



Carmen Blubaugh joins UGA Entomology faculty

Dr. Carmen Blubaugh faced a tough decision a few months ago. Leave a successful and comfortable research appointment, an area which she loved and excelled in or pack her bags and come lead and grow an undergraduate program at UGA Entomology, a less familiar and more challenging mission, especially as most agricultural majors are shrinking in numbers nationally.

Safe. Challenging. Hmm.

She sat across from Dr. Kris Braman, UGA Entomology Department Head, who encouraged Carmen to consider the opportunities in the challenges.

“Over the coming years, I’d be confronting a bunch of grand challenges with my service learning students: food access, science literacy, human health, ecology restoration and regenerative agriculture.

These have always formed the core of my motivation as an agroecologist, but I’ve never had such an exciting invitation to lean into those chewier issues in my academic career,” Blubaugh said of the opportunity to join the faculty at UGA Entomology.

“It felt surprising and wonderful that my strength and knowledge in these areas were equally valued by this department as my grants and publications record. As soon as Dr. Braman helped me see my new role through that lens, I was on board,” said Blubaugh, excited about her new position as Assistant Professor.

Decision made. Challenge accepted.

This avid agroecologist was not born an entomologist but discovered ecological restoration during her undergraduate years while working to establish a native butterfly garden. She eventually became passionate about sustainable agriculture and local food systems and decided to leverage her obsession with complex insect food webs to help small farmers protect their crops.

And, her UGA research program will continue to support her obsession.

“I want to understand how and where we can best leverage biodiversity (whether it be soils, plants or insects) to promote biological pest control. . . really, I study the chaos in insect food webs!” she said, describing her continuing research.

So, what does future research look like according to Carmen?

“I’m curious about how nutrient availability and plant defensive chemistry interact to shape herbivore growth and predation among insects that vary in their diet specialization across multiple trophic levels. I’m also thinking a lot about how invasive pests and predators are restructuring agricultural food webs in the Southeast. Finally, I’m considering the interface between integrated weed management and insect pest management and hope to learn more about how to help new and beginning farmers prioritize their weed management efforts based on the varying competitiveness of their crops and the degree to which weed diversity buffers crops against herbivore attack,” she explained.

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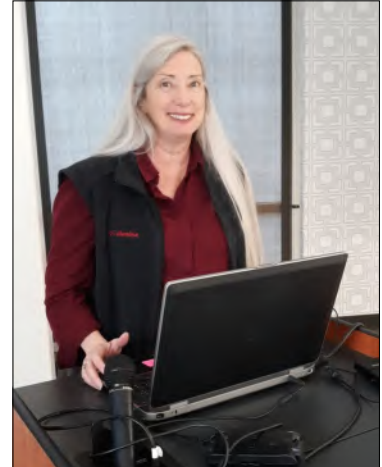
From the desk of S. Kristine Braman ...

This unprecedented time has presented numerous challenges for our UGA Entomology Department faculty, staff and students. It has, however, been inspiring to see our faculty quickly pivot to online instruction, develop and implement hybrid models and devise creative methods to teach their labs and engage in active and service learning in a remote environment. Equally inspiring has been watching our students reach out and support each other during this stressful time. Silver-linings abound. We are becoming experts in webinars and virtual field days to remain in touch with our clientele.

Our student numbers are up and we are celebrating student awards and a number of successful student defenses this semester. Virtual ESA was a new experience. We appreciate all the effort that went in to making that event and our presentation options possible. We are very proud of our Double Dawg, Michelle Samuel- Foo as she delivered her outstanding Founders' Memorial Lecture and look forward to her continued leadership in ESA's South Eastern Branch.

We welcome Dr. Carmen Blubaugh to our department in an exciting new role in Teaching and Research. Carmen brings tremendous energy and vision already impacting our students in her role as undergraduate coordinator. Keep your eye on our evolving departmental web page for updates! We are also so pleased to welcome Mary Kate Rubin as Business Manager and Bradley Mackett as Research Technician.

We are so proud of our faculty, staff and students that you will see highlighted in this issue. Congratulations to **Angelita Acebes, Ash Sial, Brett Blaauw, Shimat Joseph, Don Champagne, Trish Moore, Will Hudson, Jason Schmidt, Jean (Tzu-Chin) Liu, Pin-Chu Lai, Gabrielle LaTora, Charles Gruver** on their awards! It is great to see your hard work recognized!



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ESA Student and Staff Winners

Jean (Tzu-Chin) Liu, PhD student, received **First Place** in the Poster Competition

Jean's research is directed by Brett Blaauw

Pin-Chu Lai, PhD student, received **Second Place** in the 10-minute paper competition

Gabrielle LaTora, research professional, received **Second Place** in the 10-minute paper competition. Both Lai and LaTora are in Babu Srinivasan's research laboratory.

The 2020 UGA Entomology Games Team consisting of Fawad Khan (captain), Kyle Slusher, Gurjit Singh and Mdhula Gireesh competed valiantly during the competition. Despite months of preparation and practice, the team did not make the final cut for the 2020 national games. Competition was tough this year and we are proud of our team's effort!

The best way to predict the future is to create it. — Abraham Lincoln

Blubaugh from page one



Blubaugh lab members Nick Lyon, Katherine Hagan, Carmen Blubaugh, Cristiana Huff and Grace Won

To handle this scope of research, Blubaugh has immediate priorities to recruit “an awesome team of graduate students” to help with her “big sustainable agricultural agenda.” To date she has three graduate students on board so far getting ready to start some “cool projects.” Blubaugh is also excited about getting to know the undergraduate students, even though Covid-19 has created a challenging environment for social interaction.

“It hasn’t been easy to engage the way I like to during Covid, but I have big ideas for some exciting entomology service projects in the spring,” Blubaugh said, adding she truly hopes to

help them develop a supportive and productive community through the service-learning course.

Yet, this energetic, joyful scientist who loves research and teaching perhaps finds the most satisfaction from experiencing simple understanding of the relevance of her work from others.

“It’s a total thrill to successfully articulate for students and/or farmers why what I’ve learned is so incredibly cool. I can’t always get people on board, but when someone shares a deep enough understanding to appreciate why a discovery is important, that’s everything,” she said.

Yes, it is.

Welcome to UGA Entomology Dr. Carmen Blubaugh.

Faculty Grants Awarded

SCRI: Flatheaded Borer Management in Specialty Tree Crops—UGA received **\$529,349**. Co PI Entomology: **Angelita Acebes, Shimat Joseph, Brett Blaauw**.

Southern SARE: Pecan Hedge-pruning: A Sustainable Management Option for the SE US. **\$299,892.39** PI: **Angelita Acebes**, co-PI **Jason Schmidt** and **Will Hudson**, with other UGA and USDA collaborators.

Southern IPM Center: IPM Working Group to Address Ambrosia Beetle Issues in Tree Fruit, Tree Nut and Nurseries in the Eastern and Southern US. **\$24,893**. PI: **Angelita Acebes**, co-PI: **Shimat Joseph, Brett Blaauw**

Pecan Commodity Commission: Extension: Production of Pecan Calendar Management Guide for Growers, Research: Maintenance of the Experimental Orchard at Ponder Farm and Investigation on the Effectiveness of Common Management Options for Ambrosia Beetles in Pecans **\$27,000** PI: **Angelita Acebes**, co-PI: **Will Hudson**

USDA National Institute of Food and Agriculture: Molecular basis of insecticide resistance in the Diamondback moth *Plutella xylostella* (Lepidoptera: Plutellidae) in Georgia and Florida, USA. **\$323,834**. **Donald Champagne (PI), David Riley, Alton (Stormy) Sparks**

USDA/AMS 2020 Specialty Crop Block Grant Award: Biology and Management of Redheaded Flea Beetle in Nurseries. **\$70,000**. **Shimat Joseph**

\$5.4 MILLION NIFA GRANT AWARD



By Emily Cabrera, IPM Communications Coordinator

The University of Georgia College of Agricultural and Environmental Sciences (CAES) has been awarded a \$5.4 million grant by the U.S. Department of Agriculture's National Institute of Food and Agriculture to develop long-term, sustainable methods for controlling the spotted wing drosophila (SWD).

Native to Asia, SWD is a tiny fly that was first detected in California in 2008 and has since emerged as a devastating pest of small and stone fruits throughout the U.S., valued at \$5.8 billion in damage annually. It affects soft-skinned fruits such as blueberries, blackberries, raspberries, strawberries, cherries and others.

Blueberry entomologist and coordinator of the UGA Integrated Pest Management Program, Ashfaq Sial is leading a multi-state team of researchers from 10 land-grant universities and

the USDA to develop and implement long-term sustainable strategies to control SWD.

The pest has caused blueberry crop losses of up to 20% annually. Blueberries are Georgia's top fruit crop and ninth-largest agricultural commodity with an estimated \$300 million in value, according to UGA agricultural economists.

This project builds on previous work to develop control strategies in response to the crisis situation created after the detection and widespread distribution of this devastating invasive pest in all fruit-growing regions of the U.S. The team made substantial progress by refining monitoring tools, developing effective insecticide-based management programs, identifying effective cultural controls, and screening native and exotic biological control agents to address the drosophila invasion.

"The progress we've made is great, but SWD management is still highly insecticide dependent and is further challenged by secondary pest outbreaks, insecticide resistance and increased input costs," explained Sial. "Because SWD has become established as a keystone pest throughout the U.S., it's critical to develop more sustainable strategies to manage it."

The goal of this new project is to pivot away from crisis response to build a long-term, integrated and systems-based approach to managing SWD. The team will work with region- and crop-specific teams of growers to implement best management programs, evaluate alternatives to insecticides, assess and reduce the risk of insecticide resistance development, and develop and disseminate actionable recommendations that enable producers to optimize pest management decisions for sustainable SWD management. They will also develop economically based decision aid tools to increase profitability and evaluate the impact of these initiatives.

The team aims to develop and deliver systems-based integrated management programs to berry and cherry growers that are cost effective and environmentally sustainable for long-term management of SWD in the U.S. Ultimately, implementing these solutions will directly contribute to the long-term profitability and sustainability of farms and farmers nationwide.

Joining Sial on this project is Kay Kelsey, a professor and evaluation expert in the CAES Department of Agricultural Leadership, Education and Communication. Other collaborators and their institutions include Hannah Burrack, North Carolina State University; Kent Daane, University of California Berkeley; Rufus Isaacs, Michigan State University; Greg Loeb and Miguel Gomez, Cornell University; Cesar Rodriguez-Saona, Rutgers University; Philip Fanning, University of Maine; Elizabeth Beers, Tobin Northfield, Karina Gallardo and Gwen Hoheisel, Washington State University; Vaughn Walton, Oregon State University; Joanna Chiu and Frank Zalom, University of California Davis; and Kim Hoelmer and Xingeng Wang, USDA Agricultural Research Service in Newark, Delaware.

To learn more on pest management strategies and research, visit site.extension.uga.edu/ipm.

Grant supports diversity initiatives

By Michele Hatcher

Dr. Patricia Moore is passionate about teaching, just ask her students in her classroom or lab.

Maybe even more importantly, she is passionate about access to higher education for all deserving students, especially those from underrepresented groups who



think maybe there isn't necessarily a welcoming place for them anywhere. But she knew her lab and others at UGA Entomology would be an ideal home for all students as ongoing diversity efforts continue here in the department.

Dr. Moore went to work to fund her education mission and found a grant that went right to the heart of her work. She was awarded the **USDA NIFA National Needs Fellowship**, a program designed to support the training of new students at the master's and doctoral levels in order to fill nationally identified expertise shortage areas in Food, Agricultural, Natural Resources and Human Sciences. It was also created to increase the number, quality and diversity of students in the food, agricultural and related sciences by recruiting outstanding students, particularly those from traditionally underrepresented groups to enter and complete graduate training in these areas.

"Given that a specific objective of this grant was to recruit diverse graduate students, it made us think creatively and broadly about identifying excellent candidates who also met a diversity target," Moore said of her recruitment efforts after receiving the grant.

"Our department does relatively well around the diversity of our graduate students and this Fellowship builds on our ongoing efforts in this area," she added.

But Dr. Moore said the long-term efforts of the grant will have positive effects for all students, not just those receiving the fellowships.

"I think the biggest impact is in focusing our attention on how we create an environment where all students can be successful. The initiatives built into the Fellowship around mentoring and exploring potential career options were developed after exploring data on how to promote an inclusive department," Moore emphasized.

"Ultimately, these initiatives will benefit all our students as the research tells us that diversity in the workplace improves critical thinking and decision making," she said.

To date, the program has attracted four outstanding students who began their programs this fall and one more will start in the spring.

"On the diversity front, we have recruited 3 PhD Fellows and 2 MS Fellows. Two of the Fellows are Black, three are women (underrepresented in Entomology), several are 1st generation college students and one is returning to agricultural sciences after time in the workforce," Moore explained.

The students' programs are focused on insect-microbial interactions and on the need to increase communication across the basic science, and industrial application of scientific discoveries. One highlight of the program in Entomology is the project placements that all Fellows will participate in in order to build bridges between CAES and industrial and governmental partners.

With the building blocks in place, Moore sees a bright future for her students and hopefully, future students in the UGA Entomology program.

"I am extremely pleased with the quality of the students we have attracted. Allen Moore (CAES Associate Dean) and I have been teaching a special topics course with the Fellows this semester and they have proved themselves to be a lively, thoughtful and motivated group. I am looking forward to continuing to work with them as they move in their graduate careers and onwards," Moore said, expectantly.

Entomology faculty, students, alumni discover distinctive supergene in fireants

By Sean Montgomery for CAES News

A unique study conducted by University of Georgia entomologists led to the discovery of a distinctive supergene in fire ant colonies that determines whether young queen ants will leave their birth colony to start their own new colony or if they will join one with multiple queens. Researchers also found that ants were more aggressive toward queens who don't possess the supergene, causing colony workers to kill them. This critical finding opens the door to new pest control methods that may be more efficient in eradicating problematic fire ant colonies.

"Learning about the way fire ants behave is very important baseline information," said **Ken Ross**, a longtime professor of entomology at the university. "This information is key to helping us manage pest populations and predict what dissimilarities can happen in their environment."



A supergene is a collection of neighboring genes located on a chromosome that are inherited together due to close genetic linkage. Studying these unique genes is important to understanding the potential causes for differences among the social structure of fire ants, specifically for controlling the species and building upon the existing knowledge base.

Researchers focused on young queen fire ants embarking on nuptial flights. They compared the supergene's impact on the fire ants' two primary types of social structures: monogyne, which is reproduction from queens that form a new nest, and polygyne, reproduction from queens that join an existing nest.

Ross initially worked alongside colleagues in his lab to discover a remarkable example of genetically encoded differences in social organization within the fire ant species *Solenopsis invicta*. The next step was to understand how these genetic differences result in complex behavioral and physiological variations among ants from single queen colonies versus colonies with multiple queens. Compounding this knowledge helps scientists further understand patterns of development in the species, increasing alternatives to combat invasive populations.

Led by a pair of UGA entomology graduate alumni, **Joanie King**, who earned her master's degree in 2017, and **Samuel Arsenault**, who earned his doctoral degree in 2020, the team developed an experimental design that utilized a collection of samples from two fire ant organs — brain and ovarian tissues — and the complete range of social chromosome genotypes and social forms within this fire ant species.

The innovative study incorporated various scientific methods, leading to a collaboration of tools and resources throughout many different areas of the institution.

"UGA was a very supportive environment to conduct this research," said **Brendan Hunt**, associate professor of entomology. "We received help preparing samples for RNA-sequencing from Dr. Bob Schmitz's lab in the Genetics department, performed the sequencing at the Georgia Genomics and Bioinformatics Core, and utilized computational resources from the Georgia Advanced Computing Resource Center to analyze the data."

These types of student-led projects give young researchers the chance to grow in a hands-on environment with mentorship and guidance from scientists with proven track records in the field.

"The graduate students gained experience that helped them transition to the next stages of their careers," said Hunt. "Both have gone on to continue their studies of ant genetics."

After earning their degrees and completing the research at UGA, King began pursuing a doctorate at Texas A&M University to study alongside Edward Vargo, and Arsenault works as a postdoctoral researcher with Harvard University's Buck Triple Lab.

To read the full published research, check out the [Wiley Online Library](#) digital archive. For more information on the UGA department of entomology, visit ent.uga.edu.

NEW FACES IN THE DEPARTMENT

Mary Kate Rubin recently joined the staff in the Athens Entomology office as Business Manager for the department. While she considers herself to wear many different hats in her job, she primarily sums up her job duties as relating to “all things within financial and budget management.” She has been an employee of UGA and CAES since July 2018, and as of recently, she comes to us after two years as the Finance/Grants Accountant in the Department of Agricultural Leadership, Education, and Communication (ALEC).

Having earned both her bachelor’s and master’s degrees in Agribusiness from CAES, MK’s love of both CAES and the University began long before she became an employee. She is originally from Cave Spring, GA – a small, quiet town located 70 miles northwest of Atlanta. It’s in this tiny town that MK grew up on a dairy farm, later converted to a row crop operation that is still running to this day. Her father and uncle both received their degrees in Dairy Science from UGA, and have long instilled Bulldog Pride to the whole family.

MK has been married for one year to her husband Josh, who is also a staff member in CAES. Their favorite adventure thus far in married life has been traveling to Rome, Italy and Vatican City. During pandemic times, they bought a house in Colbert, GA where they are now enjoying settling in and making it their home. Despite a childhood immersed on a farm, MK has never been the biggest fan of bugs. Since moving in, she has had to call upon Josh to rescue her from many insect crawlers that have made themselves a little too comfortable indoors despite the amount of outdoor space surrounding her house as she likes to point out. However, MK quickly has gained a newfound appreciation for some of these domestic dwellers since joining Entomology!



Bradley Mackett joined Kevin Vogel’s lab as a Research Technician where he assists in the research of kissing bugs’ physiology and symbiosis. He graduated from the University of Georgia in May 2020 with a Bachelor of Science degree in Biology. Previously, Bradley worked in the Entomology department as a student assistant in Dr. Michael Strand and Dr. Gaelen Burke’s labs where he reared *Microplitis* colonies. In his spare time, Bradley likes to make his way up to North Georgia where he enjoys hiking, rock climbing and paddle boarding. If not traveling up north, you can find him at Active climbing, slacklining in Dudley park or running on the trails behind Lake Herrick. And when he wants to slow down just a bit, he enjoys reading psychological thrillers and working in his garden.

Entomology welcomes Mary Kate and Bradley!





Gruver named Award of Excellence Winner

Charles Gruver was selected the 2020 Award of Excellence Winner for technical support on the Tifton Campus. Charles has worked in the Vegetable Entomology Research Laboratory (VERL) under David Riley since 2015 as a Tech III. Charles has done an excellent job over the last five years as indicated by the high marks in his annual job performance evaluations. His work on diamondback moth toxicological bioassays has resulted in two submitted publications, one of which he is a co-author, Riley, D.G., H. Smith, J. Bennett, P. Torrance, E. Huffman, A. Sparks, Jr., C. Gruber, T. Dunn and D. Champagne. 2020 Regional survey of diamondback moth response to critical dosages of insecticides in Georgia and Florida. *J. Econ. Entomol.* (submitted March 2020). As indicated by the author list and the 5-year length of the study, Charles does an excellent job coordinating multiple graduate students and making sure the job gets done even over long-term projects like this one.

Charles gets high marks on his positive attitude and ability to calm people down in stressful situations. He is not only an excellent people-person, he is an entertainer. Partly due to his love for public events, he finds time for his music band that he operates on certain weekends. He played his drum set for the last UGA Tifton Campus Christmas breakfast and was complimented by many of the Tifton Campus employees.



Congratulations to Dr. Michael Arvin after a successful dissertation defense! Michael was a PhD student under the direction of Dr. Michael Strand. His title was "Characterization of structural and replication genes in *Microplitis demolitor* bracovirus."

Beautiful flowers provided by a very proud mom!



An informal hooding ceremony was held in the courtyard of the biological sciences building to celebrate **Dr. Kelsey Coffman's** successful defense of her dissertation. Since no formal graduation ceremonies will be held this semester, Dr. Gaelen Burke did not want the moment to pass without a little pomp and circumstance. . . with masks and social distancing, of course!

Recent student publications



Gabriela Cardona-Rivera has recently had a paper accepted for publication in the volume 56 in 2021 of the Journal of Entomological Science. The work is titled "Wetlands provide a source of arthropods beneficial to agriculture: A case study from central Georgia, USA." It is co-authored by Brittany Clark, Dr. Joseph McHugh, Dr. Bryana Bush and Dr. Darold Batzer. Gabriela is a PhD student under the direction of Dr. Darold Batzer. The abstract said, "We described the overlap of arthropod communities between agricultural lands and adjacent wetlands using transect sampling, to determine if these juxtapositions might be influencing abundances of beneficial arthropods in agricultural lands. We further assessed experimentally whether these beneficial arthropods migrating from wetlands may potentially enhance crop productivity. Large numbers of predaceous carabid beetles and spiders moved from the wetlands into the agricultural lands; both of these groups can be important to biological control of crop pests. However, our exclusion experiments did not detect significant impacts of these predators on herbivorous insects or on crop productivity. Numerous studies have established that natural habitats adjacent to crop lands serve as refuge to beneficial arthropod communities and enhance overall biodiversity. Wetlands adjacent to agricultural lands appear to serve the same function. Our study suggests that wetlands may provide the ecosystem service of enhancing numbers of arthropods beneficial to agriculture, a service not established previously, and a factor that may motivate farmers to conserve wetlands that they own."



Emily Shelby, first year PhD student in Dr. Patricia Moore's lab, published a review paper for the special issue *Improving Whitefly Management* in the journal *Insects*. The review paper, titled "Debugging: strategies and considerations for efficient RNAi-mediated control of the whitefly *Bemisia tabaci*," was written in collaboration with Dr. Jen Moss, Dr. Sharon Anderson and Dr. Alvin Simmons. Dr. Allen Moore and Dr. Patricia Moore. The abstract states: The whitefly *Bemisia tabaci* is a globally important pest that is difficult to control through insecticides, transgenic crops, and natural enemies. Post-transcriptional gene silencing through RNA interference (RNAi) has shown potential as a pest management strategy against *B. tabaci*. While genomic data and other resources are available to create highly effective customizable pest management strategies with RNAi, current applications do not capitalize on species-specific biology. This lack of specificity has the potential to have substantial ecological impacts. Here, we discuss both short- and long-term considerations for sustainable RNAi pest management strategies for *B. tabaci*, focusing on the need for species specificity incorporating both life history and population genetic considerations. We provide a conceptual framework for selecting sublethal target genes based on their involvement in physiological pathways, which has the greatest potential to ameliorate unintended negative consequences. We suggest that these considerations allow an integrated pest management approach, with fewer negative ecological impacts and reduced likelihood of the evolution of resistant populations.

SNAPSHOTS



Undergraduate Student Spotlight

Emma Grace Crumbley

Like most undergraduates, I struggled my freshman year to choose what I wanted to study. I have always had a keen interest in science and music, but rather than declaring a major right away in either discipline, I took my freshman year to explore my interests as I completed my core classes. Ecology, public health, and even theatre were all contenders in my quest to find my perfect major. However, it wasn't until I took my first class with Dr. Shockley that I knew for certain what I wanted to study. "Insects in Culture," a class designed to analyze how entomology translates to societal advancements through design, fine arts, cuisine, and technology, completely changed my perception of the possibilities within this field. In this course, I discovered the direct applications that entomology has to public health and medicine, and I realized that this was a field I wanted desperately to be involved with.

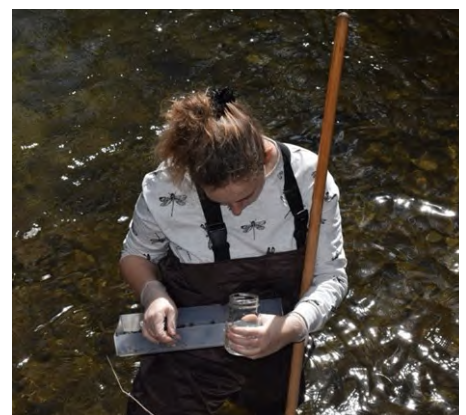
Not long after taking this course, Dr. Shockley reached out to me about an opportunity to work in the UGA Insect Zoo, an insect husbandry lab with an emphasis on entomology-related outreach and education. My responsibilities in the Insect Zoo would include the rearing and upkeep of several insect colonies, both native species and exotic species, as well as the construction of informational insect exhibits, giving

demonstrations of insect handling at various community outreach events, and on occasion leading tours of our facility and current specimens to prospective entomology students. It was a perfect fit for me!

Since I began working in the Zoo my sophomore year, I have had the pleasure of working under the guidance of Dr. Shockley, Jena Johnson, and Dr. Braman as we continue to improve the Insect Zoo as an integral part of the UGA Entomology Department. Our mission at the Insect Zoo is to foster a genuine interest in entomology and science by creating exciting, interesting, and engaging presentations that audiences of all ages and scientific backgrounds can enjoy.

Outside of the Zoo, I have enjoyed my time at UGA as a full-time student on the pre-medical track double-majoring in Entomology and Applied Biotechnology. I am also an active member of the UGA Redcoat Marching Band where I serve as a Rank Leader for the Sousaphone Section, as well as member of the Iota Zeta chapter of Sigma Alpha Iota, an international, professional music fraternity for women. I

currently plan to graduate this coming spring, and I will be taking the MCAT in the months following. Though my plans immediately after graduation are still a bit uncertain, my goal is to merge my interests in entomology and medicine in order to study arboviruses and eventually work as a medical research entomologist.



Katherine Hagan

As a kid growing up on a farm in western Kentucky, I was interested in the natural world and animals of any kind, but it was not channeled to the world of entomology until my undergraduate program at Centre College in Danville, Kentucky. Charged with an exploratory project, I wanted to investigate the possibility of dorm room beekeeping. Thankfully from an administrative perspective (and mine if we're being honest), the risk of bee allergies and potential for catastrophe prevented me from pursuing keeping bees in the dorm, and I quickly switched to a beekeeping blog where I delved into the biology of honey bees and the world of beekeeping.

The curiosity I had as a kid about the natural world, was revamped into hours spent reading and learning about bee species of any kind, but nothing kept my interest like honey bees. The culture of the beekeeping world and the biology of honey bees, particularly the social behavior, blew my mind. Although there are roughly 60,000 individuals in one hive, honey bees work together and coordinate their behavior to function as a group. Not only that, but humans have been working closely with bees for over 10,000 years, which makes for a rich history of honey bee research.

Following this independent project, I followed my interest in entomology through internships with the University of Kentucky, National Park Service, American Museum of Natural History, and New York Botanical Gardens. Entomology also accompanied me to a study abroad in Merida, Mexico,

where I learned about the revitalization of stingless beekeeping following the introduction of Africanized bees in the Yucatán. An accumulation of these experiences as well as the strong mentors in my life, including UGA Batzer lab alum Dr. Mark Galatowitsch, encouraged me to pursue entomology at the graduate level. The extensive outreach of Dr. Keith Delaplane and Jennifer Berry first attracted me to UGA, and Dr. Delaplane's interest in social evolution and the role of honey bee queen mating moved it to my first choice.

While at UGA, beekeeping has taken me into contrasting environments from elementary schools to prisons. I have met some of the kindest and greatest people I know, including the Lewis Bartlett and Jack Garrison, who I get to work with every day. As my time at UGA is ending, I will fondly remember the terror of Dr. Brown's Insect Physiology course, the excitement of late-night insect collecting on the Sapelo trip with Dr. McHugh, back to school parties, the kindness of the office staff, and departmental happy hours at Little King's. Although honey bees got me here, it is the people that make it so hard to leave. I will forever be grateful for UGA Entomology and the strong mentors in my life.



Joseph Taylor

As a young kid I was always fascinated by science. With an imagination fueled by educational shows like the Magic school bus and some less than education ones like Dexter's Laboratory, I wanted to figure out how everything worked and how it all fits together. For the majority of my young life that interest had no specific focus but eventually it coalesced the natural world and understanding the diverse animal species across the planet and the way they interacted. However, my path towards studying insects specifically was mostly accidental.

My undergraduate university, Washington and Lee, was a small liberal arts schools, however despite its small nature there were several opportunities for participation in research. As someone interested in zoology I was somewhat dismayed to find that nearly all of the biology faculty with open research projects were exclusively medical focused with two exceptions: A spider lab looking at key proteins in spider silk and Dr. Larry Hurd's lab studying the ecology of the Chinese mantis, *Tenodera sinensis*. While at the time I didn't have any particular interest in insects I thought the idea of helping with any kind of ecology research would be a fantastic starting point and that I would naturally progress beyond insects as time moved went on. The labs overall goals were to quantify the changes in diet of *T. sinensis* changes as it matures and grows in size using a technique known as stable isotope analysis (SIA) which allows for quantifying the food webs (basically measuring the composition of the nitrogen and carbon in an organism and comparing it to diet items in the field in order to reconstruct diets. The project required a lot of field collecting of insects as well as an equal amount of lab work to prepare and run SIA.

It was hard work, but I felt that same excitement I had when learning about science in grade school, except now the purpose was to further human



knowledge rather than simply satisfying my curiosity. In fact, the more I worked with Dr. Hurd, the more I delved into praying mantids and the various insects that comprised their communities, and the more I fell in love with insects as research subjects. I took this newfound enthusiasm and what I had learned from working in Dr. Hurd's lab with me into my graduate career in Dr. Bill Snyder's Agroecology lab. Rather than *T. sinensis*, the focus of my research is now a the common black ground beetle *Pterostichus melanarius*, which is a common generalist predator which has long been the subject of various biological pest control studies. However, as it is rather large (over 12mm) and omnivorous there is some concern that it can interfere with biological controls efforts just as much as it contributes. The focus of my dissertation, which I recently got funded by a National Institute of Food and Agriculture (NIFA) grant, is to combine SIA, DNA based diet analysis and on-farm surveys to create a realistic picture of the diet of *P. melanarius* to determine it's real world biological pest control efficacy as well as to determine what growers can do to maximize it's benefits why limiting its detrimental effects. I find the combination of field work (plant surveys and insect collections) and lab work (SIA and molecular diet analysis) to be constantly engaging and the fact that my research can yield practical applications as well as furthering pure ecology is icing on the cake.

Dr. Ardina “Andrea” Pruijssers is part of the research team that has developed one of the vaccines developed to protect against COVID-19. Andrea studied wasp viruses under the direction of Dr. Michael Strand in the Entomology department and graduated from UGA with her PhD. The following article in the New England Journal of Medicine lists her as an author and you can read about the critical vaccine development work of which she has been a part. https://www.nejm.org/doi/full/10.1056/NEJMoa2022483?query=featured_home&fbclid=IwAR03Ku-tZSwKM17xKuJ-zBjzshoOmpeToROTLLeDN0gXAL-P5L0wDbGZZPo

Currently, Andrea is a research assistant professor at Vanderbilt University Medical Center and lead antiviral scientist in Dr. Mark Denison's lab. According to an article in the *CUMC Reporter*, this lab played a key role in the development of the drug remdesivir, the first drug approved by the U.S. Food and Drug Administration for the treatment of COVID-19.

Prujssers is quoted in the article saying, “We started this work years ago knowing that, with no therapeutics on the market to treat coronavirus infections, we would be in trouble if a pandemic hit. We are now developing additional drugs to battle COVID-19 and to be better prepared for future pandemics.”



Dr. Andrea Pruijssers



Dr. Eirka Niland

UGA Entomology is proud to have highly trained graduates from our program working daily in critical research roles. We are especially proud of Andrea and her research team as their efforts will save lives around the world.

Dr. Erika S. Niland, Ph.D , has recently been named the chair of the Biology Department at Wingate University in North Carolina. Erika received her master's degree in entomology from UGA under the direction of Wayne Gardner. **CONGRATULATIONS!**



Michelle Samuel-Foo A voice of encouragement, a force for change

By Emily Cabrera, IPM Communications Coordinator

For Michelle Samuel-Foo (BA – Biology, 00'; MS – Agronomy, 03'; PhD – Entomology, 08') the quest for more has its roots in the agricultural fields of her island home where as a child of subsistence farmers she helped her parents from preparation to harvest and honed skills that set her course for becoming a leader and change-maker in the field of agricultural academia.

Growing up in the small village of Sangre Grande, a rural part of Trinidad and Tobago, a small Caribbean island just north of Venezuela, opportunity and success whether in the fields or the classroom, wasn't something that came easy to people in her family – it

had to be earned through diligence and unyielding motivation.

So, Samuel-Foo got to work graduating high school amongst the top of her class and then used that same motivation to be the first and only one of her family of seven children to attend college.

"Growing up, we were poor, we didn't have a lot of extras," Samuel-Foo said of her upbringing. "My dad had little formal education but I saw how hard both he and my mother worked for all of us. I knew that I wanted an education and a different way of life... I didn't know what that would be, I just knew I wanted my name to be associated with excellence."

Shortly after graduation, Samuel-Foo attended a college fair in Port of Spain Trinidad, sponsored by the US Embassy, and was offered a scholarship to study in the US based on her SAT scores. Within three months, Samuel-Foo had left her island home and landed in rural Georgia to embark on a decades-long educational journey where she took courses in crop and soil sciences and entomology that expanded her mind and was continually blessed by her faculty mentors, Dr.'s Jerry Johnson, Roger Boerma and John All, who recognized her potential and encouraged her to keep pushing the boundaries.

As she was finishing her PhD program at the University of Georgia, she found a job posting for an IPM position at the University of Florida's Institute of Food and Agriculture and knew she would be the perfect fit.

"I remember sitting in my interview and being asked by the director 'When Georgia plays Florida, who will you root for?'" recalls Samuel-Foo. "Without fully understanding the significance of this historic rivalry, I naively said 'Oh definitely Georgia!', and guess what – they still hired me!"

Over the next ten years, Samuel-Foo served as the Southern regional coordinator for the IR-4 program, an initiative sponsored by USDA to procure chemical registrations for growers of specialty crops in the US. Her jurisdiction was the 13-state southeastern region, plus the territory of Puerto Rico.

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Hexapod Herald Subscriptions

Editor Michele Hatcher

The Hexapod Herald will be issued in **Spring, Summer** and **Winter** of each year. We ask that you share this issue with friends and neighbors, and anyone who is interested in UGA Entomology. Due to printing & mailing costs, a limited number of hard copies will be produced & mailed. Electronic subscription is preferred. To subscribe to the Hexapod Herald, contact us



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Welcome **Maisy Durkin**, our newest zookeeper at the UGA Insect Zoo. She is a freshman Entomology major from Gainesville, GA whose favorite insect is the Eastern Hercules Beetle. But she loves all mantids! In her "spare" time Maisy enjoys being a member of the UGA Red Coat Band.



"This was unlike any job I'd ever imagined," she said, "I had to be show ready in every way because here I was, a young, Afro-Caribbean woman trying to earn the trust of important stakeholders and represent their needs at national events and workshops. I had to convey my competence in agronomy, entomology, pathology, weed science – you name it – as the ability to procure the registrations that our growers needed depended on my ability to understand the issues and advocate convincingly. And while some would have been intimidated by this, I saw it as a challenge, and sometimes you just have to grab the bull by the horns, do your best and let your work stand for itself."

Needless to say, the hard work and extensive amount of travel over those ten years meant that Samuel-Foo had to make tough sacrifices in her personal life. Now with three young boys at home, she was ready for a change of pace.

Now as a Director of Research at Alabama State University, Samuel-Foo is focusing her attention on establishing roots to strengthen the historically black college by engaging the campus community and building stronger ties with local African American farmers who aren't familiar with Extension. She hopes to bring ASU, as a non-land grant university, into the regional sphere of conversation and research efforts in agriculture.

And yet, while she loves teaching and research, Samuel-Foo says the ultimate vision for her future is to move into college administration, where she can influence policy that will positively impact all students, but especially minorities.

"I want to rupture the stereotype among minorities that a career in agriculture means you are resigned to only occupy positions that require hard, laborious work. There is meaningful work in the fields of agricultural engineering, product development, research, education, leadership and so much more, and I want to help make these paths more accessible," she said of her future goal.

Michelle Samuel-Foo may have come from humble beginnings, but it was in those fields in Trinidad that she developed the strength to persevere. Now in the field of academia, she hopes to be heard as a voice of encouragement for anyone who thinks they are at a disadvantage.

"I never had the formula for success, but I never felt sorry for myself and I never told myself I couldn't succeed. I honestly believe - and say it all the time - that you have to take the initiative, even with the smallest of tasks. Whatever it is, do it to the best of your ability and you will be rewarded for it – someone will notice."

Calendar Reminders

December 11 — Lund Club Silent Auction

December 11-17 — Final Exams

December 18— Undergraduate Commencement

December 25-31— UGA Holiday for faculty, staff and students

January 1 — UGA Holiday

January 18 — UGA MLK Holiday

You are never too old
to set another goal
or to dream a new
dream.
C. S. Lewis

We don't mean to bug you but . . .



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Dr. Joe McHugh's taxonomy students spend time night collecting

In spite of the darkness of 2020, UGA Entomology has been shining its light of research, teaching and extension