invite you to join us in our groundbreaking research. Please enjoy this exploration of ideas.

Sincerely,

Paul Jones, Ph.D.

President

Fort Valley State University



PROVOST'S MESSAGE

Greetings:

As part of our institutional mission as an 1890 Land Grant university, academic excellence, research and service are the cornerstones of Fort Valley State University (FVSU). In

my capacity as provost and vice president for academic affairs, I am proud to witness firsthand how our campus brings learning to life by leveraging external funding to offer various experiential learning through strong research initiatives that occur in our Agricultural Research Station. I appreciate the hard work and dedication of our faculty and staff members who work diligently each day to ensure we meet the needs of our current students while we prepare for the needs of the future students at FVSU.



Our small classroom sizes, unique programming, modern facilities and state-of-the-art equipment allow students to earn marketable skills inside the classroom and beyond that help prepare them for a rewarding career in a competitive job market throughout the world. Our students have the opportunity to gain this knowledge and experience through study abroad and graduate assistantships led by our accomplished faculty members who acquire grants to conduct unique research projects that bring to light new and innovative solutions to challenges that plague society.

Best wishes,

A handwritten signature in black ink, appearing to read 'T. Ramon Stuart'.

T. Ramon Stuart, Ph.D.

Provost and Vice President for Academic Affairs
Fort Valley State University

DEAN'S MESSAGE

It is my pleasure once again to give you an update on our College's research activities. We have placed a renewed emphasis on effectively communicating to the stakeholders the positive impacts our research is creating. To accomplish this, the focus of the College's latest research-extension joint planning meeting was on assessing and disseminating the value of what we do to end-users. This has resulted in a closer working relationship between research and extension personnel.

Our faculty members have also been taking advantage of the opportunities the USDA has created for professional development through collaborations. For example, Dr. Mahipal Singh initiated a collaborative research project with USDA-ARS in Beltsville, MD, utilizing a transformational research tool, CRISPR-Cas9, which enables removal of an undesirable trait or addition of a desirable trait relevant to agriculture and food production by suitably editing the genome of a plant or animal species. Our messaging is also focused on spreading the word about the benefits of gene editing and how gene edited organisms are drastically different from transgenic organisms.




In our efforts to continue to enhance our research infrastructure, we have recently completed a new Transmission Electron Microscopy Laboratory. With this laboratory, in addition to the existing Scanning Electron Microscopy Facility, we are well on our way to launching a Center for Electron Microscopic Studies.

As the College's student enrollment is steadily increasing, we have set new student recruitment goals, and have proposed ideas for additional new academic programs. The One Health approach taken by the Department of Veterinary Science and Public Health has resulted in both undergraduate and graduate programs maintaining unconditional accreditations and their enrollment bursting at the seams. The addition of a new concentration in Agricultural Epidemiology in the MPH Program has further enhanced its marketability. We are also pleased that FVSU received a \$25,000 endowment scholarship fund from the Georgia Coastal Soil and Water Conservation District in support of the College's Environmental Soil Science Program.

We are excited and proud of the College's accomplishments during the past year. I hope you enjoy reading this issue of FVSU Research Report.

Govind Kannan, Ph.D.

Dean and Research Director
Fort Valley State University

A photograph of Dr. Bipul Biswas, an assistant professor of graduate biotechnology, standing in a peach orchard. He is wearing a light-colored button-down shirt and has a name tag. He is gesturing with his hands as if explaining something. The background shows rows of peach trees with some yellowing leaves, suggesting a late season or a specific condition being studied. The sky is blue with some clouds.

Dr. Bipul Biswas, assistant professor of graduate biotechnology with densely planted peach trees.

THE AGBOT:

Bringing Precision Agriculture to Peaches

By Donn Cooper

They say necessity is the mother of invention, but meaningful scientific innovation often doesn't happen without serendipity as well.

Dr. Bipul Biswas, a Fort Valley State University assistant professor of graduate biotechnology, can attest to that fact personally. His relatively simple solution to gathering usable data holds the promise of transforming peach orchard management in Georgia and may lead to the next generation of applied robotics in agriculture.

Peach Tree Short Life (PTSL) – an economically important and complex syndrome that leads to the sudden collapse of peach trees between three and six years of age – left the biotechnology expert vexed. Biswas, who studies the PTSL, said the condition continues to plague Southeastern growers. But neither Biswas nor his graduate students had the time to visit the high-density peach orchard on FVSU's campus at the same time every day. Thus, they could not capture exact measurements of the young trees to analyze their vigor and chart their susceptibility to PTSL.

As Biswas points out, the only way to monitor and possibly solve a condition like PTSL that occurs so abruptly is close examination.

“The trees can't come to us and tell us, ‘I'm sick,’” Biswas said.

Biswas knew he had to save time by mechanizing the process. His first thought was to obtain a golf cart to take him from the laboratory to the field faster. But the orchard of 1200 trees, 75 per row, is too compact to enter with a golf cart. It would also run over his experiments with intercropping annual vegetables in a young peach orchard, a practice that could bring more income to farmers. In addition, he researched unmanned aerial vehicles, commonly referred to as drones, but they were limited by an inability to approach peach foliage close enough to capture detailed imagery without disturbing the tree and the uncontrollable variability of flying.

“Drones cannot take the same picture in the same place every day,” Biswas said.

The answer was something new: the AgBot. Biswas shared his problem with Neuralmation, LLC, which collaborated with him to create a self-propelled robot armed with four cameras to photograph both the top and the bottom of the peach trees. Resembling a freezer chest on six wheels and running on four rechargeable batteries, the self-propelled AgBot takes approximately two hours to go down 16 rows in the orchard at Fort Valley State, a total path of about 8000 feet.

As it moves, it's collecting precise digital information that would go unnoticed by the naked eye. After five hours, the batteries need to be recharged, and the AgBot's computer vision system enables it to read visual cues and work its way back to its charging station. It can then return to the orchard automatically. The current prototype is weather-resistant and sturdy enough to carry more than 300 lbs and can move back and forth from the orchard on its own twice per week.

The most important innovation for the AgBot was also the result of Biswas's need and creativity. The professor studies the effects of neem products, extract of *Azadirachta indica* seeds and leaves, a common control for diseases and insect pests in Certified Organic agriculture, to limit foliar disease and harmful root-knot nematodes in peach orchards. Biswas, who is cultivating the neem tree at FVSU for a variety of commercial products, said neem can provide peach farmers with an effective chemical tool and a marketing opportunity for consumers looking for natural and organic food products.

"Everyone wants organic if they can find something that works," Biswas said.

But, again, Biswas and his assistants' time is limited, and there is little opportunity to lug a sprayer pack to the peach orchard. Plus, the equipment is heavy, and the work is difficult. Biswas said he woke up one morning and knew the answer instantly: He would add a spray mechanism to the AgBot.

Biswas' team is currently developing spraying attachments and sensors that can control spray

direction and volume by analyzing real time feedback. The benefits for farmers are immense. Not only could

a robotic sprayer limit pesticide exposure among workers, it offers all of the advantages of precision agriculture in terms of reducing spray applications, input costs and labor. Advanced sensors will also be able to relay a plethora of information with immediate value to the grower, such as weather damage, fruit maturity and production estimates.

Furthermore, Biswas is quick to point out that nothing about his robot is really new. While there have been repeated claims about the transformations coming from modern technology and precision agriculture, the facts have yet to catch up to the vision. In other words, technology is nothing without application.

"You have to use your brain on what to do with it," Biswas said.

For Biswas, his broader work with PTSL returned some promising early results. He successfully intercropped, stevia, kale, strawberries, bok choy and tomatoes in the young orchard. Although he has used no fertilizer and only organic controls, his peaches developed a crop in their second year in production, a year ahead of a conventionally managed orchard, with no loss to PTSL.

Biswas said his peach trees' health could be attributed to the use of fabric ground cover. It's an interesting possibility. Surely, he'll devise a way to find out.



Biswas (far right) and graduate student Ankush Sangra (far left) demonstrate the use of the 'AgBot' to FVSU president Dr. Paul Jones (second from right) and chief of staff Kendall Issac (2nd from left) at the Peach research plot.



Visiting students and teachers learn about the 'AgBot' from Biswas during FVSU's 2017 Field Day.

For more information about this research project, contact:
Bipul Biswas, Ph.D.
Phone: 478-825-6827
Email: biswasb@fvsu.edu

An Environmental Concern Hits Close To **HOME**



By Russell Boone, Jr.

An environmental catastrophe raising lead and arsenic levels in water could cause a community to suffer long-term problems like the recent tragedy in Flint, Michigan.

For this reason, two Fort Valley State University College of Agriculture, Family Sciences and Technology professors are overseeing research to insure such a disaster does not happen in Fort Valley.

Dr. Jacques Surrency, professor of plant and environmental soil sciences and Dr. Oreta Samples, coordinator of FVSU's Master of Public Health (MPH) program, are working on a project titled, "The Environmental Impact of the Woolfork Chemical Site on Drainage Runoff on Indigenous Plants in the Fort Valley Community."

The project is funded by a grant from the U.S. Department of Agriculture's (USDA) Evans-Allen Act of 1977. The Evans-Allen Act is a capacity grant for food and agricultural research conducted by 1890 Land-Grant Universities like FVSU. The grant, approved in March 2017 totals \$176, 642 for a five year period. Research started in May 2017.

Surrency said the purpose of the grant is to determine if high concentrations of arsenic or lead are present in indigenous plants (like the bracken fern) or creeks in the general area of the defunct Woolfork Chemical Plant area in Fort Valley. This includes natural or man-made water runoff areas. They will also test animals (primarily dogs and cats) that reside in or near the site.

"I hope this project will impact local residents by improving community awareness through research and outreach about possible health issues associated with prolonged chemical exposure," Surrency said.

Funds from the grant will be used to buy equipment and pay for travel to seminars. In addition, funds will help pay the salaries and tuition for two MPH graduate students assisting with the project for two years.

(From left) FVSU professors Dr. Oreta Samples, Dr. Jacques Surrency and graduate student Ovigueroye Ojarikre conduct research concerning soil and water contamination in Fort Valley.

Samples, who is the co-primary investigator for the project, explained the reason for collaborating with Surrency. "Our Master of Public Health program has a concentration in environmental sciences and environmental health. So anything that is a toxin effecting soil, water, air, plant and animal life is going to be a public health issue," Samples said.

Master of Public Health students participating in the program will play a key role in collecting information.

"The graduate students we are involving in this project are all thesis research students. They will actually be doing the collecting, testing or preparing of samples that will be sent out for compiling data analysis in the results," Samples said. In addition, the students will conduct tests in Surrency's lab on campus and work in the University of Georgia's environmental sciences laboratory.

"For me, it was a great opportunity and I jumped into it," said Ovigueroye Ojarikre, a Master of Public Health student concentrating in environmental health sciences. "I know that most times, people who are exposed to contamination don't have a voice, but if they talk about it and can be heard, it could lead to corrective measures" she said. Ojarikre said her primary duties are to collect data, soil and water samples and serve as a historian for the project.

"There is no other university that is doing research on this site other than Fort Valley State's College of Agriculture," Surrency said. The soil science professor added that with the site being practically in the university's back yard, it makes sense to conduct research on the effects the site may have on local residents.

For more information about this research project contact, Dr. Jacques Surrency, professor of plant and environmental soil sciences (478) 825-6362 or surrencyj@fvsu.edu

For more information about this research project, contact:
Jacques Surrency, Ph.D.
Phone: 478-825-6362
Email: surrencyj@fvsu.edu

Dr. Young Park, a FVSU professor of food science with his latest book.



Making a Better World with **Goat Milk**

Consider the awkward position of the goat: Tough and thrifty. It's a kind of wonder of nature for its ability to thrive. Through a variety of meat products and its exceptionally nutritious milk, it provides most of the animal protein for the globe. Yet, in America, customs of taste and agricultural traditions have relegated it to an afterthought on the plate and in the pasture.

Dr. Young Park, a distinguished professor of food science at Fort Valley State University and international renowned dairy goat researcher, has spent the last 35 years studying dairy goat products. As perhaps the most active dairy goat scientist in the country, his work and life reflect the conflicting perceptions of goats in and outside of the United States.

Park, who is in constant demand as a speaker and trainer, traveled to Nepal, Korea and Guatemala before the end of summer 2017 to work with researchers and farmers on the development of safe dairy goat products. His book, *Handbook of Milk of Non-Bovine Mammals*, was adopted as a textbook for research by Harvard Medical School and is published in its second edition in May, 2017.

In Guatemala, the United States Agency for International Development's Farmer-to-Farmer program invited Park to train producers on how to successfully process goat milk.

"They want me to show them how to make a sanitary and quality product," Park said.

Guatemala, like India and other tropical countries in Central America, the Caribbean and Africa, does not have the resources, environment and forage capacity to maintain high-input cattle production systems. Goats are the livestock of necessity. But while most small producers around the world have access to goat milk, they lack the knowledge to create stable, safe products.

Park taught farmers in Guatemala to make goat cheese and yogurt. This, in turn, will help them produce a value-added commodity, which presents the

opportunity for income and economic opportunity in their country.

But goat milk and its products are more than just an economic tool. With the generally inefficient absorption of proteins from consuming plant-based foods, Park said there's no better nutritional vehicle for protein, phosphate and calcium than goat milk products. His research shows that goat milk has an incredible array of health benefits, especially compared to cow milk, and it can be a vital ingredient to the wellbeing of young children.

Compared to cow milk, goat milk has higher digestibility and higher short- and medium-chain fatty acids, which are more quickly digested and metabolized and provide energy. It has higher iron bioavailability, which can increase hemoglobin regeneration efficiency. Its higher alkalinity can treat stomach ulcers. The quality of its fat content can help with fat malabsorption, and it doesn't have to be homogenized. Goat milk can even reduce cholesterol.

One might think that Park was a goat milk fanatic from the beginning, but his interest came very much by accident. After receiving his doctorate in food chemistry and nutrition from Utah State University, he was offered postdoctoral research opportunities at Columbia University and the University of Cincinnati.

Shortly afterward, a permanent position at Prairie View Agricultural and Mechanical University (PVAMU) arose. The security of full-time work was not something to pass up, and he moved to Texas in 1982. Upon arriving at PVAMU, the institution received \$3 million from the U.S. Department of Agriculture (USDA) for research at the university's International Dairy Goat Research Center.

Despite overwhelming benefits of goat milk, it took time for even Park to come around to its taste.

"When I started my research, I didn't like it. It had a 'goaty' flavor," Park said, echoing a common complaint of those not used to the taste.

His opinion changed 25 years ago at an international conference on goat research in France, where he was introduced to goat cheese produced in the esteemed

tradition of fine French cheese-making. He quickly realized that goat milk products could have increasing appeal at both the commodity and craft ends of the market.

Indeed, from 1993 to 2013, the production of goat milk globally rose from 8,738,000 to 15,244,000 metric tons, approximately 75 percent. It is now a multibillion-dollar industry.

“I think goat products will be increasingly popular,” Park said. “It has better quality and nutrition and is hypoallergenic. And it tastes good, especially to people looking for a premium product.”

If the projections of having to feed nine billion people by 2050 come to fruition, goats will play an important role because of their efficiency and adaptability. With this in mind and inspired by his Christian faith, Park established a nonprofit and a website, www.caprಿದairyworld.org,

to disseminate free information about goat and goat milk production.

Domestically, he hopes that communicating the economic and nutritional benefits of goat milk will eventually lead to increased institutional investment in research and, perhaps, better optimization of natural resources in the U.S. by including goats in livestock systems.

“My hope is that the dairy goat industry will have more support from government, industry and academia,” Park said.

For more information about this research project, contact:

Young Park, Ph.D.

Phone: 478-827-3089

Email: parky@fvsu.edu



Park assists students packaging goat cheese, using a double chamber vacuum packaging machine in the Georgia Small Ruminant Research and Extension Center on campus.



Dr. Ajit Mahapatra (second from right), and Hema Degala (far right), research assistant, prepare to show biotechnology graduate students Richa Arya (second from left) and Madalyn Bryant (far left) how to use the new XENON pulsed ultraviolet light system at the Houston Stallworth Agricultural Research Station on campus.

Improving Food Quality ONE LIGHT AT A TIME

By Latasha Ford

Fort Valley State University aims to make a mark in food safety research with the help of a new pulsed ultraviolet light system that could aid in the decontamination of foods and extend shelf life without heat or chemical preservatives.

The \$35,000 U.S. Department of Agriculture funded device is used to conduct research and aid in student learning experiences. It is located in the

food engineering lab at the Houston Stallworth Agricultural Research Station on campus. Dr. Ajit Mahapatra, FVSU associate professor of food and bioprocess engineering, said the XENON pulsed UV-light, Z-1000 modular sterilization system is unique because it's a safer and more sanitary method for rapidly killing microorganisms on food surfaces. It's a non-thermal and non-chemical technology.

Mahapatra and his research assistant, Hema Degala, agreed that the pulsed UV-light is more efficient than

the continuous UV-C light, because it offers better penetration potential through food products. Pulsed UV-light can kill up to 99.9 percent of pathogenic and spoilage microorganisms, molds, parasites and insects. It can also be used for killing bacteria on surfaces of food packaging materials. The continuous UVC light did not offer the same qualities.

“It doesn’t leave any off flavor,” Degala explained.

Not only is the taste not affected, the pulsed UV-light also doesn’t alter any other properties.

“It has less impact in changing the color of the food and texture, and it doesn’t increase the temperature of the food because of the short duration of exposure to the light pulses,” Mahapatra added. This is important because the appearance and texture of foods influence what consumers select to eat.

Additionally, Mahapatra said the use of the pulsed UV-light could make a huge impact in the food

industry for decontaminating not only meat products, but also liquids and vegetables.

He said the technology started with sterilizing indoor air and equipment in hospitals and then moved to liquid foods.

“It’s more effective on liquid foods than solid foods,” he said. One of the drawbacks with the technology is that the pulsed UV-light only sterilizes the surface; however, Mahapatra said most microorganisms live on the surface only.

Furthermore, Mahapatra said the pulsed UV-light is a great opportunity for student training so that they can get hands-on experience.

FVSU biotechnology graduate students Richa Arya and Madalyn Bryant expressed how this new equipment will impact their studies.



Students Richa Arya (left) and Madalyn Bryant (right), along with research assistant Hema Degala (center), use the pulsed ultraviolet light system to kill E. coli on meat surfaces.

“Whatever we’re learning here, we can implement in the food industry and use to enhance our information and incorporate many techniques,” Arya said.

Bryant said they are able to take this information out into communities and explain how to prevent different foodborne illnesses and share how to properly store food.

In addition, the pulsed UV-light could aid in preventing foodborne illnesses by killing microorganisms such as *Escherichia coli*. Degala said for research, their focus will be on *E. coli* O157:H7. Most cases of an outbreak are caused by this particular strain common to the United States.

“Most of the meat products will be contaminated with this kind of bacteria, but it can also contaminate other food products due to improper handling,” Degala said.

To help with decontamination, the pulsed UV-light can offer high-speed sterilization.

“There is no doubt that we have improved our level of research from common washing methods to the level of pulsed UV-light in our food engineering lab,” Degala said.

For more information about the pulsed UV-light sterilization of foods, contact Mahapatra at (478) 825-6809 or mahapatraa@fvsu.edu.

For more information about this research project, contact:
Ajit Mahapatra, Ph.D.
Phone: 478-825-6809
Email: mahapatraa@fvsu.edu



Mahapatra speaks to students and research assistant about the benefits of using the UV-light.

A man with dark hair, wearing a blue polo shirt with 'FVSU' and 'FORT VALLEY STATE UNIVERSITY' on it, stands in a field of tall grain plants. He is holding two large stalks of grain in his hands, looking towards the camera with a slight smile. The background is a vast field of similar plants under a clear sky.

The Plant Breeders' Hidden HERO

By Donn Cooper

Credit is often given to the person standing closest to the results. This is no less true in plant breeding, where often the breeder receives all of the acclaim for developing new varieties. But with rapid advances in genetic science, any breeder will quickly admit that his or her work would be impossible without the assistance of geneticists mapping out the way. Like a navigator with a pilot, the geneticist shows the breeder where to go.

Plant genetics and genomics are the focal points of study for Fort Valley State University research professional, Dr. Somashekhar Punnuri, since his arrival in 2012. His work leverages the most advanced technologies in genomics — such as Genotyping-by-Sequencing (GBS), a kind of Next-Generation Sequencing (NGS) marker — to dissect complex traits in cereal and forage crops and improve their performance in the field.

With his understanding of plant genomics, host-plant resistance and technical expertise, Punnuri can identify and tag genes with traits important to agronomy, particularly those that confer resistance to pests and diseases. In turn, breeders can do their work more efficiently and productively by focusing on qualities that are most important to farmers. The result is a production system that relies more on the plant's resilience than inputs and chemical controls.

“There is natural immunity in the plant,” Punnuri said. “We are not modifying plant's genetic make-up. It is a very environmental approach.”

Collaborating with the U.S. Department of Agriculture (USDA), the University of Georgia, Cornell University, and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Punnuri mapped thousands of genetic markers for pearl millet. Published in the Crop Science Society journal *The Plant Genome*, this research provided DNA guideposts for the breeding community and documented markers associated with leaf spot resistance. The work could lead to more vigorous breeds of a plant known for its tolerance of drought and soil toxicity and resourcefulness.

More recently, Punnuri turned his attention to sorghum and the sugarcane aphid, a growing concern for American sorghum farmers.

Although the sugarcane aphid is relatively common around the world, it has recently become an economically significant pest in the United States. In 2013, it suddenly appeared in sorghum fields in Texas and Louisiana. Combines were choked down with honeydew, a sticky substance secreted by the aphid, and farmers lost half of their sorghum crop from damage and disease.

Aphids attack the health of the plant in two ways. They pierce the plant and suck sap, and their honeydew coats plant tissue and reduces photosynthetic capability. Aphid damage on sorghum can lead to poor head development, grain set and harvest.

Most aphids can reproduce without mating. In general, females give birth to as many as three offspring daily. When food sources diminish, a proportion of adults can develop wings, allowing them to fly or float on the wind to nearby hosts. The sugarcane aphid was spotted on sorghum in Texas, Oklahoma, Louisiana and Mississippi before the end of 2013. By 2015, it spread across sorghum fields in the lower half of the country, overwintering on Johnsongrass and volunteer sorghum plants.

With its drought tolerance and capacity to produce consumable energy in the forms of raw sugar, animal feed, biofuel and grain, sorghum is one of the most important crops globally. The U.S. is the largest producer of grain sorghum in the world, growing 597 million bushels in 2015. Not surprisingly, the rise of this devastating pest put government bodies and scientists on high alert.

In 2016, Punnuri received a subcontract from the USDA Agricultural Research Service (ARS) to develop Integrated Pest Management strategies to control the outbreak of sugarcane aphid. Under the direction of Dr. Xinzhi Ni of USDA ARS, Punnuri is coordinating research and monitoring sugarcane aphid activities on test plots of sorghum at FVSU, one of seven research sites of the Areawide Pest Management Project in



the Southeast. Punnuri's role is to develop both short-term and long-term management strategies for growers, which includes studying effective insecticide treatments, evaluating the performance of commercial hybrids, and breeding new aphid-resistant varieties.

While the project is just beginning, Punnuri and Dr. Karen Harris-Shultz representing USDA ARS, said epicuticular wax, which coats the outermost layer of sorghum, plays a vital role in the plant's ability to withstand drought, insects and pathogens. Together they are studying a wax mutant locus in the sorghum genome that regulates epicuticular wax, which may soon help plant breeders develop a sorghum variety resistant to sugarcane aphids.

Research Professional Dr. Somashekhar Punnuri observes the experimental plots of sorghum at FVSU.

“As this pest showed up to be damaging recently on sorghum, we still need to understand every aspect of this insect, basically,” Punnuri said. “It will take some time before we deliver desirable products for sorghum producers.”

But with increasingly rapid innovations in genetics and biotechnology, the wait for a new plant variety will be shorter than it has ever been in human history.

For more information about genomics or Integrated Pest Management Strategies, contact Dr. Somashekhar Punnuri at (478) 825-6519 or punnuris@fvsu.edu.

For more information about this research project, contact:
Somashekhar Punnuri, Ph.D.
Phone: 478-825-6519
Email: punnuris@fvsu.edu

Food SCIENCE

BACHELOR OF SCIENCE

Students graduating with a Bachelor of Science in Food Science at FVSU will be prepared for employment in food industry, government agencies and academia as food scientists and technologists. Career opportunities in food industry include food processing, new and innovative food products development, new products and ingredients evaluation, process supervision, quality assurance and analysis, procurement, distribution, sales, merchandising and consumer relations. Federal and state agencies employ food science graduates in different fields such as food safety, regulatory control, research and development of food standards.

Food science is the multidisciplinary study of food and the application of knowledge gained to develop food products and processes, food preservation and storage methods, and food safety and quality techniques. Food science addresses the conversion of raw agricultural products into a nutritious, convenient and economical food supply. Most food products available in grocery stores were developed, produced and tested by food scientists.



FOR MORE INFORMATION
CONTACT:

Dr. Jung Lee

Coordinator and Professor of Food Science

Office: 478-822-1328

Email: leej@fvsu.edu



College of Agriculture **FACULTY AND STAFF** contribute information to textbook

By Russell Boone Jr.

Students studying veterinary technology across the country can reference a source featuring the knowledge and experience of two Fort Valley State University College of Agriculture professors and one of its veterinary technicians.

Dr. Oreta Samples, coordinator of FVSU's Master of Public Health program, Dr. George McCommon, director of FVSU's Veterinary Sciences Department and Anna Ellis, veterinary technician, collaborated and wrote six chapters in the ninth edition of "McCurnin's Clinical Textbook for Veterinary Technicians."

Samples co-edited the textbook with Joanna Bassett, program director of the veterinary technology program at Manor College in Jenkintown, Pa. and Angela Beal, program director of the Veterinary Tech Institute at Bradford School in Columbus, Ohio.

The FVSU instructor said the publication is considered the bible of all veterinary technician programs. "It is pretty much used worldwide for veterinary technician studies," Samples said.

Samples added that the textbook will be required reading for all FVSU veterinary technology students. "It covers veterinary technology from beginning to end, with particular emphasis on what students need to know in order to pass the veterinary technicians national board exam," Samples said.

"You really don't have to use another textbook as long as you have this one," McCommon said. McCommon said having a faculty member or program coordinator listed on the cover of a highly used and regarded textbook speaks volumes for FVSU.

He also said to have FVSU personnel contribute six chapters is very impressive. "It really makes the

(veterinary technology) program and the university look really good. This is an opportunity to highlight the quality of workmanship that's coming out of this department," McCommon said.

Samples, who reviewed or edited more than 150 books, journals and articles in the veterinary field, said she was contacted by Bassett to co-edit the publication because of her past editing experience.

She was also recommended by a senior editor at Elsevier Publishing, a textbook publishing company which has a large line of veterinary science textbooks. For her role as a co-editor, Samples was given the opportunity to write three chapters in the new textbook. The FVSU professor said the chapters she contributed contain relevant information needed for an individual to effectively practice veterinary technology.

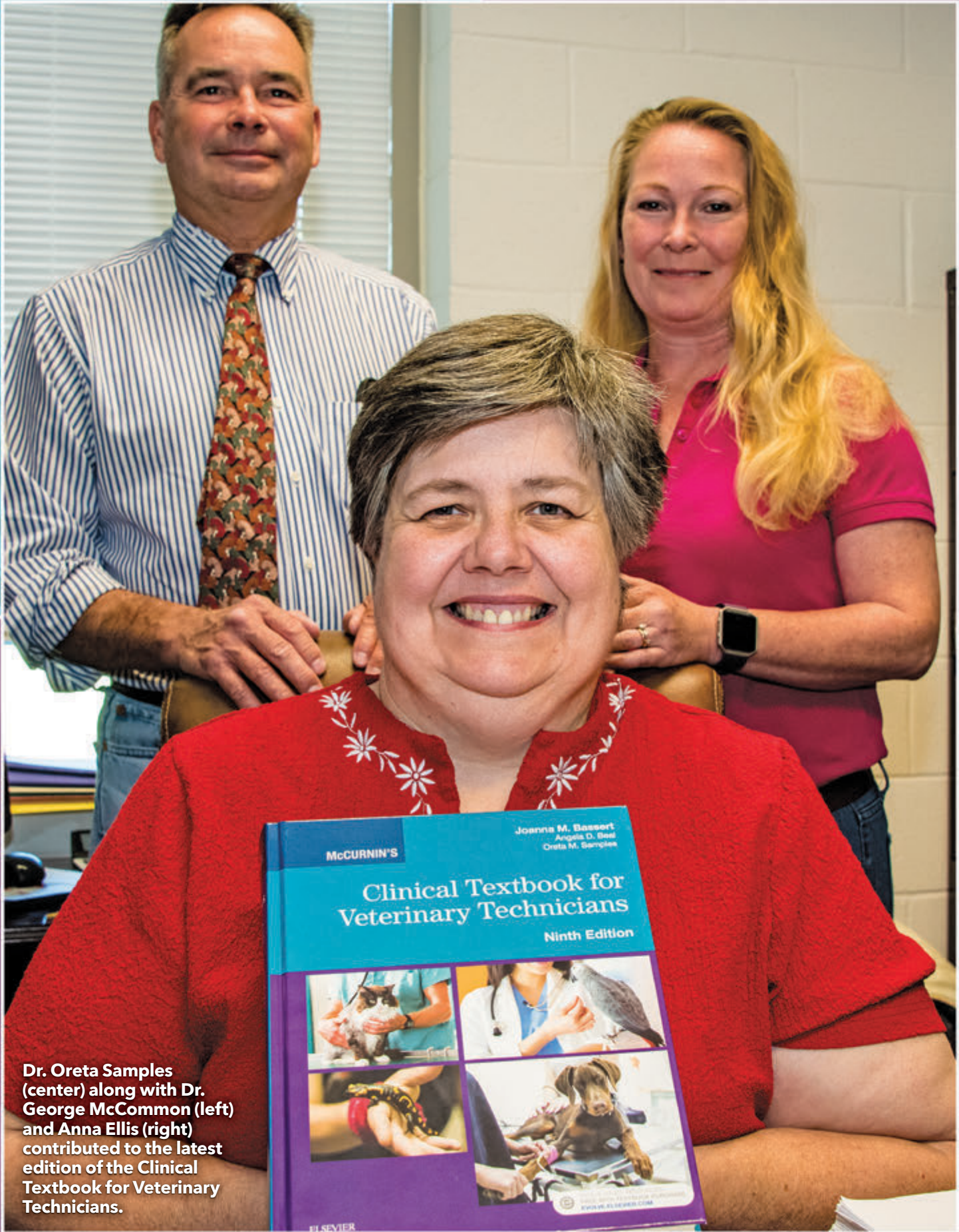
Samples said she is pleased to know she is regarded as a writer in the veterinary technology field.

"It is a dream come true. I have always wanted to be a writer, first and foremost. It's something I wanted to do since I was a child," Samples said.

The next edition of the textbook is scheduled for 2024. Samples is already signed up to repeat her role as co-editor and author. In the meantime, she is in the process of writing projects including a veterinary technology laboratory manual.

For more information about the textbook, contact Samples or McCommon at (478) 825-6424 or e-mail sampleso@fvsu.edu or mccommog@fvsu.edu.

For more information about the textbook, contact:
George McCommon, D.V.M. / Oreta Samples, Ph.D.
Phone: 478-825-6424
Email: mccommog@fvsu.edu / sampleso@fvsu.edu



Dr. Oreta Samples (center) along with Dr. George McCommon (left) and Anna Ellis (right) contributed to the latest edition of the Clinical Textbook for Veterinary Technicians.

Professor earns grant to conduct gene-editing research



By Russell Boone Jr.

A federal grant is making it possible for a Fort Valley State University scientist to conduct technologically advanced research designed to enhance meat and milk production in goats.

Dr. Mahipal Singh, a FVSU associate professor of animal biotechnology, received a \$100,000 grant as part of the U.S. Department of Agriculture's (USDA) 1890 Faculty Research Fellowship award program.

The program, part of USDA's Agricultural Research Service (ARS), allows scientists from 1890 Land-Grant universities like FVSU, to work with USDA-ARS scientists on various research projects concerning plants and animals at USDA research facilities.

Singh's research focus is the enhancement of goat meat and milk production by working with their genomes (DNA) and embryos. Singh also hopes to develop goats that are free of allergens harmful to humans and mastitis (infections) which affects goats' ability to produce milk.

Moreover, small farmers in the future may also benefit from Singh's work. He projects that the research results may produce genetically modified animals, and once they are tested for mastitis and the milk is determined to be allergen free, the animals will be bred and hopefully produce a large population.

"That population can be distributed to the farmers and the farmers can rear (raise) those animals," Singh said.

The animal biotechnology professor will conduct some of his research at the Beltsville Agricultural Research Center (BARC), the USDA's largest research facility, in Beltsville, Md.

Singh chose the BARC location to perform his research because of an earlier collaboration with Dr. David Donovan, senior molecular biologist at the facility.

In addition to working with goats, Singh said the research opportunity provided through the grant opens the door for FVSU to develop close relationships with the USDA, staff at the BARC and scientists on a global scale. Singh said those factors

could also lead to collaboration on future research projects.

Singh also mentioned that FVSU has sufficient resources for goat research. He said once FVSU scientists get experience in modifying genomes and embryos, the university will be at the forefront of biotechnology research.

"We will not only attract the top scientists from the U.S., but also from Asia, Africa and countries from around the world," Singh said.

For one year, funds from the grant will cover several expenses for Singh such as salary, travel, living accommodations and research supplies.

For more information about Dr. Mahipal Singh's research, contact Singh at (478) 822-7042 or email singhm@fvsu.edu.



For more information about Dr. Singh's research, contact:
Mahipal Singh, Ph.D.
Phone: 478-822-7042
Email: singhm@fvsu.edu

GRADUATE STUDENT



Lubana Shahin

HOMETOWN: Chittaurgarh, Rajasthan, India

AGE: 28

UNDERGRADUATE DEGREE & SCHOOL:
Mohanlal Sukhadia University, Udaipur,
Rajasthan

PROGRAM OF STUDY AT FVSU: Master of
Science in Biotechnology

Why did you choose FVSU for your graduate education?

I decided to apply for my graduate education at FVSU when I learned about the tremendous research opportunities here in biotechnology. I chose FVSU to explore the field of biotechnology in depth because it is one of the renowned universities in Georgia for its extended research in agriculture and biotechnology.

What do you enjoy most about the program?

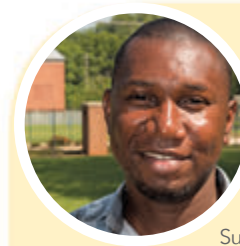
A graduate student gets exposure to extensive hands-on opportunities. I learn something new every day under the guidance of my advisor who is extremely well-versed in the field. I enjoy working in the lab on different projects and learning new techniques.

What do you plan to do after graduation?

I want to pursue a doctorate after completing the master's degree at FVSU. I am pretty sure that on the basis of the research I am conducting at FVSU, I could get into a doctoral program at a top ranked university.

What would you tell students interested in attending FVSU for graduate school?

I would definitely recommend the graduate programs at FVSU to prospective because this university has tremendous opportunities for research.



Kingsley Anyiam Kalu

HOMETOWN: Lagos, Nigeria

AGE: 33

UNDERGRADUATE DEGREE AND
SCHOOL: Bachelor of Medicine, Bachelor of
Surgery (M.B.B.S.) University of Jos.

PROGRAM OF STUDY AT FVSU: Master of Public Health

Why did you choose FVSU for your graduate education?

The public health program is offered in a hybrid format. It also offers a concentration in environmental health along with flexibilities in courses and research.

What do you enjoy most about the program?

The program provides students with in-depth knowledge about public health and its application. It also provides opportunities for oral and poster presentations to colleagues at conferences.

What do you plan to do after graduation?

I plan to pursue a doctorate degree in environmental health.

What would you tell students interested in attending FVSU for graduate school?

The public health department at Fort Valley State University is one of the fastest growing departments in middle Georgia. It is a place for those who are willing to dedicate their life to the field of public health. This is a program with dedicated, intelligent, friendly down-to-earth faculty and staff who want their students to excel. The uniqueness of the program affords one the opportunity to develop academically, socially and mentally because of the interaction between students and teachers.

PROFILES



Ovigueroye Ojarikre

HOMETOWN: Mosogor, Delta State, Nigeria

AGE: 35

UNDERGRADUATE DEGREE AND SCHOOL: Doctor of Optometry, University of Benin.

PROGRAM OF STUDY AT FVSU: Master of Public Health

Why did you choose FVSU for your graduate education?

I am interested in environmental health and few schools offer environmental health in their public health programs.

What do you enjoy most about the program?

I like the friendliness and support of my teachers. Their offices are always open and because of the small class sizes they know their students capabilities.

What do you plan to do after graduation?

I plan to pursue my doctorate degree in environmental health.

What would you tell students interested in attending FVSU for graduate school?

It's a good school with dedicated teachers who can communicate on a one-on-one basis.



Nabin Prasad Sedhain

HOMETOWN: Sundarbazar-8, Lamjung, Gandaki Zone, Nepal

AGE: 26

UNDERGRADUATE DEGREE AND SCHOOL: Bachelor of Sciences in Agriculture and Animal Sciences (IAAS) Lamjung Campus, affiliated to

Tyibhuvan University.

PROGRAM OF STUDY AT FVSU: Master of Science Plant Biotechnology.

Why did you choose FVSU for your graduate education?

Fort Valley is one of the best colleges in the state of Georgia and it is a land-grant institution. I am interested in biotechnology because the population is growing at an alarming rate. Biotechnology teaches students how to improve the variety of crops, crop yields and crop production. FVSU is a small campus, but it has adequate facilities and students have many opportunities to study and conduct research.

What do you enjoy most about the program?

Unlike larger universities, FVSU offers one-on-one interaction between instructors and students. We can easily ask professors questions about things we don't understand, and we can get hands-on experience using modern equipment to conduct research.

What do you plan to do after graduation?

After graduation, I want to work on my doctorate degree in biotechnology. I eventually want to work for a government agency such as the U.S. Department of Agriculture (USDA).

What would you tell students interested in attending FVSU for graduate school?

This university is gaining popularity in various areas ranging from athletics to research. Students can easily interact and enjoy the multi-cultural environment with students being recruited from different countries.



FVSU professor makes use of soilless method to grow plants



Dr. Bipul Biswas, an assistant professor of plant science at the Fort Valley State University, is using hydroponics to grow plants and produce in a greenhouse on campus. Hydroponics is the practice of growing plants in a nutrient solution instead of water or soil which requires less labor.

Some of the produce grown on campus using hydroponics include romaine lettuce, red sail lettuce, stevia, bok choy, strawberries and bell peppers.

Biswas said farmers and urban growers can benefit from the use of hydroponics because growing crops and vegetables in soil requires lots of water and labor such as cleaning weeds and managing pests. Other factors reduced when using hydroponics, include weather damage to crops and plant soil borne bacterial contamination.

“Crops grown in a controlled environment using hydroponic systems (methods such as nutrient film techniques, vertical gardens or aero flow) can be grown year-round, and it is faster than soil. This means higher production and more income for farmers and growers,” Biswas said.

The FVSU scientist added that the limited space needed in hydroponics allows urban growers to raise crops in small or limited spaces such as apartments, basements, or designated rooms in a dwelling.

Biswas said he’s achieved positive results growing plants hydroponically on campus.

“Crops grow much faster using hydroponics than in soil. Yields are better and the crops are high quality and clean. There are no weed problems and they come with no soil borne microbes which minimizes health risks,” Biswas said.

Sodexo Inc., the official food caterer for FVSU’s student and faculty cafeterias, approached Biswas about supplying hydroponically grown vegetables exclusively for the Georgia Room restaurant on campus. Biswas said the company is impressed with the vegetables grown hydroponically. Negotiations are in progress to complete distribution arrangements.

For more information about hydroponics, contact Biswas at (478) 825-6827 or email biswasb@fvsu.edu.

Guatemalans benefit from the expertise of Fort Valley State University research scientist



Dr. Young Park, a Fort Valley State University professor of food science, was invited by the U.S. Agency for International Development’s (USAID) Farmer-to-Farmer volunteer training program to assist in Guatemala from July 23 to Aug. 6.

USAID invited Park, an expert in dairy goat production and dairy technology, to assist in the establishment of a dairy goat industry. He also visited to educate and train the Save the Children program staff, regional technicians and university students and faculty in Guatemala.

During his two-week visit, Park spoke to more than 186 people, including farmers, health and nutrition professionals and university faculty and students about the benefits of goat’s milk and its dairy products. Additionally, he conducted hands-on training for processing goat’s milk and cheese making to local Nebaj region small goat farmers and staff at the milk processing plant located at PAISANO-CEPROCAL.

Because the farmers did not have an adequate processing plant or the necessary equipment, Park manually demonstrated how to make goat cheese.

By sharing his skills and knowledge, Park was able to build a foundation in Guatemala for producing quality goat's milk, which is essential for the establishment of its dairy goat industry.

"My volunteer work in Guatemala made a big impact on the future dairy goat industry and the wellbeing of the country," he said.

Partners of the Americas' USAID-funded Farmer-to-Farmer program provide technical assistance to individual farmers, farmer associations, agricultural cooperatives, education institutions and others in countries such as the Dominican Republic, Guatemala, Haiti and Nicaragua.

For more information about goat's milk and this project, contact Park at (478) 827-3089 or park@fvsu.edu.

Fort Valley State University scientist selected as Fulbright Specialist

Dr. Thomas Terrill, a Fort Valley State University research scientist, and world-renowned expert in sheep and goat parasitology, was recently selected as a 2017 Fulbright Specialist. A Fulbright Specialist is a researcher or academic scientist selected to participate in a two to six weeks, project-based exchange at institutions across the globe.

The purpose of a Fulbright Specialist is to serve as an expert on a short-term basis for governments, universities or non-governmental organizations with a need in a specific area.

For example, if a university has a need to train scientists about animal health for a short-term basis, they submit an application for a Fulbright Specialist and are paired with the appropriate person.

As an appointed Fulbright Specialist, Terrill will be listed on a roster as an expert in goat and sheep parasite management, feeding and forages. Terrill's travel, lodging and other expenses will be paid by the Fulbright program.

"A lot of the parasitology work I am doing has application with small farmers, empowering them to be more profitable and keep their animals healthier. In many parts of the world, animals are people's bank account. The health of their animals directly

impacts the health of their children and their bottom line as far as their finances. A small change can have a big impact, especially in a subsistence farming community," Terrill said.

Some of the assistance that Terrill could offer include conducting seminars, assisting farmers, facilitating small research projects, conducting trainings, helping organize conferences or presenting a series of lectures to students.

Although Terrill does not know if he will be requested, he said he knows he has to be available to leave the country and help those in need at any time within the three year span. As a result, he works to stay knowledgeable of best practices and techniques.

"It keeps me on my toes, because I need to be prepared if someone calls," Terrill said.

The Fulbright Specialist Program was created in 2001 by the U.S. Department of State, Bureau of Educational and Cultural Affairs. For more information about Fulbright Specialist Program, visit <http://ow.ly/zaxk309Y5zj>.



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



The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the bases of race, color, national origin, age, disability, sex, gender identity, religion, reprisal and, where applicable, political beliefs, marital status, familial or parental status, sexual orientation, or all or part of an individual's income is derived from any public assistance program, or protected genetic information in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases will apply to all programs and/or employment activities.) If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442 or email at program.intake@usda.gov. Individuals who are deaf, hard of hearing, or have speech disabilities and wish to file either an EEO or program complaint please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish). Persons with disabilities who wish to file a program complaint, please see information above on how to contact us by mail directly or by email. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.) please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). USDA is an equal opportunity provider and employer. Fort Valley State University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award baccalaureate, master's and educational specialist degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097 or call 404-679-4500 for questions about the accreditation of Fort Valley State University. Fort Valley State University is an affirmative action, equal opportunity institution and does not discriminate against applicants, students or employees on the basis of race, gender, ethnicity, national origin, sexual orientation, religion, age, disability or marital or veteran status.