AgLINK

Linking the College to its Alumni and Friends

Tennessee State University College of Agriculture Magazine • www.tnstate.edu/agriculture • Fall/Winter 2019

Introducing our newest Hall of Famers

ALSO IN THIS ISSUE:

- *#ScienceMatters: TSU researchers seek real solutions to real world problems*
- *Searching for Endangered Pygmy Rattlers (Hint: We found them)*

TENNESSEE STATE UNIVERSITY
College of Agriculture

Message from the Dean

Dr. Chandra Reddy, Dean
College of Agriculture

Dear Alumni and Friends,

As we flip the calendar, we are thankful for the many great things that happened this past year in the College and in the University and aspire to do better in the New Year! Our students continue to do well both in and out of the classroom.

As reported before, faculty engagement with students through research programs, outstanding classroom teaching, and leadership development activities is contributing tremendously to our students' successes.

Our graduate programs have grown from 12 students in 2008 to 104 students today; 30 of them are Ph.D. students. I am extremely pleased to share that we are now authorized to offer the new M.S. program in Food and Animal Sciences, effective now. Many of our students have won local and national awards; a few of these stories are detailed on pages 3, 8, and 32-33. We have several financial assistance programs in place for outstanding students to pursue agriculture and human sciences. If you need additional information about paying for a student's education, please reach out to our Outreach Counselor, Ms. Keisha Macklin, at (615) 963-6520.

The new $867 billion Farm Bill offers us and other 1890 land-grant institutions new opportunities in terms of student support. This farm bill includes about $40 million in mandatory funding for new scholarships at 1890 land-grant universities, meaning each university will have about $2 million in new funding for scholarships to attract students over the next five years. The 2018 Farm Bill also provides $10 million a year to establish three HBCU Centers of Excellence within the 1890 community. These centers will focus on agricultural workforce development, nutrition and food security, economic development, and emerging technologies. In addition, the farm bill legalizes hemp (*Cannabis sativa*) growth and manufacturing. Hemp will now be treated as a commodity crop making it eligible for crop insurance. One year ago, TSU began a comprehensive program researching hemp at the request of several stakeholders. We are one of the few 1890 institutions that have an existing hemp program at this time. These new opportunities should help propel TSU Ag to further heights.

This issue of the magazine provides considerable details on our research program and the personnel involved. We have expanded our research capabilities both in terms of personnel (see page 36) and facilities (see page 51). We continue to improve our infrastructure and strive to provide innovative research and education facilities featuring the latest in emerging technologies to our students and faculty. Recently, we added six new research labs bringing our total research labs to 35. This expansion allows us to secure more competitive grant funds. You can learn about our latest and newly funded projects on page 18. This research enables our students to learn how to solve real-world problems thereby creating new scientific knowledge while educating stakeholders and developing a future workforce, particularly from underrepresented groups. In this regard, I am pleased to share that we are in the early stages of creating a new Food Science building, similar to the Biotechnology Building to which several of you have already visited. We are in the process of securing the State Building Commission approval for this new construction project.

You will find in these pages a feature on the 2018 Hall of Fame inductees, which includes me. I want to thank the members of the Hall of Fame Committee for the excellent work they do in selecting the inductees and organizing the event during the Homecoming week. I also want to take this opportunity to congratulate again my fellow inductees Mr. Will Nesby and Mr. J.W. McGuire.

I strongly encourage you to visit us. You are always welcome here. See you soon.

Sincerelv.

Chandra

Chandra Reddy
Dean and Director of Research/Administrator of Extension

Contents

On the Cover
The Hall of Fame inductees posed with TSU President Glenda Glover while guests lined up to take photos for family and friends. From left: Will Nesby, J.W. McGuire, Glover, and Dr. Chandra Reddy. *Photo by Joan Kite*

From the Editor

Joan Kite
Editor

This issue of AgLINK is devoted to research here at the College of Agriculture, but underlying all its stories is another theme: passion and the pursuit of excellence.

The people you meet in these pages — Hall of Famers Will Nesby, J.W. McGuire, and Dr. Chandra Reddy, research assistant and snake whisperer Shawn Snyder, freshman and rising star Braxton Simpson, award-winning Professor Jason de Koff, and so many more— all share a common characteristic. Each one of them is passionate about their chosen path and adamant that they strive for excellence.

There is no time to rest on one's laurels either. Once an accomplishment is attained, a brass ring is caught, or a strategic goal is completed, TSU aggies next question is, "What's next? What are the tasks we must complete as a College to climb to the next rung?"

In this issue, you will read about some of the major research projects happening within our labs that tackle pressing global issues: childhood obesity, food safety, food security and hunger, climate change, and sustainable energy.

This pursuit of excellence applies to the publication you now have in your hands. This is our second issue of our official magazine, but we need your feedback to improve, to get better, to become excellent.

We are interested in the information you are interested in learning about within these pages. What kinds of stories would you like to read? What information are you looking for that isn't here? Are we missing something? Any and all ideas, constructive criticisms and positive feedback are welcome.

We are also interested in your stories. Have you reached a rung on the ladder of success and want to share the news with your TSU Ag family? By all means, share it with us, and we will gladly share it with the world.

This magazine is mailed to our alumni, stakeholders, and TSU family friends, the old-fashioned way, courtesy of the United States Post Office, but you may opt to receive the magazine electronically. Please visit www.tnstate.edu/agriculture to subscribe to the electronic version of this magazine.

I am available any time so feel free to send an email to jkite1@tnstate.edu or call me at (615) 963-5708. I am interested in your thoughts, opinions and ideas. I look forward to hearing from you soon.

In the meantime, enjoy this issue!

Contributors include: *Tom Byl, Carter Catlin, Brittaney Hogan, Jason de Koff, Winnie Mukuna, Bharat Pokharel, Shawn Snyder, Daiva Wilson, Anthony Witcher, and De'Etra Young.*

Reaping what they sow

Students win big at TAS Annual Meeting

By Joan Kite

TENNESSEE STATE UNIVERSITY SWEPT away the top Agriculture awards for oral and poster presentations at the Annual Meeting of the Tennessee Academy of Science last semester in Clarksville, Tennessee.

TSU College of Agriculture students also attained honors in the geosciences, cell and molecular biology, zoology, and ecology and environmental sciences categories.

"Our students did a great job," said Dr. Anthony Witcher, an assistant professor at TSU's Otis Floyd Nursery Research Center in McMinnville, Tennessee.

The College of Agriculture submitted 16 entries in the poster presentation competition and 11 entries in the oral presentation competition. Every year, the Tennessee Academy of Science holds its Annual Meeting to bring together scientists, educators and students and discuss and share developments within the national scientific culture.

Two of Witcher's students took honors. Christina Jennings won first place for her poster presentation titled, "Glyphosate resistant and susceptible horseweed seed germination rate and response to herbicide rate."

"I was nervous," Jennings said of the experience of leading the judges through the steps in her research. "I'm still relatively new... but I absolutely had to know what I was talking about."

Alaina Kresovic, who interned with Witcher over the summer, won Third Place for her poster presentation titled, "Evaluation of fertilizer type and compost rate for growth of vinca."

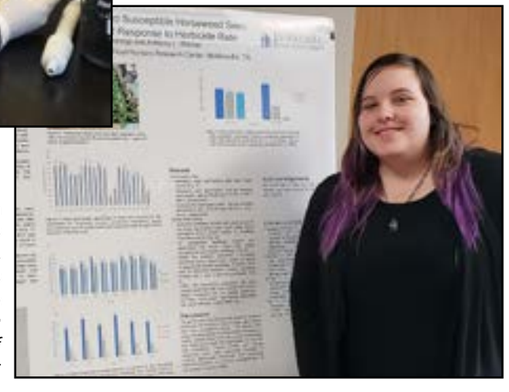
Graduate student Uzoamaka C. Abana won second place for her poster presentation titled, "The effectiveness of herbivore induced plant volatiles for monitoring field populations of *Orius insidiosus* and thrips in sweet pepper in Tennessee."

Kyle McGeary who works with Dr. Jason de Koff took First Place in his oral presentation on the "Effects of nitrogen and cultivar type on germination and soil coverage in winter canola (*Brassica napus L.*) in Tennessee. Winnie Mukuna followed up with Second Place for her oral presentation on the "Prevalence of antimicrobial

TAS, Turn to page 52

Kyle McGeary (right), shows a sample collections card that he uses to capture and determine the numbers and types of pollinators that visit winter canola crops. *Photo by Joan Kite*

Winnie Mukuna (left) earned Second Place for her oral presentation on the "Prevalence of antimicrobial resistance Enterobacteriaceae in plant-based milk. *Photo courtesy of Winnie Mukuna*



Graduate student Christina Jennings (right), who is expecting to earn her M.S. in Agricultural Science this summer, received First Place in the Agriculture Poster Competition. *Photo courtesy of Dr. Anthony Witcher*

Sssssssssearching for *Sistrurus miliarius*

A young environmental scientist tracks the threatened Western Pygmy Rattlesnake.

By JOAN KITE

In April of 2017, TSU College of Agriculture graduate student Shawn Snyder had told Nashville's hometown paper, *The Tennessean*, that he had just begun his research project tracking the threatened Western Pygmy Rattlesnake.

"The goal right now is to find our first one," Snyder told the reporter.

At the time, he was asking the public to photograph the rarely seen snake and send him information about where it was located.

The tiny venomous snake is about 15 to 20 inches long and doesn't care for crowds. With its orangish-brown mid-dorsal stripe, dark blotches, and cream-colored belly, the snake blends in easily coiled on the forest floor or basking on a felled oak tree.

Almost two years later, Snyder can not believe his good fortune. In an undisclosed location of Middle Tennessee, Snyder has been able to locate and track three Western Pygmy Rattlers — two females and one male. The area where the snakes were found is being withheld to protect the snakes from human predators.

> ***" It's hard to get the public to understand the need for venomous snake species. But if it didn't have a purpose, it wouldn't be here."***
>
> Shawn Snyder
> Graduate Assistant
> TSU College of Agriculture

Vipers are in desperate need of a public relations campaign.

"It's hard to get the public to understand the need for venomous snake species," Snyder said. "But if it didn't have a purpose, *it wouldn't be here*. Venom is very valuable; it has many benefits. For instance, Copperhead's venom helps coagulate blood."

The Tennessee Wildlife Resources Agency has listed the Western Pygmy Rattlesnake as threatened, which means it could become endangered if not extinct. The Tennessee Department of Environment and Conservation have deemed the creature "very rare" and "imperiled."

Little is known about the pygmy rattler but Professor William Sutton, TSU's wildlife expert, and Snyder hope to change that.

Prior to Snyder's research with Dr. Sutton this past year, only two other studies — one published in 1981 and the other in 1998 — have examined the Western pygmy in Tennessee.

Snyder said he was pleasantly surprised to have been able to track three snakes through the use of radio telemetry.

Veterinarian Becky Hardman, who also works as a graduate student research assistant at the University of Tennessee, surgically inserted transmitters into the snakes. Snyder

Left: Graduate student Shawn Snyder uses a receiver and three-pronged Yagi-Uda antenna to track three pygmy rattlers that have been tagged with Passive-Integrated Transponder tags. Snyder is using the data he collects to identify habitats conducive to the threatened species. Right: The threatened pygmy rattler, a native of Tennessee, is cleverly camouflaged among the dried leaves of the forest floor. *Photos by Joan Kite*

Above: A Western Pygmy Rattlesnake slithers along the moist grassy floor in the Tennessee woods. The pygmy rattler prefers moist soils and is known to be a good swimmer. Below: Young scientist Shawn Snyder finds a pygmy rattler sliding along a rural road at night. The vipers prefer roads as the tarmac absorbs the sun's heat and stays warm through the night. *Photos by Shawn Snyder*

Above: After locating one of the tagged pygmy rattlers, graduate student Shawn Snyder takes notes in the field collecting such data as exact location, time of day, weather, and soil conditions. TWRA officer Amy Spencer takes photos of the snake and is planning to produce a podcast on TSU's research. *Photo by Joan Kite* **Right: Shawn Snyder uses an acrylic tube to contain one of the pygmy rattlers while it is measured and sexed.** *Photo by Shawn Snyder*

then released the snakes back into their habitat.

Snyder spent this past summer and fall tracking the snakes every two or three days, often venturing out at night to increase the chance of encounters.

"At one point, I found a male and female copulating," Snyder said.

The pygmy rattler can be quite docile often preferring to lay quietly in camouflage. It's rattle sounds like a buzz of an insect and one needs to be within three feet to hear it.

Snyder said he believes pygmy rattlers prefer lowlands, flood plains, and wetlands because dinner is easier to find in these areas. Pygmy rattlers eat frogs, lizards, other small snakes, amphibians, and tiny rodents.

The species may also prefer those habitats because it is less likely to become dinner for other creatures, Snyder said.

The snake's biggest threat, however, is from humans.

Human population growth, deforestation, habitat destruction and fragmentation, climate change, urban sprawl, and emerging pathogens pose serious threats to the future of the pygmy rattler.

The tiny viper has a huge ecological role to play in Middle Tennessee. It helps control rodent populations that play host to black-legged ticks, a parasite that can transmit Lyme disease to humans. Left untreated, Lyme disease can cause heart problems, liver inflammation, joint pain, and neurological difficulties.

Snyder and Dr. Sutton are preparing recommendations for the TRWA in hopes to help protect and conserve the pygmy rattler.

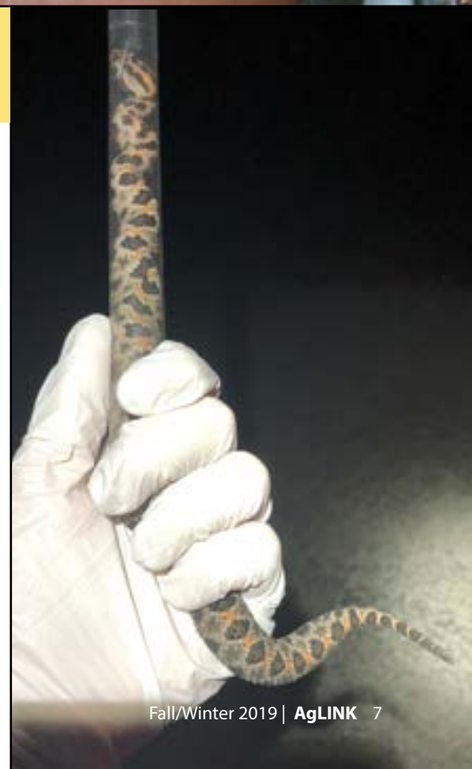
Because Snyder's use of the Maximum Entropy algorithm to create a Species Distribution Model proved so successful in locating the pygmy rattler, Snyder said he hopes future TSU students will build on his research and continue to expand the current limited knowledge base.

"This research is important because we are trying to prioritize habitats that could potentially hold populations of this rare snake," said Dr. Sutton. "Data from our research will better inform TWRA on the status of the species and will guide future survey efforts for this species in Tennessee. Most importantly, TWRA will be able to use our data to estimate overall acreage of potential habitat for the Pygmy Rattlesnake in Tennessee and to prioritize further protection or management to provide habitat for this species into the future."

Snyder is busy crunching numbers, analyzing data and seeking to understand what his research has revealed.

He expects to graduate in May. And he rightfully expects his research will be the third published study about the Western Pygmy Rattlesnake and its presence in Middle Tennessee.

Snyder will continue his doctoral studies at the University of Maine in Orono, Maine. Instead of focusing on a single species, however, he will use his academic experience gained at TSU to create a model of an entire habitat.



Dr. Chandra Reddy, dean of the College of Agriculture, presents Alexius Dingle with a $2,500 check bestowed upon her by members of the 1890 Universities Foundation. The Justin Smith Morrill Scholarship is awarded to a graduating senior from each of the 1890 land-grant universities that are members of the Foundation. *Photo by Joan Kite*

Dingle receives Justin Smith Morrill Scholarship

By JOAN KITE

ALEXIUS DINGLE, AN AGRICULTURE science major expecting to graduate in May, can rest a little easier after completing all those applications for grad school.

Her application fees are covered through her own efforts and a generous scholarship.

Awarded the prestigious Justin Smith Morrill Scholarship, she now has $2,500 to defray the cost of application fees.

"My ultimate goal is to get a Ph.D. in microbiology," Dingle said. "I want to spend my career researching how we can use microorganisms to make our lives easier."

The Justin Smith Morrill Scholarship is presented by the 1890 Land-Grant Universities Foundation to 19 graduating seniors — one at each of the 1890 member universities.

The scholarship was established to commemorate Justin Smith Morrill, a Vermont politician who advocated dedicating public lands to create higher education institutions that taught agriculture and other subjects to all. In

1862, President Abe Lincoln signed the Morrill Land Grant Act, a law that ultimately funded 105 institutions, and later on established colleges dedicated to educating African Americans.

Dingle is emblematic of that vital heritage.

She is a USDA/1890 National Scholar, a Tennessee State University Dean's Scholar, and has been on the President's List for the past three years.

Sustaining a 4.0 GPA, Dingle has also been able to serve as President of the Alpha Chi Chapter of the Delta Sigma Theta Sorority and Freshman/Sophomore Class Representative of the Tennessee State University Honors College.

She is a member of Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS), the Hip'Notyze Dance Troupe, and the African Student Association.

She has taken first place two years in a row in the TSU Research Symposium for Undergraduate Science.

During the past three summers, she has interned at the USDA Animal and Plant Health Inspection Service in Riverdale, Maryland, where she assisted in implementing regulations for genetically engineered organisms, and at the University of Maryland Center for Environmental Science, where she sought to quantify mixotrophic behavior in dinoflagellates (algaes) indigenous to the Chesapeake Bay.

Dingle anticipates hearing in late winter or early spring from one of the four graduate schools for which she has applied.

A doctorate is on the goals' list.

Is teaching at a university in her future?

"I've thought about becoming a professor," she said.

APLU awards Ag professor Regional Excellence in Extension

Dr. Jason de Koff's leadership in biomass energy training and promotion wins 1890s Region

Dr. Jason de Koff takes regional honors for leadership in Tennessee and the nation to build capacity for biomass energy training and promotion. The Association of Public & Land-Grant Universities presented de Koff with the award at its annual meeting last November in New Orleans. *Photo courtesy of APLU*

By JOAN KITE

NO STRANGER TO ACCOLADES and honors, Dr. Jason de Koff can add one more line to his curriculum vitae.

Under the awards portion, de Koff can insert regional winner for the Excellence in Extension Award presented by the Cooperative Extension Section of the Association of Public & Land-Grant Universities and co-sponsored by USDA's National Institute of Food and Agriculture.

"I am very honored by this award and thankful for the opportunity to engage in a career that allows me to serve others," Dr. de Koff said. "This ability to serve is an important passion of mine and takes many different forms, providing great meaning for me."

The national and regional awards are presented to those educators who demonstrate sustained and meritorious programming and has maintained at least five consecutive years of work experience in Extension.

Dr. de Koff was specifically recognized for his continuous efforts teaching bioenergy and its production to Extension agents, farmers and youth — an area of particular interest for the young researcher.

Dr. de Koff develops programs designed to provide producers with current information on the range of biofuel crops that exist as well as current practices for maximizing yields with environmental impacts.

One of his more popular teaching tools is the Mobile Biodiesel Education Demonstration, a large trailer designed to show farmers, students and the public how a biodiesel processor works. That project helped make him national finalist two years in a row (2016, 2017) in the Search for Excellence in Crop Production by the National Association of County Agricultural Agents.

"We are very proud of Dr. Jason de Koff for his outstanding contributions to Tennessee farmers," said Dr. Chandra Reddy, dean of the College of Agriculture. "He is our model Extension faculty at the university."

Winners for the Excellence in Extension awards were nominated last May and the Awards committees revealed the names of the winners in September. Last month, Dr. de Koff traveled to New Orleans to pick up his award.

Dr. de Koff has been recognized repeatedly for his talents in teaching, leadership and communications. He has received various honors including the National Association of County Agricultural Agents, Achievement Award, the Tennessee Association of Agricultural Agents and Specialists Early Career Award, the American Society of Agronomy Early Career Professional Award, and the TSU Outstanding Extension and Teacher Awards.

#ScienceMatters

@TSU, what happens in the lab does NOT stay in the lab.

Research Impacting You.

As a Land-Grant University, Tennessee State University's College of Agriculture has the special mission of conducting research that aligns with the interest of the USDA and its various divisions. Through the Agriculture and Food Research Initiative put forth by the USDA's National Institute of Food and Agriculture, key areas have been identified where research is needed to find solutions to critical global problems. TSU researchers work diligently to find solutions in

- **Childhood Obesity**
- **Food Safety**
- **Global Food Security & Hunger**
- **Climate Change**
- **Sustainable Energy**

We invite you into our labs in this issue to see what progress is being made in these areas and how it will impact you.

Childhood Obesity

In Tennessee, 38 percent of its children are obese and twice as likely to die before the age of 55. One TSU nutritionist is helping create technology to educate parents about food.

Decreasing pounds by increasing education

By JOAN KITE

THE COMMONWEALTH FUND DID not have good news for the State of Tennessee when it released its *2018 Scorecard on State Health System Performance.*

When it came to the rate of childhood obesity, Tennessee ranked dead last.

According to the report, 38 percent of Tennessee children are either overweight or obese — a number that has only increased since 2010, when 31.7 percent of the children were considered too heavy to be healthy.

Their futures could be grim. Chances of early onset diabetes, cardiovascular disease, high blood pressure, cancer, stroke and even death are in the forecast for these children, according to the Centers for Disease Control and Prevention.

Dr. Elyse Shearer, a registered dietitian and professor in the Department of Human Sciences within the College of Agriculture, said the numbers are alarming because eating habits are formed in the early years of a child's development. If the child is overweight or obese, re-teaching healthy eating habits can be harder to do.

With the financial help of a nearly $5 million grant from USDA's Agriculture and Food Research Initiative (AFRI), Shearer and Dr. Pamela C. Hull, a medical sociologist at Vanderbilt University with extensive knowledge in the development, testing and dissemination of behavioral interventions, are developing a smartphone app for participants in the Women, Infants, and Children (WIC) program.

WIC is a nutritional program for pregnant and breastfeeding women, infants, and children up to the age of 5 and ensures that the tiniest of humans are guaranteed nourishment. The app

Dr. Elyse Shearer (far left) speaks with Department of Human Science students and faculty at a recent orientation. Shearer is working with a Vanderbilt University professor to create a smartphone app designed to increase healthy eating habits in at-risk nutritional mothers and their children. *Photo by Joan Kite*

> ***" Research shows that if the parents change their eating habits, the children change as well."***
>
> Dr. Elyse Shearer
> Professor &
> Registered Dietitian
> TSU College of Agriculture

is designed to encourage mothers to use WIC benefits wisely and increase consumption of healthier foods.

The pilot program creating the initial application was so successful now the Tennessee WIC program wants to use the smartphone app in all of its centers across the state. The CHEW grant funds research to create and develop Version 2.0 of the Children Eat Well (CHEW) smartphone app.

"The intent of the grant is to combat childhood obesity," Shearer said. "We are targeting pre-school children ages 2 through 4 because that is when a lot of eating habits are formed. Research shows that if the parents change their eating habits, the children change as well."

The updated app will include a database of 500 healthy recipes, and nutrition facts that accompany each of the recipes. The recipes are created from WIC-approved foods.

Most are designed to be child friendly (think hot dogs, hamburgers, and spaghetti.) Vegetables are highlighted as well.

Users can create shopping lists, add items to their shopping cart, and keep updated on their WIC account information.

Approximately 130,000 people currently participate in the WIC program in Tennessee.

Shearer said they hope to roll out the new app in 2019.

Food Safety

Committing to the future of food

Professor dedicates energies to protecting a nation of eaters and its food supply

By JOAN KITE

SINCE 2010, OUTBREAKS OF foodborne illnesses have been consistently increasing, according to the Center for Disease Control and Prevention's National Outbreak Reporting System.

The CDC estimates 48 million people get sick, 128,000 end up in hospitals, and 3,000 die as a result of foodborne illness.

No food product seems immune to the contamination of "bad" bacteria harmful to humans. Beverages, fresh spinach, prepared cookie dough, ground beef, and cheese have all fallen prey to *E.coli* and *Salmonella* outbreaks.

Food safety is an issue that affects everyone. After all, everyone eats.

Dr. Ankit Patras, an assistant professor and researcher, has dedicated much of his life and career to the mission of increasing food safety.

At the College of Agriculture, he created the inaugural "Securing Our Food Supply" conference where science, government, and industry professionals share the latest information about food-related risks and emerging technologies to combat them.

In his lab, Dr. Patras has developed an integrated research program designed to accelerate the technology transfer of ultraviolet light-based technologies, which destroy food contaminants and inactivate vegetative cells, endospores, and viruses, for routine adoption by the food and beverage industry.

"One of the major aspects of the program is using novel approaches, both experimental and computational (computational fluid dynamics and light transport models), to ensure uniform UV exposure (irradiation dose) without any arbitrary fluence rate, distribution, and uncertainty in the delivered UV dose within the UV systems," Dr. Patras said.

"An important aspect of the program is the creation of science-based knowledge that bridges existing knowledge gaps by assessing the sensitivity of target foodborne viruses and bacterial spores to UV and developing dose-response curves," Dr. Patras said.

In 2018, USDA's National

FOOD, Turn to page 19

Global Food Security & Hunger

Genome editing enhances nutrient density in soybean

By JOAN KITE

SCIENCE IS HARD WORK.

Dr. Ali Taheri's students can vouch for that. After all, two of them helped their professor plant 20,000 mutated soybean seeds — one by one — by hand. No robots to help. No automated seeders.

The seeds were the vital beginnings of an ongoing research project in which Dr. Taheri is seeking to improve soybean through genetic mutation.

Of the 20,000 seeds that Dr. Taheri and his students planted, 1800 mature plants were selected.

The research team then planted a second crop. This time, 18,000 seeds were planted of which 6,400 mature plants were collected.

From those plants, DNA was extracted to establish a mutant gene pool.

"With the help and hardwork of the students and technician, we were able to extract DNA from all 6,400 samples in two months," Taheri said.

The study's goal is to "develop an improved soybean germplasm for screening of novel traits and create a mutant library for functional genomics research." Developing herbicide resistant soybeans is funded by an Evans Allen project while improving oil and protein are funded through the Tennessee Soybean Promotion Board.

The initial crop was planted to see which seeds would bear healthy phenotypes that showed increased levels of methionine, a sulphur-containing amino acid and an important building block for protein, and cysteine, an essential amino acid found in eggs and dairy products.

Dr. Ali Taheri works with a student on a DNA sampling project during the Biotechnology Summer Camp for 6th through 8th graders at TSU's College of Agriculture. *Photo by Joan Kite*

Soybean contains small amounts of cysteine, but Dr. Taheri theorizes that by increasing the levels of methionine and cysteine in the seed of the soybean plant, the "naturally fortified" soybean will become more nutritious for both human consumption and also swine and poultry diet/feed.

Dr. Taheri also seeks to increase the levels of oleic acid, healthier fatty acids that lower levels of "bad" cholesterol in the human body. Oleic acids also maintain cell membranes, provide energy, and Vitamin E.

With the world population on the rise, climate changes affecting the globe, and natural resources becoming increasingly limited, scientists are seeking ways to feed the world despite the demands that Mother Nature and humans place upon it.

For many people moving to a plant-based diet (according to research firm Global Data, vegans have increased by 600 percent in America since 2014), a nutritionally enhanced soybean would mean healthier soymilk, tofu, soybean oil, and other soybean-based foods.

According to the USDA Economic Research Service, 57 percent of the vegetable oil consumed in the United States is from the soybean.

Dr. Taheri uses the CRISPR-CAS9 genome editing tool to improve seed composition traits in soybean as well.

"Genome editing is like microsurgery," Dr. Taheri said.

Now, a plant breeder can grow soybeans with enhanced nutritional value.

Sustainable Energy

Professor, students study alternative ways to fuel the world

By JASON DE KOFF

ACCORDING TO THE U.S. ENERGY Information Administration, fossils fuels made up 80 percent of all energy consumption in 2017 with 9 percent from nuclear and 11 percent from renewable energy. Only about 2 percent of the total energy consumed two years ago came from biofuels.

Anyone with a retirement plan knows, in order to manage risk, we need to have a diversified portfolio. Therefore, our energy security requires a greater diversity of fuel types, which is where sustainable energy comes in.

I engage in agricultural research that relates to sustainable energy by working with potential bioenergy crops and identifying ways they can be produced by farmers in Tennessee to enhance their economic value and the agricultural ecosystem.

One project focuses on switchgrass. Switchgrass is a warm-season native and a member of the tall grass prairie. It has many environmentally beneficial attributes including a deep root system, a nutrient and water efficient physiology, and a perennial growth cycle. Being a native plant, switchgrass is well adapted to the soils and pests in the U.S. and does not risk becoming invasive as other nonnative plants can.

A deep root system allows switchgrass to access water and nutrients that other plants cannot and store carbon in the soil once old roots die and new ones are formed. Having a nutrient and water efficient physiology means that switchgrass can grow on marginal lands, those that normally wouldn't be used for crop production.

As it is a perennial, switchgrass doesn't have to be replanted each year which can reduce the risk of soil erosion. Switchgrass also grows very tall, over six feet, and the more plant material that is produced, the more bioenergy you can make. Along with graduate student Priya Saini, I am currently working to identify different rates of nitrogen along with an amendment called biochar, a waste product from one type of bioenergy production process, in hopes of reducing nitrogen fertilizer rates, and enhancing the health of the soil.

Another project in which I am engaged focuses on winter canola. In Tennessee, canola can be planted in the fall, go dormant in the winter, and rejuvenate in the spring once temperatures warm again.

This could be an important crop for farmers by preventing soil erosion over the winter, serving as an additional source of revenue for farmers, and alternating with winter wheat to reduce competition from pests.

The oil produced can also be used by farmers to make their own biodiesel that they could use to power their diesel equipment. Graduate student Kyle McGeary assists me in looking at specific varieties of winter canola, along with nitrogen fertilizer rates, to identify which combinations produce the highest yields.

ENERGY, Turn to page 52

Graduate student Priya Saini discusses winter canola seed collections with Professor Jason de Koff. *Photo courtesy of Jason de Koff*

Climate Change

In grains of soil, science reveals degrees of change

By JOAN KITE

Last year at the 24th annual Climate Conference, scientists said global carbon emissions reached a new high in 2018, rising 3.4 percent in the U.S. alone.

Extreme weather events, increased droughts, and longer, wetter, warmer growing seasons can introduce new pathogens that directly affect our food supply.

Dr. Jianwei Li looks to the soil to find potential solutions for increased carbon emissions. His research seeks to understand how climate change factors alter soil microbial processes, and the degree to which those changes feedback to long-term carbon and nutrients cycling in soils and terrestrial ecosystems.

"Climate change occurred in history of Earth over geological time, but the rate of current climate change today is unprecedentedly rapid and has never occurred in the earth's past two million years of history," Dr. Li said. "The daunting climate change has already affected us and the environment around us, including temperature and moisture which are critical controls on our food production in the field. Given the demand for tripled productions of food, fuel and fiber to meet 10 billion human beings, climate change unfortunately is deteriorating the shortage of food, water, energy and resources. Climate change is the top pressing issue that will require scientists to research and to offer solutions."

In Dr. Li's Lab of Climate Change and Soil Biogeochemistry, doctoral student Siyang Jian, Master's student Madhav Parajuli, undergraduate student Maggie Syverson, and Dr. Jianjun Duan, a visiting scholar from Guizhou University in China, test soil samples using

CLIMATE, Turn to page 19

TSU Ag Research Projects 2018-19

Principal Investigator	Project Title	Amount
Dr. Karla Addesso	**Expansion of Japanese Beetle Biological Control Farm Bill Goal**	$109,384
Dr. Kaushalya Amarasekare	**Building Capacity in Extension, Outreach, Technical Assistance to Promote Integrated Pest Management of Arthropods in Tennessee**	$249,980
Dr. Fulya Baysal-Gurel	**Improving Production and Profitability of Nursery Production Using Unmanned Aircraft System**	$599.925
Dr. Fur-Chi Chen	**Magnetic Nanoparticle Enhanced Biosensor for Detection of Campylobacter**	$408,069
Dr. Jason Oliver	**Methods for Quarantine Certification and Biological Control of Imported Fire Ant in Nursery Production**	$40,698
Dr. Dilip Nandwani	**Professional Development in Assessing the Impact on Organically Managed Horticultural Crops to Enhance Research**	$100,000
	Integrating Row Covers into Organic Production Systems for Specialty Leafy Vegetables	$20,000
Dr. Ankit Patras	**Advanced Ultraviolet Technologies for Inactivation of Bacterial Spores and Viral Pathogens in Beverages**	$570,442
Dr. John Ricketts	**Advancing Capacity in Food, Agriculture, Natural Resources, and Human Sciences through Professional Development in Online Learning, Virtual Reality**	$99,990
	Cultivating a Comprehensive Pipeline Model for Minority-Serving Food, Agriculture, Natural Resources, and Human Sciences Degrees	$678,136
Dr. YongMing Sang	**Functional Study of the Rapidly Evolving Interferon Complex in Amphibians**	$878,572
Dr. Anthony Witcher	**Insecticide Drench Volume and Transport Treatment Efficacy for Regulatory Pests in Containerized Nursery Stock**	$77,317
Dr. Ying Wu	**Microencapsulation for Target Delivery of Antibiotics Delivery Alternatives to Enhance Poultry Performance**	$300,000
Dr. De'Etra Young	**Broadening Minority Participation for the Agriculture Workforce: Measuring, Fostering and Transforming Undergraduate Research Experiences**	$148,896
	A Pathway to Broaden Participation of Underrepresented Groups in Graduate School & Geoscience	$199,742
	1890 Land Grant Historically Black Colleges & Universities Environmental Justice Academy	$80,000

The above research projects are federally funded by USDA's National Institute of Food and Agriculture, the Animal and Plant Health Inspection Service, the Agricultural Research Service, and the United States Forestry Service and National Science Foundation.

FOOD, From page 14

Institute of Food and Agriculture awarded Dr. Patras a $500,000 grant to fund his research.

"Consumers have a right to expect that the foods they purchase and consume will be safe and of high quality," said Dr. Chandra Reddy, dean of the College of Agriculture. "They want toxin-free and pathogen free, yet are concerned about the methods used to achieve this."

While working at Trojan Technologies and the University of Guelph in Canada, Dr. Patras' early career focused on developing irradiation processes to inactivate viruses from food and pharmaceutical products while conducting optical simulations and modelling to validate the processes.

Since then, his horizons have broadened considerably. He has served as an informal consultant in the establishment of the new Food Science building, and will be integral to expanding on the curriculum and research opportunities. His food safety conference last summer featured speakers such as Dr. Max Teplitski, the national program leader in food safety and microbiology for the National Institute of Food and Agriculture, Dr. Vijay Juneja, a supervisory microbiologist for the Agricultural Research Service, and Steffany Cavallo, outbreak coordinator for the Tennessee Department of Health. Dr. Patras has not yet set a concrete date for the next food safety conference at TSU, but expects the event to get bigger with each passing year.

Dr. Ankit Patras (right) speaks with his research assistants in one of the food laboratories in Lawson Hall at the College of Agriculture. *Photo by Joan Kite*

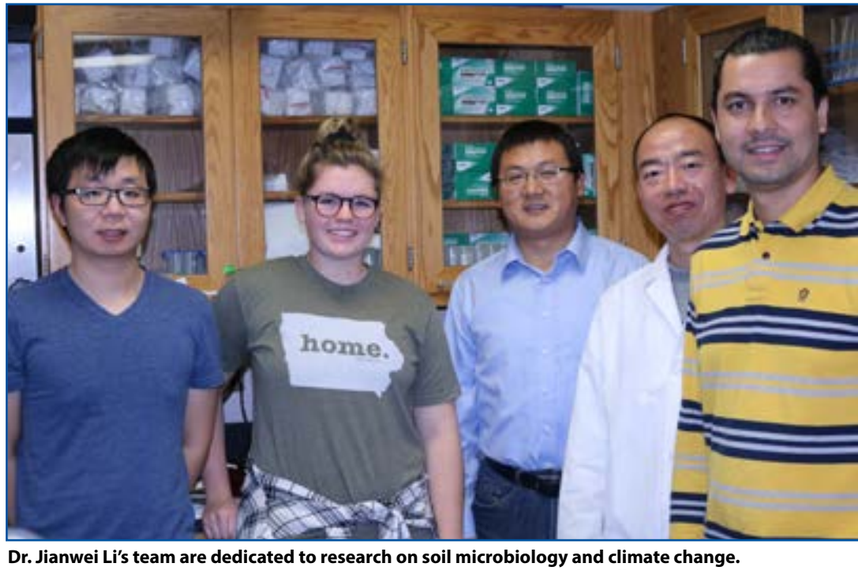
CLIMATE, From page 17

emerging technologies that quantify soil microbial biomass, extracellular enzyme activities, soil CO_2 efflux, and stable carbon isotopes.

Using these various techniques, Dr. Li's team analyzes and evaluates how increasingly hotter temperatures might affect soil health. His work has already led to better prediction models and has contributed to knowledge about amending soil's health and raising edible plants tolerant of heat and drought.

His work has been published in respected peer-reviewed journals including "Journal of Integrative Agriculture," "Soil Biology and Biochemistry," "Geoderma," and the "Journal of Geophysical Research: Biogeosciences." His current project is "Excellence in Research: Mechanistic Prediction of Soil Microbial Response to Temperature Change."

When he's not in the lab, Dr. Li is in the classroom teaching.



Dr. Jianwei Li's team are dedicated to research on soil microbiology and climate change. From left: Siyang Jian, Maggie Syversen, Dr. Li, Dr. Jianjun Duan, and Madhav Parajuli. *Photo by Joan Kite*

Preparing the next gen scientist

Graduate student Mary Jane Espina prepares soybean sample for tissue cultures and genome editing using the CRISPR-CAS9 system. *Photo courtesy of Bharat Pokharel*

TSU Ag grooms grads to be tomorrow's problem solvers

By BHARAT POKHAREL

THE DEPARTMENT OF AGRICULTURAL and Environmental Sciences currently offers graduate programs tailored to prepare students for careers in private industry, academia, and government.

Students can pursue a master's degree in agricultural sciences with a thesis or non-thesis option that concentrates on Agribusiness Management and Analysis, Food Supply Chain Management, Agricultural Education, Food and Animal Sciences, or Plant Sciences. If interested in Applied Geospatial Sciences, students can earn a Professional Sciences Master's degree or graduate certificate in the field.

The doctorate in Biological Sciences is an interdepartmental degree program offered by the departments of Biological Sciences and Agricultural and Environmental Sciences. Doctoral candidates can choose a focus in Environmental Sciences, Food and Animal Sciences, Biotechnology, and Cell and Molecular Biology.

> These students are groomed for careers in laboratory and research station settings ensuring their success within the professional scientific community.

Graduate students have a multitude of opportunities to enhance their professional development while engaging in research that contributes to the university's research mission. A careful matching of a student's research interest with faculty members' active research programs is important for motivating and inspiring students. The faculty mentor not only guides them through their research projects, but also works closely with them to set short-term and long-term career goals.

Faculty encourage them to develop the necessary set of skills and competencies, and expand their knowledge, creativity, and scholastic activities through classroom, experiential hands-on learning, and networking opportunities that prepare them for the ever-demanding job market.

The graduate program aims to prepare professionals and research scholars who have in-depth knowledge, experience and expertise in the increasingly complex field of agricultural and environmental sciences.

With a designated degree program complemented with research experiences, the program produces scholars who are capable of evaluating and defining a diverse set of problems, evaluating and developing feasibility studies, analyzing and interpreting data, and developing, implementing, and evaluating acceptable solutions to the real world problems encountered by government, academia, industry, and society in general.

One of the core strengths of the College's graduate program is the experiential hands-on research learning that helps students understand the scientist's responsibilities while actively learning intellectual and practical skills such as effective interpersonal communication, analysis, and problem-solving. These students are groomed for careers in laboratory and research station settings ensuring their success within the professional scientific community.

The college has three state-of-the-art experimental research facilities — the main campus research and education center, two off-campus facilities, and 35 research laboratories dedicated to advanced microbiological, biotechnology, environmental sciences, food science, and animal science research using the latest cutting-edge instruments and technologies.

Experiential research learning opportunities expose students to the research world where they bridge classroom learning with real-life situations and solutions. Graduate students transform their inert knowledge into a research product, which they then share in professional research conferences, workshops, and meetings. They have garnered many awards and recognitions while getting feedback on their research work developing professional networks within their research fields.

Table 1. Graduate student population by focus area and degree program within the College of Agriculture

Focus Group	Student Number by Degree Program				
	CERT/GIS	M.S.	Ph.D.	PSM-GIS	Total
Agribusiness, Leadership, Education & Comm		22			22
Agricultural Biotechnology		12	11		23
Environmental Sciences	6	22	9	4	41
Food and Animal Sciences		8	10		18
Total	6	64	30	4	104

Note: majority of these students are financially supported through research grants, except non-thesis, long-distance and non-traditional (currently employed by the state or federal government or industries) students

Graduate Research Assistant Priya Saini Sandhu analyzes phytochemical properties of biochar in a series of lab experiments for its potential use as a soil amendment.
Photo courtesy of Jason de Koff

The College currently has 104 graduate students (both traditional and non-traditional). Graduate students are an important strength of the College's program; therefore, their contributions to TSU's research, extension, and teaching mission are important milestones, and are always greatly appreciated and highly valued. Students' life-long memorable learning experiences are the output for our faculty. When these students enter into the workforce and thrive, that is the College's impact to the community.

• • •

Bharat Pokharel, Ph.D., is an assistant research professor who coordinates the graduate student program within the College of Agriculture.

Brittaney Hogan (left) and Alexius Dingle use a secchi tube to check the turbidity of a small pond at Mammoth Cave National Park in Kentucky. *Photo courtesy of Tom Byl*

'Learn by Doing'

Scholars program launches students into real-world success

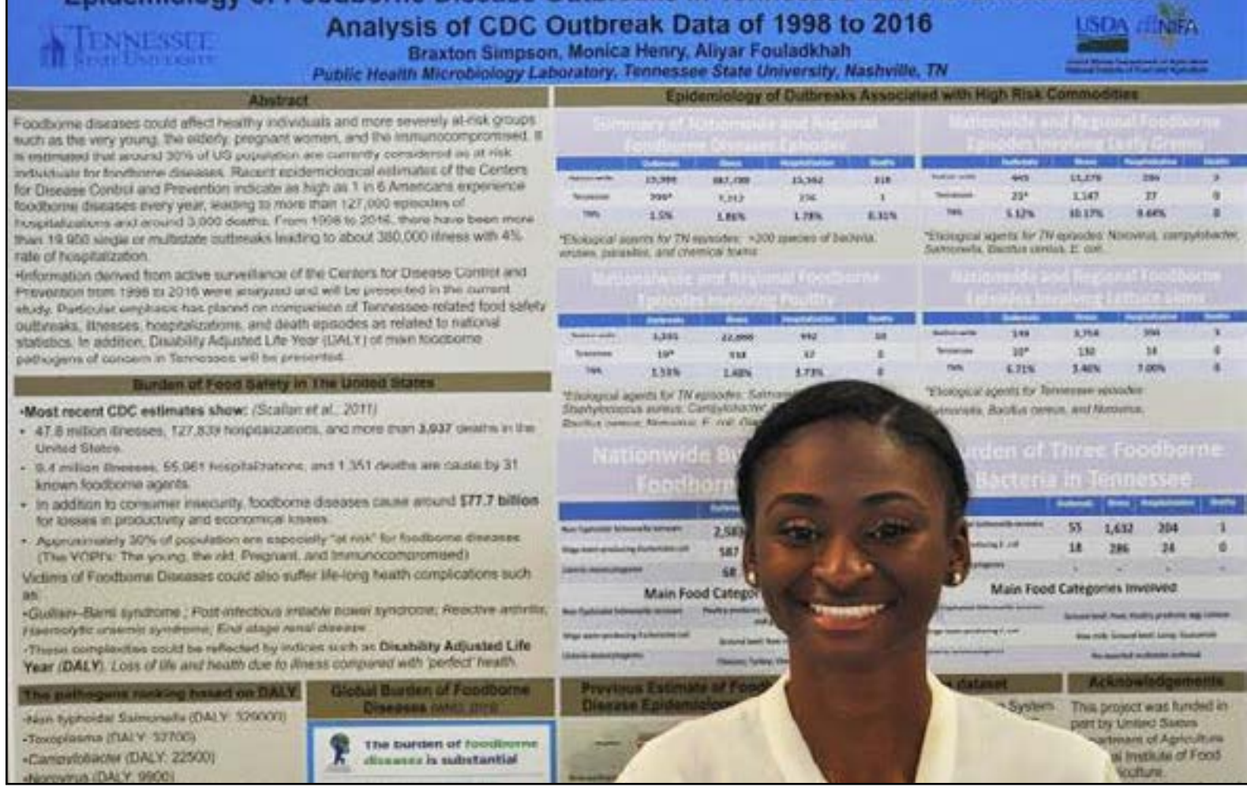
By DE'ETRA YOUNG

A KEY GOAL OF federal government recruitment policies is to attain a workforce that draws from all segments and mirrors the ethnic, racial, and gender diversity of the U.S. population. According to the U.S. Bureau of Labor Statistics, minority workers are steadily increasing in the workforce, but still, only 0.3 percent of these workers are in food and agriculture.

Tennessee State University's College of Agriculture has designed and implemented an undergraduate workforce development program focusing on providing research experiences for its students.

Formally known as the Dean's Scholars Program, this experiential learning experience fosters and supports students in scholarly research endeavors to recruit, retain, and train next-generation under-represented undergraduates into the interdisciplinary field of agriculture and natural resources. Boasting a 3.42 average GPA, 53 students are actively engaged in Dean's Scholars research this academic year.

The College of Agriculture has created an innovative learning space to facilitate active learning for its undergraduates. Designed to provide students with an opportunity to "learn by doing," the Dean's Scholars mission is to promote mentored experiential learning experiences for undergraduate and community college transfer students in agriculture and human sciences. The mentoring program fosters and supports students in scholarly research endeavors, critical thinking, and communication skills to help them achieve



Dean's Scholar Braxton Simpson stands in front of her poster depicting her research on foodborne illness that she presented at the TSU Research Symposium last year. Simpson has earned a three-year internship with Bayer's Monsanto. *Photo courtesy of Braxton Simpson*

their personal and professional goals as undergraduates and to prepare them for the next challenge.

Braxton Simpson, a junior Agricultural Sciences student, has greatly benefited from her undergraduate research experiences. As a freshman, she landed a three-year internship with Monsanto.

"The Dean's Scholars program has been nothing short of an eye-opener to the endless possibilities and opportunities that lie ahead for me in agriculture. Coming into college, I had no idea I would have the opportunity to work in a microbiology lab and conduct award-winning research. Nor did I know I would have the opportunity to dive into health disparities and evaluate the impact of public health," Simpson said.

Alexius Dingle, a graduating senior in the Department of Agricultural and Environmental Sciences, has been participating in the program for four years. As a scholar, Dingle has received interdisciplinary research training experience. She has conducted research in three labs and completed a summer Research Experience for Undergraduates with the University of Maryland Center for Environmental Sciences.

> ***"Watching them grow academically and learn how the research process works is exciting."***
>
> Dr. Tom Byl
> TSU Professor-on-Loan

"The Dean's Scholars program at TSU is an invaluable program because it provides undergraduates an opportunity to have hands-on research experiences," Dingle said.

The college has created a culture where the faculty is strongly encouraged to involve undergraduates in their research activities. As a high-impact educational practice, undergraduate research has been shown to increase the college's recruitment and retention efforts and provides training that will support post-graduation success.

Dr. Tom Byl, a scientist with the United States Geological Survey and TSU Professor-on-Loan, is a champion of undergraduate research. Having mentored undergraduates for more than 20 years, Byl said, "I am honored and pleased to work with these exceptional students. Watching them grow academically and learn how the research process works is exciting. I also benefit from their challenges and questions. They help me to visualize environmental problems from different angles and come up with new and innovative solutions. It is very rewarding and fun."

• • •

De'Etra Young, Ph.D., is an assistant professor who mentors and advises participants in the Dean's Scholars Program and the Minorities in Agriculture, Natural Resources and Related Sciences organization.

The portraits of an Extension county director, a USDA liaison, and the dean of the College of Agriculture now hang with a select group of generous mentors, educators, and pioneers in the Agricultural and Home Economics Hall of Fame located in the Farrell-Westbrook Building. *Photo by Joan Kite*

TSU aggies, alums honor new members to Hall of Fame

By JOAN KITE

THREE OUTSTANDING CONTRIBUTORS TO education, agriculture, and their communities were celebrated in mid-October when they were inducted into the 20th Annual Agriculture and Home Economics Hall of Fame.

Introduced by their colleagues and congratulated by TSU President Glenda Glover, Will Nesby, J.W. McGuire, and Dr. Chandra Reddy beamed as they accepted their plaques, medals, and certificates before a packed house at the Sheraton Music City Hotel.

> ***"This is clearly the reflection of the love and admiration that you have for the inductees, their families, and the agricultural and human sciences programs at Tennessee State University."***
>
> William Hayslett
> Academic Coordinator
> College of Agriculture

"I am grateful to see the huge turnout tonight," said William Hayslett, academic coordinator for the College and a Hall of Famer himself. "This is clearly the reflection of the love and admiration that you have for the inductees, their families and the agricultural and human sciences programs at Tennessee State University."

Colleagues, family, and friends of the inductees had taken every seat at every table. The three honorees together represented the three-pronged mission of land-grant universities — to teach, research and reach out to the community sharing their knowledge.

McGuire, a TSU alumnus, pursued his graduate education in Extension Education from the University of Tennessee. He went on to become an assistant UT Extension Agent in Wilson County in 1979.

By 2003, McGuire had risen through the ranks becoming the Wilson County Extension Director, a position he assumed until he retired in 2010.

He has remained loyal to his alma mater throughout his career, serving as an active member of the TSU Agricultural Alumni Association, the chairperson of the Wilson County TSU Alumni Scholarship Banquet Committee, and when appropriate, placing other TSU graduates into Extension Agent positions.

Nesby is also an alumnus, graduating from Tennessee A & I State University in 1968, and immediately embarking on a lifelong career with the USDA. As an agricultural economist for the Soil Conservation Service (now known as Natural Resources Conservation Service), Nesby wowed his superiors winning the Outstanding Performance Award for completing the economics analyses for eight NRCS projects.

"He practiced, Dr. Davis, our first president's admonition, 'Get good and get known,'" said Ola Hudson, TSU alumna and retired teacher and coordinator

FAME, Turn to page 31

Celebrating the inductees

Q & A with our 2018 Hall of Famers

What work has been most rewarding for you and why?
My professional career involved various positions with the United States Department of Agriculture and serving as recruiter for the School of Agriculture and Family and Consumer Sciences at Tennessee State University. During those 43 years, the most rewarding for me were the final 19, where I served as USDA/1890 Program Liaison and School Recruiter. Serving as advisor, counselor, and mentor to students from the day they entered college as freshmen and witnessing them graduate and move on to professional positions would truly be considered my "Most Rewarding."

If you could give students three pearls of advice, what would those three suggestions be?

- Be aware and take advantage of the many opportunities as provided through internships, scholarships, organizations, and departments in order to gain assistance toward reaching YOUR GOALS.
- Attend your classes, make sure to stay focused, gain all the knowledge that you can as related to your major field of study, and remember to learn and correctly speak the English Language.
- Always be willing to help someone who might be less fortunate than yourself.

What new challenges and/or adventures are you seeking to complete in your life today?
Now that I am retired, my challenges and adventures are filled with the happiness and joy that I receive everyday by spending time with my wife, Ann, and our grandchildren and great grandchildren.

WILL NESBY

What work has been most rewarding for you and why?
I have had many rewarding work experiences but to mention a few, I have enjoyed working with home owners in the area of gardening (vegetable, landscape and just basic home gardening). Another area that I am proud of and would like to share with the readers is the Wilson County Master Gardener program. I began this program in 1994 and during that time we trained more than 700 volunteers to assist with horticulture problems and concerns. When I first began my career I worked with the 4-H program in the area of clubs and other activities such as camps, special contest competitions like bread baking, poster contests, and many demonstrations. I found that working with youth in special projects and events was rewarding. I felt I could impact on lives of more people by working with home owners and home horticulture, Small farmers, home owners and volunteers. Extension is focused more toward large producers and businesses. This gives the home owner and under-represented audiences the opportunity to be involved in Extension programs.

If you could give students three pearls of advice, what would those three suggestions be?

- Always work hard no matter what your assigned duties may be. Never give up on your dreams of life goals.
- What ever you do in your life (personal or professional), always include GOD first.
- Always be willing to help others that you may come in contact with. If possible, always give back to your church, high school, and university.

What new challenges and/or adventures are you seeking to complete in your life today?
Now, I am content to be able to spend time with my family. My grandsons are growing now, so I want to be able spend special time with them. My mother is older now and lives in another area. I want to be able visit with her more often. I own a small landscape business and I will continue do that as long as I am physically able. Lastly, I will continue to volunteer for Extension Services and other nonprofit organizations. I am a deacon and Sunday school teacher in my local church and I will continue my work there. I am an active member of Tennessee State and University of Tennessee Alumni Associations.

J.W. McGUIRE

What work has been most rewarding for you and why?

I can divide my long career into three categories: international research and development, university teaching and research, and leading the College of Agriculture as the Dean.

My work in Africa resulted in significant advances in dryland production systems of the Sahelian region. Through an Institution Building Project funded by the U.S. Agency for International Development (USAID), I and my team were able to develop several pearl millet/cowpea alternative production strategies to mitigate the risk of erratic weather patterns and significantly increase the yield potential of the region by several fold. At the end of the USAID project, the World Bank funded dissemination of these new crop production technologies to the farming community in Niger and elsewhere.

The Sahelian region of Africa is one of the poorest parts of Africa and agriculture is the livelihood for most people in that part of the world. It was very satisfying to see that farmers in the region were able to improve their agricultural productivity by applying the new technologies that I and my team have developed. In recognition of this major accomplishment, the USAID awarded me a Gold Medal and $5,000.

Under the realm of university teaching and research, my research work in Alabama was able to bring changes in tillage practices in cotton production systems. I and my multi-institutional colleagues were able to increase the no-till adoption level in cotton production system from 14 to 84 percent in a few short years. The adoption of no-till crop systems by farmers helps conserve soil and moisture and promotes environmental sustainability. This important contribution to American agriculture helped me earn the highest recognition as Fellow of the American Society of Agronomy and Fellow of the American Society of Soil Science, which are granted to the top 0.3 percent of the respective societies' members.

As the Dean, I have lead TSU's efforts in restructuring the College of Agriculture, securing new funding from the state of Tennessee, growing the student enrollment, improving the college's infrastructure, and many important foundational efforts which have made the College an important contributor in advancing minorities in agricultural workforce and in developing new knowledge that has great impact in the agricultural sector.

As I analyze and think through my professional life, the contributions to help others succeed (students or farmers or anyone else for that matter) is the most satisfying thing in life.

If you could give students three pearls of advice, what would those three suggestions be?

- Pursue your passions with enthusiasm and energy so that you enjoy your time pursuing them.
- Become an expert/pro in your field so that everyone comes looking for your expertise and services rather than you chasing them.
- Meet and try to be friends with people from all backgrounds and places as all people have the same desires, fears, and needs.

REDDY, Turn to page 52

FAME, From page 25

"Under his (Reddy's) leadership, funded research has increased from 18 to 55 million dollars annually. The College's Cooperative Extension program has increased from 12 to 50 of the 95 counties in Tennessee. Student numbers grew from 12 to 125 undergraduates and from 47 to 155 graduates respectively."

Ola Hudson
2006 Hall of Fame Member

of Home Economics at Metropolitan Nashville Public Schools.

"In 1992, Mr. Nesby became the USDA liaison officer for Tennessee Sate University and being a TSU alum and housed in the College of Agriculture cause his love for his alma mater to grow and grow."

Mr. Nesby said his finest time during his career was tirelessly working to recruit, mentor and assist TSU students to pursue their dreams.

"When the academic department budget funds were deficient," Hudson said, "Mr. Nesby leveraged his position as USDA liaison officer to widely advertise and recruit for the USDA 1890 National Scholars Program."

Hall of Famer Will Nesby accepts his medal and plaques from Carol Wade, member of the Agriculture & Home Economics Hall of Fame Committee, and Assistant Professor Carollyn Boykin. *Photo by Joan Kite*

Nesby continues to serve on behalf of TSU as chairperson for the TSU Agriculture and Home Economics Hall of Fame Committee and member and financial supporter of the TSU Agricultural Alumni Association.

The third person to be inducted into the Hall of Fame did not graduate from TSU, but has made significant contributions to expanding the College's expert faculty, research funding, student enrollment, and physical capacity.

Dr. Chandra Reddy, dean of the College of Agriculture and director of Research and administrator of Extension, has been with TSU for 10 years.

"His stellar career (as dean of Graduate Studies) at Alabama A&M University more than prepared him for his role as dean, director of Research and administrator of Extension," Hudson said.

"Under his (Reddy's) leadership, funded research has increased from 18 to 55 million dollars annually," Hudson said as people responded with cheers and claps. "The College's Cooperative Extension program has increased from 12 to 50 of the 95 counties in Tennessee. Student numbers grew from 12 to 125 undergraduates and from 47 to 155 graduates respectively. New facilities have been added to accommodate rapid growth in enrollment for both students and staff. New facilities include six new greenhouses, a landscape studio, a biotechnology building, an agricultural education workshop, a field research support building, an equipment shed, and a pesticide storage and washing facility."

The momentum has not slowed.

Plans are in the works to break ground on a new food safety sciences building, said TSU President Glenda Glover.

"And that's just to support the research in food science opportunities," Glover said. "We all know because of the population explosion, food security is probably one of the main areas that is going to be studied worldwide over the next few years."

After the men were officially inducted into the Hall of Fame, family and friends gathered to snap photos of the newly famous for lifelong memories.

Dr. Reddy's wife, Indira Kamireddi (left), his son, Ajay, and Ajay's wife, Serena, attended the celebration. *Photo by Joan Kite*

Bloom where you are planted

Success stories from the College of Agriculture

The USDA/1890 National Scholars gather at the Dean's List celebration, which was held in November in the Farrell Westbrook Complex, also known as "The Barn." From left: Waymon McNeal, India Thompson, Alexius Dingle, Daiva Wilson, USDA/1890 Program Liaison Eston Williams, Kristin Day, Ashley Morgan and Rodney Blackwell. *Photo by Joan Kite*

National Scholars: No grass under their feet

By Joan Kite

Proving that leaders waste no time getting things done, TSU's USDA/ 1890 National Scholars attained new heights this past year as they accepted additional scholarships, internships, opportunities to study abroad, and elected and appointed positions in student government and organizations.

Junior Daiva Wilson traveled to Coast Rica to study agriculture abroad.

"Best experience of my life so far." Wilson wrote in her blog titled dayswithdai.home.blog.

Wilson, who is majoring in agricultural science with a concentration in biotechnology, was elected as a representative-at-large for TSU's Student Government Association. She also interned at Cheekwood Estate & Gardens.

The USDA/1890 National Scholars Program awards full tuition, potential employment, employee benefits, fees, books, and room and board for up to four years while students earn their bachelor's degrees. Students must maintain a 3.0 GPA while in the program.

Current 1890 National Scholars include College of Agriculture students Wilson, Waymon McNeal, Alexius Dingle, Rodney Blackwell, Kristin Day, Ashley Morgan and India Thompson. Morgan and Thompson are computer science majors.

Blackwell and Day interned this past year for USDA's Natural Resources Conservation Service. Blackwell was placed in Atlantic, Iowa, while Day headed to Dallas, Texas.

"They work with landowners, farmers and ranchers," said Eston Williams who serves as TSU's USDA/1890 Program Liaison. "(The students) might be giving them advice on increasing productivity or installing systems to prevent soil erosion and enhance water quality. They can do anything from writing a farm plan to doing GIS work."

Day also was selected to serve on the Student Union Board of Governors and was picked to become a University Ambassador. Ambassadors welcome new students and their parents to the

SCHOLARS, Turn to page 35

Ag graduate student Uzoamaka Abana seen here with Syngenta's Senior Communications Manager Wendell Calhoun accepts her 1st place award and $7,000 in scholarship money in Minneapolis, Minnesota. *Photo courtesy of Syngenta*

Student wins national essay competition

Graduate student **Uzoamaka Abana, M.S., Class of 2019,** was declared Syngenta's national scholarship winner at the graduate level for her essay #RootedinAg.

Abana is pursuing her master's degree in Plant Science with a major focus in Entomology.

Abana received a total of $7,000 in scholarship funds and was presented with her award in October at the 2018 Syngenta Media Summit in Minneapolis, Minnesota.

In her essay, Abana wrote about her experiences learning about agriculture from her grandmother, who operated an independent farm in Nigeria.

"These students are the future of our industry, and Syngenta is proud to support them as they continue their education," said Mary Streett DeMers, senior communications lead for Syngenta.

"Through my Master's program and thesis work," Abana wrote, " I am now learning and researching how insects can be exploited for bountiful crop production."

Her advice to fellow students?

"If the dream is not challenging enough, it is not big enough," Abana said.

NaKesha Holloway Brown

Dean's assistant earns Master's degree

NaKesha Holloway Brown, senior office assistant to Dr. Chandra Reddy, dean of the College of Agriculture, earned her master's degree in Education specializing in Instructional Leadership at TSU in December.

Brown, who earned her B.S. in psychology and sociology from TSU in May of 2011, attended graduate school while working full-time and raising a family.

"My favorite life quote is by George Bernard Shaw: Life isn't about finding yourself. Life is about creating yourself," she wrote. "TSU has definitely provided the atmosphere and the platform for me to do just that. It has been a long time coming and lot of work to get to this point, but I am happy about the life that I am creating for myself."

Brown has worked at TSU since August of 2004.

Brown is also a photographer and writer with a fondness for literature about adolescents and has contributed stories to AgLINK magazine. She has been coy about declaring her next step, but has hinted that she may pursue her doctorate degree at her alma mater.

She is married to Reggie Brown and the couple have a son Anthony. An animal lover, Brown has two black cats, Obsidian and Onyx, three turtles, and one snake.

"Life isn't about finding yourself. Life is about creating yourself."

George Bernard Shaw

Bloom where you are planted

Success stories from the College of Agriculture

Grad student awarded $5,000 in research funding for project

Brittaney Hogan laughs with one of the children in South Africa where she taught for four weeks. *Photo courtesy of Brittaney Hogan*

The U.S. Geological Survey in conjunction with the Tennessee Water Resources Research Center has awarded a $5,000 grant to graduate student Brittaney Hogan.

The money will be used to purchase supplies and pay for travel associated with Hogan's master's project, which includes monitoring water quality and studying the ecosystems of critical amphibian ponds at Mammoth Cave National Park, said her mentor and research biologist Dr. Tom Byl.

For Hogan, it was her first time writing a grant proposal and being awarded funds for her research.

"It was very nerve wracking," she said. "I feel like I understand the process more."

Hogan is focusing her studies on Environmental Sciences and is a participant in the Dean's Scholars Program.

Hogan is becoming a bit of a world traveler as she traveled with TSU to study agriculture in Costa Rica and spent four weeks last May in South Africa teaching math and English as part of the One Heart Source program.

"As part of the program, we also took language classes that study their native language, Xhgosa," Hogan said about her trip to South Africa.

"It was a phenomenal first experience out of the country and I am so grateful for the opportunity to have been able to go."

Students gain real work experience interning in businesses, universities

The College of Agriculture had another successful year placing students in internships throughout the United States.

Two students conducted resaearch at other universities. Research assistant CheKenna Fletcher iunterned at Cornell University in Ithaca, New York last summer. Adam Traore interned with the Summer Health Professions and Education Program at Rutgers University in New Jersey. Traore is interested in becoming a pharmacist.

Braxton Simpson, who aspires to become an agricultural economist for the USDA, interned at Monsanto in Grinnell, Iowa, this past summer.

Her experience was unique as Bayer had acquired Monsanto and the two companies merged.

"It was interesting seeing two different cultures coming together," Simpson said. She did say that interning at the two companies opened her eyes to other opportunities in agribusiness.

Braxton Simpson

She plans to spend next summer at Bayer's headquarters in St. Louis learning about customer care.

For a second summer, the College placed interns Daiva Wilson, Steve Osborne and Micah Blake-Smith at Cheekwood Estate and Gardens in Nashville. Blake-Smith said he worked with public programs.

"I was asked to create games and other activities that would encourage people to come out to the gardens and learn. I also helped out with the weekly summer program known as Thursday Night Out," Blake-Smith said. "This internship requires you to get the job done mostly on your own and you have to pitch ideas and see them executed."

Micah Blake-Smith

Kanita Hutchinson

Through the USDA Pathways Program, Kristen Stigger worked for the Natural Resources and Conservation Service in Crossville, Tennessee. Other interns included: Shakarah Nelson who participated in the Ford Next Generation Learning program in Dearborn, Michigan; Kalie Ellis, who worked with the Poultry and Egg Education Project; Kanita Hutchinson who worked in the environmental division of the Tennessee Department of Transportation, and Danielle Solomon who worked with the Metro Water Division. Ellis, Hutchinson and Solomon all worked in Nashville.

Agriculture students Brittaney Hogan (from left), Kristen Stigger, Daiva Wilson, and Steve Osborne spent three weeks in Costa Rica studying at Centro Agronómico Tropical de Investigación y Enseñanza and EARTH University. *Photo courtesy of Daiva Wilson*

Ag students travel to Costa Rica to study abroad

Four students from the College of Agriculture traveled to Costa Rica this past summer to study with researchers at the prestigious school Centro Agronómico Tropical de Investigación y Enseñanza and EARTH University.

The collaborative program between CATIE and five HBCUs is designed to expose undergraduate students to food and agriculture issues at a global level.

Undergraduates Brittaney Hogan, Kristin Stigger, Daiva Wilson, and Steve Osborn were selected to attend from July 14-August 4, 2018.

The students studied agroforestry, agriculture and climate smart territories, biodiversity and ecosystem services in agriculture and sustainable agroforestry, and basic concepts about trade related inspection services, and regulatory and compliance issues regarding U.S. exports and imports.

"The trip to Costa Rica was a once-in-a-lifetime opportunity," Wilson said. " I still talk about it to this day. While we were there, we learned about the different agroforestry systems in Costa Rica and did a lot of hands-on work as well."

Hogan agreed wholeheartedly.

"Both universities were breathtaking and very informative," Hogan said. "It was an honor to have been chosen by Dean Reddy to go and I'm sure the other students would agree."

The students did take a break from their studies for some rewarding relaxation on the beaches of Cahuita.

"We met some really great people from Tuskegee and Delaware State (universities), as well as people there. Also, the food was amazing," Wilson said.

Faculty named to Entomology Board

Dr. Karla Addesso

Assistant Research Professor Dr. Karla Addesso has been named to the Governing Board of the Entomological Society of America (ESA) as the Southeastern Branch Representative.

Addesso, who is based at the College's Otis L. Floyd Nursery Research Center in McMinnville, Tennessee, specializes in insect chemical ecology, insect behavior, plant-insect interactions and integrated pest management.

"I am proud to serve ESA at a time when the society is expanding its programs and reach beyond our annual and branch meetings," Addesso said. "I will be a strong voice for the needs and initiatives proposed by members from the southeastern states."

Founded in 1889, ESA has nearly 7,000 domestic and international members affiliated with educational institutions, health agencies, private industry, and government. ESA promotes opportunities for entomologists and enables them to share their science globally.

As one of 17 board members, Addesso is charged with ensuring the long-term stability and growth of the society.

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SCHOLARS, From page 32

University. Day received a $600 scholarship stipend for her service. Dingle interned at the University of Maryland.

Applications for the USDA/1890 National Scholars Program for 2019 will be posted soon. Visit https://www.outreach.usda.gov/education/1890/ or email Eston Williams at eston.williams@osec.usda.gov for more information.

Welcome to the Lab

Meet our Research Team

Research Faculty

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Karla Addesso, Ph.D.
Assistant Professor, Entomology

Dr. Addesso's program focuses on the study of insect-insect and insect-plant interactions as well as the infochemicals responsible for those behaviors in nursery production systems.

Pheromones produced by insects and chemical cues from host and non-host plants are examined in behavioral and physiological experiments to better understand how insects respond to such compounds and how that behavior can be manipulated.

Research is performed on pests critical to nursery production in Tennessee including ambrosia beetle, Japanese beetle, imported fire ants, spider mites, Japanese maple scale, flatheaded appletree borer and other emerging pests.

The goal is to develop practical applications for behavior-modifying chemicals, microbial and low risk pesticides and plant-based toxicants so they can be incorporated into integrated pest management programs for use in the nursery industry.

Dr. Addesso earned her B.S. in Biology from the College of New Jersey, in Ewing, New Jersey, and her Ph.D. in Entomology from the University of Florida. She joined TSU's College of Agriculture in June of 2012.

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Clement Akumu, Ph.D.
Assistant Professor, Applied Remote Sensing, GIS & GPS

Dr. Akumu is interested in the application of remote sensing and Geographic Information System (GIS) techniques in agriculture and environmental sciences. Specifically, his research involves the use of satellites and unmanned aerial vehicle data in mapping, characterizing and modeling biophysical condition of crops, wetlands, and forests. He is also interested in developing new remote sensing algorithms and tools in assessing water quality and soil health in Tennessee.

Currently, Dr. Akumu is examining the change in land cover and land use in Davidson County and developing new remote sensing techniques in detecting and monitoring a variety of crop types, weeds and softwood tree species in Tennessee using drone technology, global positioning systems, GIS, and satellites.

He received his Ph.D. in Environmental Geoinformatics from the School of Environmental Sciences and Management at Southern Cross University in Australia. He earned his M.S. in Environmental Sciences from University College Cork in Ireland and his B.S. in Environmental Sciences from the University of Buea in Cameroon in 2003.

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Ahmad Aziz, Ph.D.
Associate Professor, Biotechnology & Plant Genetics

Dr. Aziz focuses his research on linking molecular advances and traditional breeding by studying the genetic makeup of sweet sorghum varieties by using DNA-based markers where micro-manipulation techniques for single gamete isolation are also used towards enhancing its biofuel production rates.

Dr. Aziz also profiles and characterizes sorghum miRNAs obtained from leaves and stems at vegetative and reproductive stages as well as their targeted proteins through deep sequencing and bioinformatics approaches.

Dr. Aziz has conducted biotechnology trainings in underserved communities in Tennessee as well as parts of Ghana, Africa.

He teaches courses in gene expression, bioinformatics and advancement in agricultural biotechnology.

Dr. Aziz earned his B.S. in Plant Breeding and Genetics from Barani Agricultural College in Rawalpindi, Pakistan, and his master's degree in Plant Molecular Biology from Quaid-e-Azam University in Islamabad, Pakistan. He received his Ph.D. in Plant Molecular Genetics from the University of Brunswick in Fredericton, Canada.

Research Faculty

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Fulya Baysal-Gurel, Ph.D.
Assistant Professor, Plant Pathology

Dr. Baysal-Gurel's research focuses on the development of sustainable, environmental friendly and economical management practices for woody ornamental diseases.

Research emphasis areas are

1) detection, diagnosis and management of fungal, oomycete, bacterial and viral diseases on woody ornamentals using both molecular and classical techniques in nursery production,

2) detection of pathogen and biocontrol agent populations through soil ecosystems,

3) molecular characterization of soil-borne pathogens of field and container-grown woody ornamentals grown in Tennessee and determining the grower perceptions and knowledge of soil-borne pathogens on woody ornamental production and management practices available and

4) development of sanitation practices for mechanically transmitted woody ornamental diseases.

Dr. Baysal-Gurel earned her B.S with honors in Plant Protection, and her M.S. and Ph.D. from Cukurova University in the Natural and Applied Sciences Institute in Turkey. She joined TSU College of Agriculture in June of 2015.

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Matthew Blair, Ph.D.
Associate Professor, Plant Genetics & Breeding

Dr. Blair conducts plant breeding and genetics projects on legumes and dicotyledonous C4 crop plants such as cultivated amaranth. He earned his B.S. in plant science and his Ph.D. in plant breeding from Cornell University. He earned his M.S. degree in Agronomy and Crop Improvement from the University of Puerto Rico / Mayaguez. His experience has led to the creation of international projects at TSU, including a new study abroad class in Colombia.

In Dr. Blair's lab at TSU, his plant genetics program seeks to impact the productivity of small-farm agriculture. The laboratory applies molecular biology research to cultivar and crop development, uses various agronomic and physiological testing techniques for association genetics and plant breeding as well as engaging in with foreign aid groups, agriculture sector decision makers, and farmers to improve new crops. Biotechnology and genomic tools are applied to grain amaranths and legumes including a range of marker systems (GBS, Re-sequencing, SNPs, SSRs).

Dr. Blair has published more than 200 refereed publications, 75 non-refereed publications, 15 book chapters, 120,000 Genbank entries, and four crop registrations in U.S. and international journals. His collaborative projects as PI or coPI in the last five years have focused on amaranth, common bean, cowpea and mung bean genomics generating approximately $1 million in research funding. His lab group has developed sets of SNP markers and molecular genotyping by sequencing profiles for these new crops.

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Richard Browning, Ph.D.
Professor, Animal Physiology

Dr. Browning grew up raising and showing Red Brahman cattle in southeast Texas. He earned his B.S. degree from Prairie View A&M University and his Ph.D. degree from Texas A&M University in animal reproduction and genetics with studies on tropical cattle.

Dr. Browning has been evaluating various meat goat breeds at TSU since 2002. His primary research focus is on how breeds comparatively affect meat goat herd performance. Related outreach activities of his lab include teaching basic performance recording in meat goat herds and effective breed selection and utilization for commercial production.

Dr. Browning's work can be found at http://www.tnstate.edu/faculty/rbrowning/. Most recently, Dr. Browning returned to the cattle arena by introducing heritage Dexter cattle to the TSU program in 2015.

In association with his work with Spanish goats, Myotonic goats, and Dexter cattle, Dr. Browning serves on the Board of Directors for the Livestock Conservancy (https://livestockconservancy.org/) and the Spanish Goat Conservation Society (https://www.sg-cs.org/).

Research Faculty

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Carter Catlin, Ph.D.
Associate Dean of Research

Dr. Catlin is the associate dean of research at the College of Agriculture. He earned his bachelor's degree in Natural Resource Development & Management at Alabama A&M University, his master's degree in Food and Resource Economics at the University of Florida, and his Ph.D. in Forest Economics at Michigan State University.

Dr. Catlin worked as an economist for the Land Management Planning Unit of the U.S. Forest Service in Fort Collins, Colorado, before accepting a position at TSU.

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Fur Chi-Chen, Ph.D.
Professor, Food Sciences

Dr. Chen's research focuses on the development of innovative technologies for food safety applications.

The new methods developed in his laboratory include immunoassays for identifying adulteration in meat and poultry products, immunoassays for verifying heat processing, immunoassays for detecting peanut allergens in processed foods, and biosensors and molecular methods for rapid identification and characterization of Salmonella and Campylobacter.

Dr. Chen and his graduate students are currently working on projects to develop and validate an automated biosensor method and to design a magnetic nanoparticle enhanced biosensor for the rapid detection of foodborne pathogens in foods.

Dr. Chen earned his B.S. in Nutrition from Chung Shan Medical and Dental College in Taiwan, his M.S. in Food Science from University of Wisconsin-Stout and his Ph.D. in Food Science from Auburn University.

He joined TSU in 2002.

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Sam Dennis, Ph.D.
Professor, Water Resources & Environmental Soils

Dr. Dennis' current research focuses on water resources and environmental soils. His research work pertains to surface water monitoring for pharmaceuticals and personal care products at the watershed scale; monitoring greenhouse gases at the field scale; and monitoring groundwater with down-well camera.

Professor Dennis has been involved in determining soil physicochemical properties at the field scale; as well as cations, anions and trace elements determination in water and soil solutions.

He is a past president of the Southern Region Environmental Soil Physics Group. He was the PD for the USDA-NIFA 1890 Institutions National Facilitation Project for Water Resources. In that capacity, he provided leadership in the coordination of water resource education, Extension and research programming at 1890 Land-grant institutions.

Dr. Dennis has served on several research and extension proposal review panels for the United States Department of Agriculture. Dr. Dennis' research work has garnered more than $1 million in funding at TSU and he has published more than 30 peer-reviewed articles in scientific journals.

He teaches Fundamentals of Soil Science and Soil and Water Conservation courses at the undergraduate level.

Research Faculty

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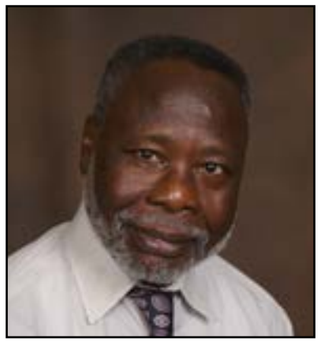
Korsi Dumenyo, Ph.D.
Associate Professor, Host-Microbe Interactions

Trained as plant pathologist with expertise in host-microbe Interactions, Dr. Dumenyo's research is focused on unearthing the molecular secrets in host-pathogen interactions in two important diseases of vegetables caused by bacterial pathogens.

The long-term research goal of Dr. Dumenyo's research team is to understand the interactions among the plant host-bacterial pathogens and insect vector trilogy. Immediate goals include identifying the pathogen genetic components responsible for many aspects of pathogenesis including host-specificity, establishing an infection system with a model host and systematically piecing together the components of virulence regulatory network.

Dr. Dumenyo earned his B.S. in Crop Science from the University of Ghana in Legon, Ghana, his M.S. in Plant and Soil Sciences from Tuskegee University in Alabama, and his Ph.D. from the University of Missouri.

He joined TSU in 2005.



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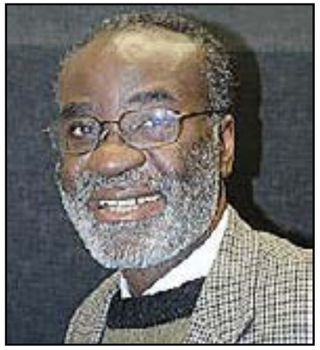
Emmanuel Dzantor, Ph.D.
Associate Professor, Soil Science

Dr. Dzantor earned his bachelor of science degree in Agriculture at the University of Science and Technology in Kumasi, Ghana, and his master of science degree in soil science and a doctorate in Soil Microbiology and Biochemistry from the University of Wisconsin in Madison, Wisconsin.

His areas of specialty include environmental toxicology, bioremediation and phytoremediation, soil health and sustainability, and soil microbiology and biochemistry.

Before moving into academia, Dr. Dzantor worked as a research chemist and microbiologist for the Tennessee Valley Authority.



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Enefiok Ekanem, Ph.D.
Professor, Agribusiness

Dr. Ekanem holds a doctorate degree in Agricultural and Applied Economics from the University of Minnesota, a Master of Arts in International Affairs, a Master of Arts in Economics, a Master of Science in Environmental Studies and a Bachelor of Science in Industrial and Systems Engineering from Ohio University in Athens, Ohio.

His responsibilities lie in the areas of small farms research, rural development, food security, economics of local food markets, biotechnology research, international trade and marketing, statistical applications, and agricultural policy.

Dr. Ekanem teaches Applied Statistics, Survey Techniques and Design, Experimental Design, Agribusiness Management and International Trade and Marketing.

Dr. Ekanem has published extensively, presented at regional, national and international conferences. He has secured millions of dollars in extramural funding since arriving at TSU. Two recent projects, funded by the United States Department of Agriculture's Agriculture and Food Research Initiative Small and Mid-sized Farms Program and the Evans-Allen program, seek to implement an accessible online marketing tool for small and medium-sized farmers in Tennessee and Alabama and assess the economic impacts of local food markets in Tennessee..

Research Faculty

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Solomon Haile, Ph.D.
Associate Professor, Applied GIS

Dr. Haile completed his Ph.D. at the University of Florida in forest resources and conservation with an interdisciplinary concentration in Geographic Information Systems. He studied forestry for his master's and bachelor's degrees at Wageningen University in the Netherlands and at Haramaya University in Ethiopia, respectively.

His research interest focuses on regulating and supporting ecosystem services of trees and forest resources in space and time scale, particularly in soil carbon sequestration; biomass energy, and integration of multipurpose tree into farms.

He has collaborated research actively with scientists in several other disciplines in Agriculture and Environmental Sciences, particularly spatial analysis of urban resources and human health-related environmental problems.

Dr Haile leads the graduate Applied GIS research, academic and outreach education program and teaches advance GIS course in the Department of Agriculture and Environmental Sciences.

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Prabodh Illukpitiya, Ph.D.
Associate Professor
Agriculture, Natural Resource & Energy Economics

Dr. Illukpitiya's academic background is in the field of agricultural and resource economics. His economic research applications include modelling benefit-costs, input-output models, risk analysis, technical efficiency, energy accounting, and hauling and transportation costs modelling.

He recently completed a USDA-NIFA funded research project on the sustainable utilization of winter oilseed crops for on-farm biodiesel production. The project goals included adaptability, economic feasibility, technology adaptation, and quantification of risk of producing biodiesel from selected oilseed crops namely industrial rapeseed, carinata, and crambe.

Dr. Illukpitiya's latest initiative includes collaborating in a Department of Energy funded multi-state research project on developing regionally appropriate herbaceous energy crops for the southeast region. The economic component of the project that Dr. Illukpitiya will perform includes Techno Economic Analysis (TEA) and design Life Cycle Analysis (LCA) for potential environmental impacts from large scale biomass production in the region.

In addition, he is collaborating on the development of a smartphone application for families who are in the Women, Infants and Children Food and Nutrition Service.

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Aditya Khanal, Ph.D.
Assistant Professor, Agribusiness

Dr. Khanal's research areas focus on agricultural finance, risk management, economic development, and production economics as it relates to farms and agribusinesses. His current projects are related to the analysis of financial constraints, and roles of diversification and alternative agricultural enterprises on financial performance of small farms.

Dr. Khanal works in a variety of areas in agricultural and applied economics including efficiency and productivity analysis, impact analysis, demand and market analysis and factors influencing decisions in land use, technology adoption, food security, and capital structure in developed and developing economies. He teaches courses in agribusiness management, agricultural finance and applied microeconomics in agribusiness. Dr. Khanal, who joined TSU in 2015, earned his Ph.D. in agricultural economics and agribusiness from Louisiana State University and has three master's degrees — a M.S. in agricultural economics and a M.S. in finance from Louisiana State University and a M.A. in Economics from Virginia Tech.

Dr. Khanal was recognized as "Outstanding Young Scholar in Agricultural Finance" by the Agricultural and Applied Economics Association and received "2018 Outstanding Young Researcher Award" from TSU's College of Agriculture.

Research Faculty

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Agnes Kilonzo-Nthenge, Ph.D.
Associate Professor, Antimicrobial Drug Resistance

Dr. Kilonzo-Nthenge's research explores microbial diversity and antimicrobial resistance in different components of agro-ecosystems and retail foods.

She has established patterns of antibiotic resistant microorganisms in domestic kitchens, farming environment, and retailed meats, and fresh produce. Her investigations have revealed critical information essential in reducing foodborne illnesses and antimicrobial resistance.

Dr. Kilonzo-Nthenge delivers antimicrobial stewardship and food safety messages via workshops and printed materials to farmers and consumers. She has published extensively in the field of food microbiology and food safety; and secured approximately $4.0 million as a Principal Investigator and Co-PI through extramural grants during her tenure at Tennessee State University.

As she advances as an independent investigator, Dr. Kilonzo-Nthenge has attracted and mentored students currently working in main food industries including Tyson Foods, Inc, McKee Foods Corporation, and Beef, JBS USA.

Dr. Kilonzo-Nthenge earned her Ph.D. from Auburn University in Auburn Alabama, her M.S. from Tuskegee University in Tuskegee, Alabama, and her B.S. from the University of East Africa in Baraton, Kenya.

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JianWei Li, Ph.D.
Assistant Professor, Climate Change

Dr. Li studied agriculture and environment in China, and graduated in 1997 with a bachelor's degree at China Agricultural University, Beijing. After working for two years as research assistant in Chinese Academy of Agricultural Sciences, he moved to the U.S. and obtained his Ph.D. in Environmental Science at Duke University, Durham North Carolina.

Following his postdoctoral training in soil ecology and modeling in University of Kansas and University of Oklahoma, Dr. Li accepted the current tenure track faculty position at TSU in 2014.

Dr. Li's research seeks to understand how climate change factors alter soil microbial processes, and the degree to which these changes feedback to long-term carbon and nutrients cycling in soils and terrestrial ecosystems (e.g., bioenergy cropland). His interdisciplinary research integrates field and laboratory observations as well as modeling approaches to address questions that intersect external disturbances and terrestrial bio-geochemical cycles. His current research projects focus on thermal variations on mineralization of soil organic matter in croplands, and assimilating long-term field and incubation data with mechanistic models to improve soil model predictions in response to climate warming.

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Kar Lim, Ph.D.
Assistant Professor, Behavioral Economics

Dr. Lim researches consumers and their behavior toward and about food products.

His focus is two-fold — first, to show how much people are willing to pay for food attributes, and second, to explain the underlying factors of the willingness to pay.

Dr. Lim's work has been published in various agricultural economics journals, including the *Canadian Journal of Agricultural Economics*, *Marine Policy*, and *Sustainability*. He won an honorable mention for 2014 outstanding article by the Canadian Journal of Agricultural Economics.

Dr. Lim received his Ph.D. in Agricultural Economics, his M.S. in Economics, and his B.S. in Computer Science from the University of Kentucky.

He joined TSU's College of Agriculture in 2015.

Research Faculty

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Margaret Mmbaga, Ph.D.
Professor, Plant Pathology

Dr. Mmbaga's research focuses on the identification of beneficial microorganisms and development of alternative products for disease management especially in vegetable production.

Her research in the Phyopathology Lab has identified several beneficial bacteria that display plant protection against fungal pathogens, including powdery mildew and root rot pathogens, and stimulate growth improving health in plants such as Arabidopsis, bell pepper, tomato, and cucumber.

Some of these beneficial bacteria are compatible with conventional fungicides and can therefore be used in rotation with chemical fungicides to reduce usage of chemical fungicides; some may be used individually or in population mixtures, as growth stimulants and inducers of plant immune system.

Her research team focuses on the development of microbial disease management products for horticultural crops.

Dr. Mmbaga earned her B.S. in Botany, Zoology and Education and her M.S. in Botany from the University of Dar es Salaam in Tanzania. She earned her Ph.D. in Plant Pathology at the University of Wisconsin.

She joined TSU in 1995.

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Samuel Nahashon, Ph.D.
Professor, Poultry Nutrition
Head, Department of Agricultural & Environmental Sciences

Dr. Nahashon's role as head of the Agricultural and Environmental Sciences Department is to provide leadership for faculty, staff and students in the department, and facilitate implementation of departmental strategic plans.

Dr. Nahashon also teaches classes in poultry science and is engaged in poultry research with the following broad objectives:

1) Evaluating strategies for improvement of nutrient utilization to improve poultry production efficiency and minimize environmental pollution;

2) Improve poultry and poultry product quality, such as reduction of excessive fatness in broilers, using conventional and molecular techniques;

3) Understanding the mechanisms of interaction of the resident and new gastrointestinal tract microorganisms and the host environment; and

4) seeking alternatives to antibiotics in poultry production.

Dr. Nahashon earned his Ph.D. degree in Poultry Science and Integrated Minor in Biochemistry and Statistics from Oregon State University in 1994. He earned his B.S. and M.S. degrees from Andrews University, and Tuskegee University in 1987 and 1990, respectively.

He joined TSU in May 2002.

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Jason Oliver, Ph.D.
Professor, Applied Crop Entomology

Dr. Oliver is located at the TSU Otis L. Floyd Nursery Research Center in McMinnville, Tennessee. His primary research focus is the development of integrated chemical, biological, and cultural approaches in the management of key pests impacting the Tennessee nursery industry.

His research has led to multiple improvements and cost reductions in federal and state quarantine protocols for imported fire ant and Japanese beetle and has introduced new biological control agents for these pests. He also has developed new techniques to manage wood-boring insects like flatheaded borers and ambrosia beetles. The program maintains a large museum collection of regional wood-boring insects.

Dr. Oliver received the Distinguished Achievement Award in Horticultural Entomology in 2017 from the Southeastern Branch Society of America and currently serves on the SEB Executive Committee as a Member-at-Large.

Dr. Oliver earned his B.S. in Wildlife and Fisheries Science and his M.S. in Entomology from the University of Tennessee, Knoxville. He received his Ph.D. in Entomology from Auburn University in Alabama.

Research Faculty

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Christine A. Ondzighi-Assoume, Ph.D.
Assistant Professor, Plant Science

Dr. Ondzighi-Assoume is the youngest of six children in a French immigrant family, originally from Gabon, central Africa. She was born in Paris, a beautiful city known for its art and notable architectural landmarks and pursued my education in Normandie until she obtained her doctoral degree in Cell Biology and Biochemistry from the University of Rouen, France.

While in her graduate program, she developed a keen interest in biological sciences and sought out postdoctoral positions to increase her knowledge in plant science and became interested in working with crops.

Dr. Ondzighi-Assoume's expertise lies in biotechnology, physiology, cell biology, biochemistry, genetic and molecular biology, biomass, and biofuels. Since October 2016, she has been a faculty member at TSU where she teaches eight classes at undergraduate and graduate levels and conducts projects that focus on improving crops through genetic engineering and biotechnology for bioenergy and agricultural production.

She supervise students including Wilson K. Ouma, M.S., Plant Science (wouma@my.tnstate.edu) who is working on the project entitled "Improving Lignocellulosic Bioenergy Feedstock in Switchgrass through CRISPR/Cas9 Technology." Nia Gordon, M.S. Plant Science (ngordon2@my.tnstate.edu) is working on "Controlling Powdery Mildew on Cucurbit Crops through Biological Control Agents."

She has published more than 20 publications in peer-reviewed journals, contributed to writing three book chapters and attended 50 national and international conferences.

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Ankit Patras, Ph.D.
Assistant Professor, Food Science and Safety

Dr. Patras received his Ph.D. in Biosystems Engineering in 2009 from School of Biosystems Engineering, College of Engineering, at University College in Dublin, Ireland, under the direction of Professor Francis Butler and Professor Nigel Brunton.

Before joining TSU, Dr. Patras worked as a postdoctoral fellow in Advanced Technology Research Group at Trojan Technologies, Canada. He worked on developing irradiation processes for inactivating viruses from food and pharmaceutical products and conducted optical simulations and modelling to validate the processes.

His current research interests include developing optical technologies for food safety applications, mycotoxins detoxification, cell cytotoxicity, microbial inactivation, and process validation. He has published 52 peer-reviewed papers in leading journals of food engineering and food safety including a U.S. patent. Major awards that Dr. Patras has received include a USDA-NIFA strengthening grant, a USDA capacity building grant, a Teagasc Doctoral Fellowship, and Ireland and Mitac's postdoctoral fellowship from the Canadian government.

His research and education specialties involve:

1. Improving food safety by developing new non-thermal technologies (optical technologies);
2. Studying the UV sensitivity of bacteria, viruses and mycotoxins;
3. Mathematical modelling and simulations;
4. Designing target irradiation doses for inactivating bacteria, viruses (enveloped and non-enveloped) and mycotoxins (aflatoxins, patulin) from food chain;
5. Understanding and studying cytotoxicity of irradiation processes using mammalian cell lines (Liver cells, blood cells, colon cell lines);
6. Pilot engineering and process validation as per CFR 179.38, CFR 179.21, CFR 113, CFR 112 etc., and
7. Conducting knowledge transfer sessions and workshops to train the next generation of scientists.

Research Faculty

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Bharat Pokharel, Ph.D.
Assistant Professor of Applied Statistics
Coordinator, Graduate Student Programs

Dr. Pokharel earned a B.S. in Forestry graduating with honors in 1998 from the Australian National University in Canberra, Australia, and a Ph.D. in Forest Biometrics in 2008 from the Michigan Technological University in Houghton, Michigan.

In between his university studies, Dr. Pokharel worked more than five years for the non-profit organization the World Wildlife Fund in different capacities as a resource professional in Nepal. He has four years of post-doctoral experience from Michigan Technological University and Nipissing University, Canada.

Dr. Pokharel is a biometrician and applied statistician, who is interested in designing research experiments, testing research hypotheses, and developing statistical models as a decision support tool in natural sciences. He is particularly interested in designing experiments and conducting observational studies in traditional and contemporary agricultural, environmental and biological inquiries, and managing and analyzing large array of data collected from control experimental designs, observational studies, and remote sensing techniques such as Landsat imagery and airborne Light Detection And Ranging in SAS and R statistical computing environment.

Dr. Pokharel's current projects include, a) mapping trees per acre across the forest landscape, b) modeling forest site productivity using soil characteristics, and c) promoting best management practices in nursery production systems for the Mid-South United States.

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Sudipta Rakshit, Ph.D.
Assistant Professor, Soil Sciences

Dr. Rakshit is an environmental soil chemist who joined the Department of Agricultural and Environmental Science in December of 2013. He earned his M.S. in Soil Science from Iowa State University, in Ames, Iowa, and his Ph.D. in Soil Chemistry from the University of Kentucky, in Lexington, Kentucky. Dr. Rakshit worked at the University of California at Berkeley, Lawrence Berkeley National Laboratory, and at Montclair State University as a postdoctoral scholar.

At TSU, Dr. Rakshit is engaged in conducting research in the areas of "Fate of Emerging Contaminants," "Redox Biogeochemistry of Nonliving Organic Matters," "Nitrogen and Phosphorus Cycling," and "Fate of Nucleic Acids in the Environment." Dr. Rakshit has 22 publications in peer-reviewed journals and numerous abstracts in national conferences.

He manages the Environmental Soil Chemistry Laboratory, which has advanced instrumentations such as Inductively Coupled Plasma Optical Emission Spectroscopy, X-Ray Diffractometer, Raman Spectrometer, Attenuated Total Reflectance Fourier Transform Infrared Spectrometer with in situ flow-cell attachments, Ion Chromatograph, and UV-VIS spectroscopy.

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Ramasamy Ravi, Ph.D.
Assistant Professor, Food Science

Prior to joining TSU in 2016, Dr. Ravi worked as a food researcher in a federal food research institute in India for more than 25 years. His specializations include sensory analysis of natural and processed foods and the development of sensory profiles for different food products. His research focus includes the physicochemical analysis of food products with respect to color, texture, aroma and flavor, and overall quality using human panels, instruments and shelf life extension.

He has unique expertise in e-sensing techniques such as electronic nose and tongue technologies for food quality analysis. He has more than 92 peer-reviewed research articles published, seven patents filed, and 90 oral, poster, and abstract presentations to his credit so far.

Dr. Ravi earned his master's and doctoral degrees in food science from the University of Mysore and completed his post-doctoral education at Michigan State University. He also served as a visiting assistant professor at Michigan State University in 2012-13.

His other expertise areas include the various applications of multivariate analysis like in food quality analysis.

Research Faculty

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Yongming Sang, Ph.D.
Associate Professor, Animal Genomics & Immunology

Dr. Sang is a Principal Investigator of the Animal Immuno-Genetics Laboratory at the College of Agriculture. He has received $1.3 million in USDA and NSF funding to elucidate, molecularly and functionally, animal immune and metabolic genes, in particular those that have antimicrobial activities and therapeutic potential against several animal pathogens.

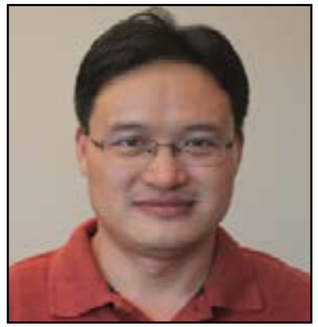
His current research includes:

1) comparative immuno-genomic project focusing on animal immunome, comparative immunogenetics, and immunoreagent development;

2) antimicrobial regulation underlying genome-wide transcriptomic determination in macrophages and dendritic cells; and

3) cross-species characterization of immunometabolic regulation of innate immunity and development of novel vaccines and IFN-based antivirals against devastating viral infections caused by either RNA or DNA viruses.

Dr. Sang earned his Ph.D. in Immuno-physiology from Kansas State University and his D.Sc. in Plant Physiology and Biochemistry from Nanjing Agricultural University in China.



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Hongwei Si, Ph.D.
Associate Professor, Nutrition

Dr. Si joined Tennessee State University in 2010 after seven years doctoral and postdoctoral training at Virginia Tech.

Dr. Si was promoted as associate professor in 2016. His research examines plant-derived chemicals and their affects on human health including childhood obesity, aging, and cardiovascular diseases.

Dr. Si has published 21 research articles since he joined TSU. He teaches courses in Elementary Nutrition, Life Span Nutrition, Functional Foods and Nutraceuticals.

Dr. Si studied veterinary medicine and earned his M.S. in microbiology and immunology at Gansu Agricultural University in China. He earned his Ph.D. in Human Nutrition at Virginia Tech.

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William Sutton, Ph.D.
Assistant Professor, Wildlife Biology

Dr. William Sutton is a wildlife biologist with expertise in the conservation of amphibians, reptiles and birds within the theme of global change ecology. At TSU, he oversees the Wildlife Ecology Lab.

Members of his research team study Tennessee populations of the endangered pygmy rattlesnake, the Hellbender (Tennessee's largest salamander) and other salamanders, wild turtle populations within the University Campus wetlands, and ticks.

Dr. Sutton was named Outstanding Young Researcher in 2016 by TSU's College of Agriculture.

He earned his B.S. in biology at Wheeling Jesuit University and his M.S. in Biological Sciences at Marshall University, both in West Virginia, and his Ph.D. in Natural Resources and Environmental Sciences from Alabama A & M.

Dr. Sutton joined TSU in 2014.

Research Faculty

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Ali Taheri, Ph.D.
Assistant Professor, Plant Molecular Genetics & Breeding

Dr. Ali Taheri is involved in enhancing seed composition qualities in annual crops with a focus on soybean.

His current overall goal is the development of soybean cultivars that have better amino acid profile and cultivars that have better oil quality similar to olive oil. To achieve these goals, he screens the mutant population developed in his laboratory and also uses novel molecular technologies such as CRISPR-CAS9 genome editing to modify the genes involved in these agronomic traits.

Using similar strategies, he is also planning to identify soybean lines with reduced level or allergens.

Dr. Taheri earned his M.S. at the University of Tehran in Tehran, Iran and his Ph.D. in Plant Molecular Biology at the University of Guelph in Ontario, Canada.

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Fisseha Tegegne, Ph.D.
Professor, Agricultural and Environmental Economics

Dr. Tegegne earned his Ph.D. from Michigan State University. His expertise is in the areas of economic development, resource economics and agribusiness. He has collaborated with faculty in the College of Agriculture as well as other universities and USDA agencies such as the Economic Research Service.

Dr. Tegegne has published in various refereed journals including: *Journal of Natural Science Education; Journal of Biotech Research; Journal of Agribusiness; Journal of Southern Rural Sociology, Journal of Interdisciplinary Education; Journal of Agronomy; Journal of Food Distribution Research; Southern Business and Economic Journal; Journal of Agricultural Sciences; Journal of Environmental Monitoring and Restoration; and Journal of Extension.* He recently completed two projects — one on food consumption in low income households and the other on an analysis of farmers' networks.

Dr. Tegegne developed and has been teaching the following graduate courses: 1) Food and Fiber: Economics and Policy; 2) Agribusiness Strategy and 3) Environmental, Resource Economics and Management. He also mentors undergraduate students and has served as chair or committee member on several Master's theses committees.

Currently, Dr. Tegegne is the PI on a project titled "Assessing Agricultural Entrepreneurship relating to Small Farmers in Selected Tennessee Counties." He is Co-PI on another project involving small farm diversification and agritourism. Dr. Tegegne has received the Distinguished Professional Award from the Southern Agricultural Economics Association and Excellence in Research Award from the Southern Rural Sociological Association.

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Anthony Witcher, Ph.D.
Assistant Professor, Nursery Production & Sustainability

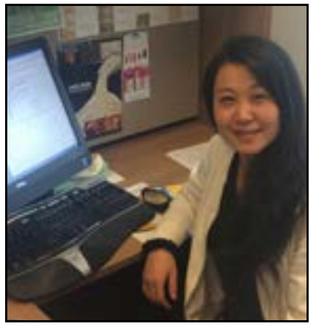
Dr. Witcher leads the nursery production and sustainability program at the Otis L. Floyd Nursery Research Center in McMinnville, and has been at TSU since March of 2015.

The focus of the nursery production and sustainability program is to address major issues in sustainable nursery crop production with an emphasis on weed management, crop nutrition, and alternative soil/substrate amendments. Results of this research will lead to a reduction of inputs in the nursery production system, thus enhancing the sustainability of the industry, improving the environment and broadening the market for Tennessee green industry products.

Current projects include evaluating alternative weed control methods for nursery crop propagation and production, managing herbicide resistant weeds in nursery crops, evaluating alternative substrate amendments for improved crop quality and reduced pesticide use, and screening new herbicides for crop safety and efficacy.

Dr. Witcher earned his B.S. and M.S. at Louisiana State University and his Ph.D. from the University of Southern Mississippi.

Research Faculty



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Ying Wu, Ph.D.
Associate Professor, Food and Animal Science

Dr. Wu's research team explores novel materials from various agricultural sources, and ways to utilize them into food systems for better quality and health benefits. The products developed using these novel food ingredients include health-promoting beverages, encapsulated phytochemicals or probiotics, or bakery products with nutritional and functional properties to prevent chronic diseases.

Various processing and analytical instruments are available in the lab for the cutting-edge research activities. The ongoing projects include:

1) *A study of health-promoting ingredients in pigeon pea and its application in food models.* In this project we have isolated and characterized protein and non-starch polysaccharides on their emulsifying properties and rheological characters. Her team also investigates the phytochemical profiles in pigeon pea and their anti-diabetic and anti-inflammatory effects. A high protein snack will be developed using pigeon pea flour as a major ingredient.

2) *Development of novel ingredients in hemp seeds.* In this project, the phytochemicals and macromolecules in hemp seeds will be investigated, and the isolated macromolecules will be utilized for encapsulation of essential compounds for extended shelf life and better bioavailability.

3) *Microencapsulation of antibiotic alternatives to enhance poultry performance.* In this project, various components such as essential oils and polyphenols will be encapsulated for controlled release in poultry intestinal tracts for inhibition of pathogen growth.

4) *Fabrication of advanced materials with controlled release properties using natural polymers.* In this project, different macromolecules isolated from various sources will be used for fabrication of micro- and nano-particles with controlled release properties.

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Suping Zhou, Ph.D.
Professor, Plant Genetics & Molecular Biology

Dr. Suping Zhou received her Ph.D. in Agronomy (Horticulture) from Nanjing Agricultural University, China.

Since joining Tennessee State University in 2000, she has received millions of dollars from research and teaching grants provided by federal and private sectors. Her research projects are mostly in the fields of Plant Biotechnology, using proteomics and genomics tools to identify important genes for tolerance to heat, drought conditions, and aluminum toxicity, and to develop tolerant plants able to thrive in those conditions.

Her lab also conducts research on microbial biotechnology focusing on developing new cellulase enzymes and biodegradable polymers. Together with USDA-ARS collaborators and her associates (post-docs, students and research associates), the Zhou's lab can provide expertise in the following areas: tissue and single cell type-based proteomics and genomics, tomato genetic transformation, metagenomics, proteogenomics, gene cloning, and PHB polymer production using microbial fermentation, isolation and identification of new bacterial strains and genomes.

Dr. Zhou teaches undergraduate and graduate classes.

Research Support Staff

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Research Support Staff

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Anonya Akuley-Amenyenu is a research associate in the College of Agriculture at TSU. She earned her B.S. and M.S. from Tuskegee University. Her current research is in water quality and horticulture production. She assists with the analysis of pharmaceuticals and TOC in surface water. She also assists with research pertaining to selected international and local vegetable and herb production. She has worked with multiple teams including AgriBusiness and Animal and Poultry Nutrition. She has published in respective peer-review journals. She assists in teaching undergraduate students and manages lab functions. She assists with grants, proposals and budgetary and contract reviews. She has served on the Staff Senate and several search committees.

Sherry Patterson Crudup
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Crudup joined TSU in 2001 and holds the position of Research Assistant II. She earned her B.S. in Agricuture Sciences from Tennessee State University. She also serves as the inventory specialist for the College of Agriculture.

Adeleke Ekundayo
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Adeleke works with principal investigators in the Soil Biochemistry/ Bioremediation and the Plant Molecular Genetics/ Breeding labs where he evaluates the potentials of soil microbial community diversity in enhancing bioenergy feedstock in degraded lands and the development of soybean mutagenic lines for traits screening and germplasm improvement. He earned his B.S. and M.S. in Microbiology from Obafemi Awolowo University in Nigeria. He joined TSU in 2012.

Shahidullah Chowdury
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Chowdhury is a research assistant in the Organic Agriculture Production and the Public Health Microbiology laboratory of Tennessee State University where he assists graduate students to complete their research projects in the laboratory environment as well as in research greenhouses and organic field. He is a member of the Institute of Food Technologists and International Association for Food Protection.

Jerzy Mierzwa, Ph. D.
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Dr. Mierzwa is an instrument research technician, lab manager and college coordinator for the Safety Committee. He earned his doctorate in Analytical and Physical Chemistry from Wroclaw University of Technology in Wroclaw, Poland. Mierzwa has taught and conducted research in Australia, Taiwan, Germany, and Japan.

Yvonne Myles
ymyles@tnstate.edu• (615) 963-2161

Myles is a research associatewho helps conduct experiments in cell biology, genetics, plant physiology, immunology and microbiology. She earned her bachelor's degree from the University of Alabama in Tuscaloosa. She joined TSU in 1988.

Paul O'Neal
poneal@blomand.net • (615) 963-2161

O'Neal is a research assistant providing support to the TSU Nursery Research Center Chemical Ecology lab. He assists with the execution of laboratory and field experiments investigating strategies to mitigate the impact of pest insects on Middle Tennessee's ornamental nursery industry. His duties include providing technical support with the preservation and identification of arthropod specimens, the maintenance of laboratory equipment, rearing plant and insect colonies, and helping prepare publications.

Alan Otey
aotey@tnstate.edu • (615) 963-6010

Alan Otey joined TSU in 2012 assisting in agroforestry and biomass plantation research at the Agricultural Research and Education Center in Cheatham County. Today, he also assist with the industrical hemp research program. Otey is a TSU graduate majoring in plant sciences. He has more than 35 years of experience in the turfgrass and landscape industry.

Our Labs

Animal Biotechnology
124 Biotechnology Building
PI: Dr. Samuel Nahashon

Plant Genetics & Genomics
138 Biotechnology Building
PI: Dr. Matthew Blair

Molecular Nutrition
234 Biotechnology Building
PI: Dr. Hongwei Si

Food Safety and Biosensors
103 CARP Building
PI: Dr. Fur Chi-Chen

Plant Genetics
214 CARP Building
PI: Dr. Korsi Dumenyo

Remote Sensing & Spatial Analysis
113 Farrell-Westbrook Building
PI: Dr. Clement Akumu

Plant Molecular Genetics & Breeding
124 Farrell-Westbrook Building
PI: Dr. Ali Taheri

Urban Forestry
125 Farrell-Westbrook Building
PI: Dr. De'Etra Young

Organic Agriculture
137 Farrell-Westbrook Building
PI: Dr. Dilip Nandwani

Animal Physiology & Genetics
210 Farrell-Westbrook Building
PI: Dr. Richard Browning

Phytopathology
125 Biotechnology Building
PI: Dr. Margaret Mmbaga

Bioenergy
223 Biotechnology Building
PI: Dr. Jason de Koff

Food Biosciences
240 Biotechnology Building
PI: Dr. Ankit Patras

Public Health Microbiology
112 & 114 CARP Building
PI: Dr. Aliyar Fouladkhah

Sensory Analysis
14 Lawson Hall
PI: Dr. Ramasamy Ravi

Biotechnology Research
201 Lawson Hall
PI: Dr. Christine Ondzighi-Assoume

Molecular Genetics & Biotechnology
121 Farrell-Westbrook
PI: Dr. Ahmad Aziz

Wildlife Ecology
125 Farrell-Westbrook
PI: Dr. William Sutton

Biogeochemistry & Climage Change
126 Farrell-Westbrook Building
PI: Dr. Jianwei Li

Bioremediation & Phytoremediation
207 Farrell-Westbrook Building
PI: Dr. Kudjo Dzantor

Modeling & Data Analysis
112 Farrell-Westbrook Building
PI: Dr. Bharat Pokharel

Plant Biotechnology
135 Biotechnology Building
PI: Dr. Suping Zhou

Environmental Soil & Chemistry
228 Biotechnology Building
PI: Dr. Sudipta Rakshit

Food Biomaterials
240 Biotechnology Building
PI: Dr. Ying Wu

Soil & Water Quality
207 CARP Building
PI: Dr. Sam Dennis

Agroforestry & Bioenergy
107A Lawson Hall
PI: Dr. Solomon Haile

Animal Genomics & Immunology
202 & 204 Lawson Hall
Dr. Yongming Sang

Plant Nutrtition
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PI: Dr. Dharma Pitchay

Water Resources
125 Farrell-Westrook Building
PI: Dr. Tom Byl

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PI: Dr. Kaushalya Amarasekare

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PI: Dr. Agnes Kilonzo-Nthenge

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(615) 963-6054
bphokhare@tnstate.edu

ENERGY, From page 16

We are also looking at how winter canola can fit into the existing ecosystem by monitoring the kinds of pollinators that are using the canola flower when it blooms in early spring. These flowers may provide an important source of energy and nutrients to these pollinators at a time when few other flowering plants exist.

• • •

Jason de Koff, Ph.D., is an award-winning associate professor who specializes in sustainable energy. He is currently working on a federal project that incorporates the use of drones for agricultural applications.

TAS, From page 3

resistance *Enterobacteriaceae* in plant-based milk."

Brent Newman earned Second Place in Zoology for his oral presentation on "Impacts of prescribed fire and forest thinning on tick populations and prevalence of tickborne diseases. Newman worked closely with the Vector Borne Disease Program at the Tennessee Department of Health.

"Our students did very well," said Dr. Bharat Pokharel, coordinator for graduate students. "It reflects the quality of research work they conduct here at TSU as well as the quality of mentorship they received from our faculty members. Our research work has received publicity and recognition among other institutions here at Tennessee."

Our Labs

Otis L. Floyd Nursery Research Center
McMinnville, Tennessee

Integrated Pest Management
118 Otis L. Floyd Nursery Research Center
PI: Dr. Jason Oliver

Nursery Production & Sustainability
163 Nursery Research Center
PI: Dr. Anthony Witcher

Insect Behavior & Chemical Ecology
111 Nursery Research Center
PI: Dr. Karla Addessso

Woody Ornamental Plant Pathology
147 Nursery Research Center
PI: Dr. Fulya Baysal-Gurel

REDDY, From page 32

What new challenges and/or adventures are you seeking to complete in your life today?

We have laid a firm foundation for the new College of Agriculture that came back strong at TSU after a 10- to 15-year hiatus. The College today has outstanding faculty, staff, and students. We have grown in graduate student enrollment, extension operations in the counties, research funding, research facilities, and undergraduate student enrollment. While that is worth celebrating, the challenge now is how do we leverage these new strengths and national recognition into a much robust college with more students and degree offerings? The new Farm Bill provides dollars for student scholarships in agriculture and that would be a great opportunity for us to recruit some outstanding students into our programs. More students in our programs would allow us to convert some of our current concentrations into degree programs.

The current leadership team has worked collaboratively and transformed the previously existed three-splintered and fledgling programs into one integrated Ag College that is considered to be a leader among the HBCU/1890 institutions. The College is unique within the HBCU/1890 community for its highly regarded governance policies and administrative structure. The team has won national recognition for its partnership with USDA and stewardship of resources. But many team members will retire in the near future. Replacing this team with capable and entrepreneurial leaders is another challenge. The College has also evolved in the last 10 years into more of a research enterprise requiring future leaders to be accomplished scholars so that they guide and mentor faculty and students. For the first time we also have considerable partnerships with industry and relationships with our stakeholders that need to be nurtured on a regular basis requiring the future leaders to be affable and tenacious personalities. In close collaboration and guidance from TSU President Glenda Glover and Interim Vice President of Academic Affairs Alisa Mosley, we will consider this as an opportunity to position the college to reach greater heights in future.

DR. CHANDRA REDDY

Calling all Alumni!

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- Promotion?
- Another degree?
- Strong opinion?
- Fond memory?
- Great story?

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Send info to jkite@tnstate.edu

Calendar of Events

March

04 | Spring Break
18 | Middle TN New Farmer Academy begins
22 | East TN New Farmer Academy begins
24 | TSU Day @Cheekwood Gardens

April

08 | Ag Week begins
10 | Week of the Young Child Community Event
12 | College of Ag Awards Luncheon
16 | Women in Agriculture Workshop
20 | Community Garden Meeting
25 | West TN New Farmer Academy begins

May

03 | Graduate Commencement
04 | Undergraduate Commencement
22 | East TN New Farmer Academy begins
27 | Memorial Day observed

June

13 | Dial Down with Diabetes Matthew Walker Health Center
17 | TSU/MNPS STEM Camp
24 | Dial Down with Diabetes Matthew Walker Health Center

July

04 | Independence Day observed
11 | Dial Down with Diabetes Matthew Walker Health Center

September

04 | TSU Extension Agent Showcase in The Barn
TN Agricultural Outlook Conference (AITC)
05 | TSU Small Farms Expo on the Campus Farm

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Joan Kite, AgLINK Editor

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TSU College of Agriculture is active on social media and invites you to join in the conversation. We want to hear your stories, thoughts and comments. Find us on Facebook, Twitter, Pinterest, and Instagram!