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It's been a joy and an honor for me to serve as Interim Dean of Ecology during the past year, and to work with the Odum School community to strengthen our academic programs, scholarly research, and public engagement. For more than five decades, the Odum School of Ecology has led the boundaries of discovery in ecological science, trained future generations, and developed innovative solutions to environmental problems. Over the past year we have grown and branched out in new areas, adding faculty and staff, increasing enrollment, and updating our building and technology to enhance our teaching and research activities. Today the Odum School is poised to develop new opportunities for alumni engagement and networking with current and former students. We are launching new fundraising efforts targeting graduate student summer scholarships and support for students working in Costa Rica. As we look to the coming academic year, the **Odum School is stronger than ever, and our future is bright.**

Despite these successes and opportunities, our deepest values and determination continue to be tested. It's been said many times during the past two years: we are living in extraordinary times. Nearly every day, we are reminded of the ongoing global pandemic, the increasingly dire consequences of climate change, the war in Ukraine, economic stressors, mental health pressures, and social injustices. Against this backdrop, the **Odum School community has pressed on with our core mission.** This mission has never been more important than it is today. In reviewing the articles for this year's *EcoVoice*, I'm reminded of the profound research discoveries by Odum School ecologists, our commitment to learning and student engagement, and our focus on making the world a better place. Much has changed in the Odum School of Ecology during the year, but the things we value most—our commitment to excellence, our relationships with our alumni and friends, and our collaborative spirit in working towards a common good—remain the same.

To our friends and alumni: I encourage you to connect with us. Please browse our website, follow us on social media, tag us in sharing your news and accomplishments, and drop us a line to say hello and share your vision and advice with us. With your support and engagement, we can create and shape the future of the Odum School of Ecology together.

– Sonia Altizer
Interim Dean and UGA Athletic Association Professor

**Read further thoughts from
Interim Dean Altizer at t.uga.edu/8hx.**

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Front cover: Yellowfin shiners (*Notropis lutipinnis*), photographed in a creek in a residential neighborhood in Athens, Georgia, in mid-July 2021 by M.S. student Andrew Nagy. Andrew describes their breeding coloration as rivaling “anything seen on tropical coral reefs.” Learn more about Andrew’s research at t.uga.edu/7wl.

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SERVICE-LEARNING: ODUM STUDENTS CHANGING THE LANDSCAPE

BY SAM PATTERSON AND BETH GAVRILLES

If you stepped into the Ecology courtyard this summer, you may have noticed some new additions: Philadelphia fleabane, golden Alexander, blue-eyed grass, and mealycup sage are just some of the native plants in the pollinator garden that now surrounds the plaque commemorating the 20th anniversary of the Conservation Ecology and Sustainable Development program. The garden is the work of the “Quad Squad,” a group of students from the undergraduate Environmental Practicum.

“The purpose of this class is to apply the things you’ve learned during your ecology degree—relating to biodiversity loss, ecosystem services, ecosystem function—to address local problems,” said Assoc. Prof. Richard Hall.

The Environmental Practicum is one of two service-learning courses for ecology undergraduates—the other is Urban Ecology—that are modeled on the interdisciplinary graduate level Environmental Practicum established by Laurie Fowler, Senior Public Service Associate Emerita. They allow students to gain experience by working on environmental problems brought to the class by community organizations.

“The goal is to meet stakeholder needs while meeting learning outcomes,” said Lecturer Alli Injaian, who teaches Urban Ecology.

According to Hall, who co-teaches the Environmental Practicum with lecturer J.P. Schmidt, PhD ’06, those outcomes include transferable skills such as working in teams, meeting deadlines, and communicating effectively with a diverse group of stakeholders with different roles and priorities. And based on their final presentations, that is exactly what happened for the 17 ecology students enrolled in the spring 2022 class.

THE PRACTICUM MODEL

Students in the Environmental Practicum form teams and select from a slate of projects presented by local stakeholders at the beginning of the semester. For spring



PHOTO BY OLIVIA WILSON, AB '22

2022, the Athens-Clarke County Sustainability Office proposed projects focused on improving environmental conditions and awareness around Dudley Park and the North Oconee River Greenway. The University of Georgia Office of Sustainability asked for help in making the UGA campus a better place for pollinators. And the Odum School itself proposed the renovation of the ecology building courtyard to create a diverse and educational native plant garden.

Early in the semester, the groups spend time brainstorming with stakeholder representatives to come up with goals, deliverables, and timelines. After the initial planning period, the class becomes more hands-on, with weekly work days and regular check-ins with faculty and stakeholders. The semester wraps up with each group giving a presentation about their project and reflecting on what they accomplished, what they learned, and how future classes might build on their work.

PLANTS, POLLINATORS, AND PARKS

Although each of the spring 2022 projects was distinct, there were some common denominators. All four involved using native plants to restore and improve habitat for pollinators and other wildlife. Each project also included a public outreach component.

One group, the “Dud Buds,” collaborated with the ACC Sustainability Office to improve conditions for pollinators in Dudley Park. The group planted native grasses along the banks of a creek that had been previously cleared of English ivy. In drier areas they planted wildflowers like big-leaf aster.

“Our goal was to foster local pollinator populations through native plantings and to create an interpretive sign highlighting how native plants and pollinators improve the habitat around them,” said team member Mikey Fager, AB ’22.

“Interpretive signage is different from informational signage,” explained team member Thea Genet. “There’s a little bit more artwork, it’s easier for younger people to



PHOTO BY OLIVIA WILSON, AB '22

read, it gives educational inspiration.”

The Dud Buds agreed that the most valuable skills they gained included the ability to communicate with their stakeholders and the flexibility that they learned from having to adapt to unexpected changes of plans.

Another group worked with ACC Sustainability to address habitat and streambank restoration, littering in public areas, and soil erosion. They focused on Dudley Park and the MLK Greenway section of the North Oconee River Greenway. The group planted native grasses like river oats to restore riparian areas and help slow erosion along the North Oconee River. They also picked up litter along the Greenway and cleaned out the Trail Creek trash trap—a device that captures floating trash like plastic and Styrofoam in a large basket that can then be emptied—netting over 36 pounds of waste materials.

Both groups coordinated on hosting an informational table at the local Green Life “Hoppy Hour” event, held on Earth Day in Athens, to showcase their projects and promote native plants and pollinators to the public.

“An important component of this was to have a very direct message, to be very focused and deliver a clear and concise message that you want to get across,” said Zach Keung, AB ’22, who worked on the streambank restoration project. “Because some people might not be interested in hearing every little detail about watershed science, or every little detail about freshwater ecosystems, but giving them information that’s actionable, that they can apply to their lives, that’s what’s important.”

A third group collaborated with the UGA Office of Sustainability on the Pollinator Project, an effort to improve conditions for pollinators through research, education, outreach, and campus operations. This group restored existing pollinator gardens at Lake Herrick and Oconee Forest Park, and focused on outreach to promote the UGA Pollinator Census that took place on April 21–22. Team members researched different kinds of pollinators found on campus—carpenter bee, honeybee, bumblebee, and paper wasp—and their nesting habitat, characteristics, abundance, and seasonal presence. They created outreach materials, including posters and videos for use on social media, and tabled at the UGA Earth Day Fair and Market to generate interest in the event among UGA students. They tested and refined the online census tool and set up stations on North and South Campus to assist participants. The team worked with Dr. Carmen Blubaugh of the entomology department to develop online and printed guides to the native plants and pollinators participants were likely to see.



PHOTO BY RICHARD HALL

THE COURTYARD GARDEN

The final group, the Quad Squad, improved a section of the Ecology building’s central courtyard, which had become overgrown with river oats. Their goal was to create an aesthetically pleasing garden that supports native pollinators.

“We hoped to not only increase species biodiversity, but to also create future educational possibilities,” said Sidney Jones, BS ’22.

The students gathered information about the courtyard’s physical attributes, its multiple uses, and factors like sun angles and access to water. They learned about native plant species and designed the garden to showcase different flowering heights and blooming times. They created informational signage and a comprehensive plant list. Perhaps most importantly, they worked with their stakeholders—in this case Assoc. Dean Jeb Byers, chair of the Odum School’s facilities committee, and the UGA Facilities Management Division grounds department—to shape the scope and scale of the project and acquire the necessary permissions.

“We learned a lot about how to work within a system as complex as the university,” said Jesse Donck-Rains, AB ’22.

Although most of the Quad Squad graduated in May 2022, their project included provisions to ensure that the garden is maintained over the summer and beyond. They developed a long-term maintenance plan and proposed that the Odum School appoint an undergraduate Courtyard Champion each year who will be responsible for its upkeep.

As with each of the Practicum projects, the Quad Squad laid the groundwork for the next cohort of students to follow in their footsteps.

Byers, who attended the final class presentations, summed up the students’ impact on future classes.

“It’s a nice proof of concept, and so there’s a potential next stage for the next group to come through to emulate what you guys have got the ball rolling on,” he said. “Thank you!” 🍌



PHOTO BY RICHARD HALL



OPENING THE DOOR TO DISCOVERY: EXPLORING UNDERGRADUATE ECOLOGY RESEARCH OPPORTUNITIES

BY KATIE TONG, AB '23

Chances are that you've heard about research by ecology undergraduate Benjamin Frick, AB '23. With faculty mentor Andy Davis, Frick coauthored a paper about Joro spiders that was published in *Physiological Entomology* in 2022 and covered by news outlets from the *New York Times* to the *Today Show*. Davis and Frick's comprehensive analysis of this recently-arrived invasive arthropod, showing that it has the potential to spread throughout the Eastern Seaboard, garnered thousands of media mentions, reaching—and unnerving—an estimated 207 million people (and counting; see story on page 16.)

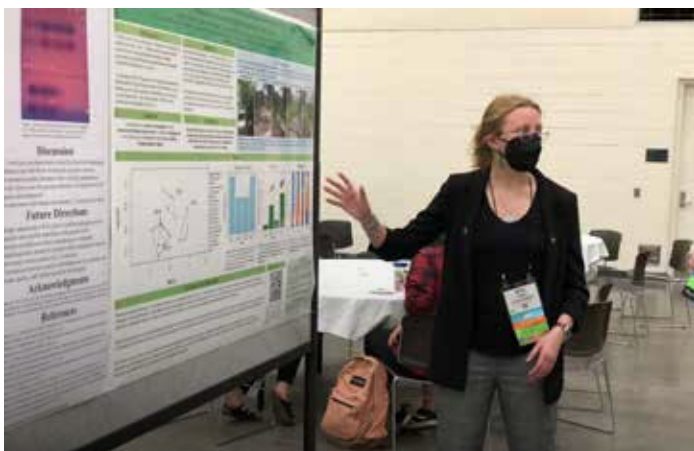
While that kind of response to undergraduate research—or any research—is hardly typical, ecology students who participate in research gain many valuable benefits that can help set them up for success in their studies and careers.

"It was one of those experiences that really demonstrated to me that I was capable of doing things that I really set my mind to," said Frick, who has also studied Tanaid crustaceans, which he describes as "mini lobsters" that live on barnacles on loggerhead sea

turtles, with Prof. John Wares of the Odum School and department of genetics.

Satyatejas Reddy, a junior majoring in biology and ecology who was recently awarded a Udall Scholarship, began his research journey during his second semester at UGA, studying disease ecology in Prof. Pejman Rohani's lab. Since then he has gone on to work on several research projects with other faculty members, including a senior thesis on salt marsh biochemistry on Sapelo Island with Amanda Spivak, an associate professor of marine sciences. He credits these experiences with helping him get accepted into a National Science Foundation Research Experience for Undergraduates (REU) program at the Bigelow Lab for Ocean Sciences in Casco Bay, Maine, where he studied clam cancer. Reddy also conducted research on the drivers of decomposition in bromeliads in Costa Rica as part of the Odum School's Tropical Ecology program with faculty mentor Amanda Rugenski.

Study abroad opportunities were also a catalyst for independent research for Skye Remko, a junior ecology major. Remko got her start with research during her



semester in Costa Rica with Rugenski, the Odum School's undergraduate program coordinator.

"I got the experience of being out in the field, designing my experiments, and knowing what I needed to sample," Remko said. She is continuing that study, an ongoing project using benthic macroinvertebrates to quantify the recovery of a stream that was devastated by flash flooding during Hurricane Nate in 2017.

Remko has also gained valuable experience in communicating about her research. In April 2022, she spoke about her project at the UGA CURO (Center for Undergraduate Research Opportunities) Symposium in Athens. She received funding through CURO and the Odum School's new Undergraduate Experiential Learning Program to present her findings at the 2022 Joint Aquatic Sciences Meeting in May, a gathering of members of nine professional scientific societies.

THE BENEFITS OF UNDERGRADUATE RESEARCH

Davis, an assistant research scientist who has mentored undergraduate researchers for many years, has seen firsthand the impacts research has on students' interests and careers. Research provides students the opportunity to work collaboratively and individually in an academic setting. Working on a research project also allows students to better conceptualize course material and can help with career path decisions.

"A student who has a degree plus research experience is much better prepared for a job in research or for graduate studies in the academic sciences," he said.

Davis's assessment is backed up by data. The Survey of Undergraduate Research Experiences (SURE) is an assessment tool developed by Dr. David Lopatto of Grinnell College and funded by the Howard Hughes Medical Institute. According to findings from a 2007 SURE report, incorporating hands-on research into their education is associated with students persisting in STEM fields, with more than 87% of survey respondents reporting they had either begun or were planning to further their education in science.

The benefits of undergraduate research go both

ways. Faculty and graduate students who mentor undergraduate researchers receive invaluable assistance with their projects, from help collecting samples to analyzing data to writing up results.

"Undergraduate research is central to the university's mission. It helps students develop as critical thinkers, and builds knowledge through discovery," said Sonia Altizer, interim dean of the Odum School. "Research is about asking a question and designing methods to find an answer. Faculty at the university depend on students to help generate new knowledge and solve problems related to local and global challenges. Students often bring enthusiasm and fresh insights that can change how we approach our research."

HOW TO GET STARTED IN RESEARCH

Getting involved in undergraduate research is easier than students may think. Many faculty members and graduate students at the Odum School have opportunities in their labs for undergraduates; knowing where to look is the first step.

"If you are interested in research, talk with other students, read [Undergraduate Advisor Misha Boyd's] 'Notes of Interest' emails, and look at our faculty webpage and see if there is something that is interesting—and reach out to that faculty member or talk with Misha or me to facilitate a connection," said Rugenski. She has worked with numerous students, serving as a research mentor to some and helping others get involved with research opportunities in different labs.

CURO is another important resource. Stephanie Schupska, senior communications coordinator for CURO and the Jere W. Morehead Honors College, explained that CURO is dedicated to providing students with both connections and funding for their research. CURO offers research awards, the CURO Honors Scholarship, summer fellowships, and conference participation grants to students conducting research in a faculty member's lab or with a graduate student.

"A part of what makes UGA so unique is that many faculty members provide research opportunities for students as early as their freshman year in college," said Schupska.

In 2022, 24 ecology students presented their original research findings at the annual CURO symposium, representing nearly 15% of all ecology majors.

Students can also gain research experience by taking a research credit course (ECOL 4960) in a study abroad/study away program, such as Agro-Ecology in Tropical America or Tropical Ecology in Costa Rica.

Engaging in research has a multitude of benefits for undergraduates, but the journey starts with students reaching out to Odum School faculty. Students can ask themselves: what do I want to learn more about? What approaches are most interesting? Where do I want to conduct this work? A few brave conversations can lead to research experiences that will challenge, reward and extend students' academic and professional preparation, and might just change their career trajectory. ■



POSTCARDS FROM COSTA RICA

PHOTOS COURTESY OF AMANDA RUGENSKI

The Odum School's semester-long Tropical Ecology study away program brings undergraduates to Costa Rica for an intensive 12 weeks to experience what the syllabus describes as "one of the most biodiverse and complex ecosystems in the world." Based at the former UGA Costa Rica Campus in San Luis de Monteverde, now operated by non-profit study abroad organization CIEE, the program offers foundational classes in general ecology, conservation biology, and natural history in an immersive setting.

Over the course of the semester, students visit coastal areas, mangroves, dry forests, cloud forests, lowland tropical forests, and local farms and nature reserves. Students also conduct independent research, learning how to formulate research questions, collect and analyze data, and communicate their findings. Lecturer Amanda Rugenski coordinated the fall 2021 program with the help of Ph.D. student Carolyn Cummins and faculty members Jeb Byers and Sonia Hernandez, PhD '08. Eleven ecology students participated in day and night hikes, ziplining, coffee and chocolate tours, amphibian surveys, and avian and bat mist netting. They learned about biodiversity, conservation, sustainable farming, and Costa Rica's culture and history. These are excerpts from the fall 2021 class blog. You can read more at courses.ecology.uga.edu/tropical-ecology. 🌿

1. ORNITHOLOGY CLASS.

2. MEASURING STREAM WIDTH AND DEPTH.

3. FINCA LA BELLA - By Will Ellis, Sept. 29, 2021

In the upper Pacific slopes of Monteverde... we visited the plot of Finca la Bella belonging to a farmer named Gilbert. On his farm, Gilbert has a wide variety of crops including banana, coffee, peppers, sugar cane, and many other fruits...

4. THE CEIBA TREE - By Kate Moore, Sept. 29, 2021

As important as it is to the ecosystem, this tree was also extremely important in Mayan culture... These connections the Mayan drew between the heavens and the universe with this tree are not hard to understand when you stand in front of a nearly 200-foot-tall tree that towers over everything else in the forest...

5. WORKING IN THE LAB.

6. TROPICAL ECOLOGY STUDENTS ON CAMPUS.

7. TIDAL POOLS - By Elizabeth Shaffer, Oct. 16, 2021

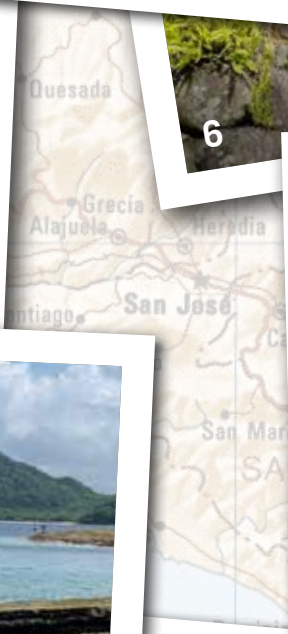
On our trip to Guanacaste, we visited a beach with an expansive intertidal zone comprised mainly of rocks and tide pools. I've never seen tide pools with so many organisms in them before...

8. SENDERO PACÍFICO - By Caroline Anscombe, Sept. 28, 2021

The Sendero Pacifico is a network of trails, but the main line connects the Monteverde Cloud forest to the Gulf of Nicoya...

9. SNORKELING IN CUAJINIQUIL - By Cody Whitlock, Oct. 30, 2021

Our first snorkeling spot was covered in sea urchins, and we saw many damselfish swimming around as well... On this excursion we also explored and learned about mangroves and saw a young crocodile...



ON THE ROAD—AND THE RIVER— WITH THE ECOLOGICAL PROBLEM SOLVING CLASS

BY CHERYTH YOUNGMANN

Science doesn't—and shouldn't—happen in a vacuum. Amanda Rugenski, lecturer and undergraduate coordinator at the University of Georgia Odum School of Ecology, gets that.

"To be able to listen to people is really important—not just to the scientists, not just to the water managers—but also to the communities that are present in these areas," she said.

She hopes the question of who needs to have a seat at the table is something students take away from the Maymester study away course she led (ECOL 3300, Field Program in Ecological Problem Solving), from May 21 to June 4, 2022, with the assistance of Odum graduate students Kristen Zemaitis and Jeffrey Beauvais.

Rugenski's class of 19 had ample opportunity to practice listening as they attended presentations and hands-on workshops throughout swaths of the Apalachicola-Chattahoochee-Flint (ACF) River Basin, learning to view environmental issues through a social-ecological lens.

Ecological Problem Solving is an experiential learning course offered annually for Ecology A.B. students, and it's an anchor course for the Sustainability Certificate. The class is meant to give students a whirlwind introduction to problem solving at the intersection of science, society, and policy. The course is built around one such issue—the tri-state "Water Wars"—and the efforts of a regional organization, the ACF Stakeholders, Inc., to provide solutions through consensus.

For several decades, Georgia, Alabama, and Florida have disputed water allocation in the ACF Basin. Georgia needs water to support both agriculture in the southern part of the state and the continued growth of Atlanta in the north. Alabama requires water for power, drinking supply, and fisheries, and Florida needs enough water to reach the coast to prevent saltwater intrusion and to sustain its seafood industry.

In response, the ACF Stakeholders, composed of a range of people including civic leaders, farmers, fishermen, and researchers across sectors and state lines, aims to foster informed, cooperative, and equitable water sharing.

The group's goals dovetail perfectly with those of the class.

"Sometimes when we think of problem solving, people don't think of humans as being a part of the solution,



PHOTO BY AMANDA RUGENSKI

and others may not think of the environment and ecosystem as being part of the solution. I want students to see how interconnected these all are, to solve these complex problems," said Rugenski.

FUN ON THE FLINT

The group experienced the ACF basin from its headwaters to the Gulf Coast, traveling a roughly 1,000-mile loop and visiting as many of the ACF stakeholders as possible along the way to learn first-hand about their perspectives and priorities. Their travels included stops to sample fish in the Chestatee River in North Georgia, a visit from an attorney with the Southern Environmental Law Center, a tour of the AgLanta Urban Food Forest at Browns Mill, and a meeting with the West Atlanta Watershed Association. They toured the Columbus Water Works, the Farley nuclear plant near Dothan, Alabama, the Jones Ecological Research Center at Ichauway, and the Stripling Irrigation Research Park in Camilla.

By the morning of June 1, after a stint in Apalachicola, Florida, the group had made its way back to Georgia. Sweating in the already 90-degree weather, the class gathered on the bank of the Flint River for an educational paddling excursion.

Three members of the Flint Riverkeeper gathered with them: R.J. Gipaya, watershed field specialist; Henry



PHOTO BY CHERYTH YOUNGMANN

Jackson, director of outreach and development; and Gordon Rogers, riverkeeper and executive director.

Rogers offered the students some background on the organization and the river itself before the class launched their canoes.

It turns out that riverkeeper isn't just an enviably cool title—though certainly it's that. It's a civic role, one that a network of organizations world-wide takes very seriously.

Riverkeepers are a kind of water watchdog. When water laws aren't upheld, or infrastructure projects and human activities pose a major threat to a river system, they speak on behalf of anglers, businesses, and townspeople to ensure access to clean freshwater. When necessary, they'll seek legal action.

Because access to water is access to equity.

"Water is meant, in my view, to be shared by everybody so that everyone has enough: industry, farmers, residential paddlers, people that want to have a baptism, swimmers, fishermen," Rogers said. "We all deserve to have it. And that's what we stand for."

But staff members were quick to say that legal action is a last resort. Mostly, what keeps the Flint Riverkeeper team busy is understanding the Flint better, to ensure that their recommendations are sound. Gipaya plays a large role in that, as the watershed field specialist.

His favorite part of the job, though, is the kind of work he did that day, guiding people on an ecological tour of the Flint, or what he calls "showing people the gem that Georgia has."

On the water, the group made its way to Table Rock. Students navigated shallow banks and rocks and paused just after Rebel Chute to cool off and swim. Then the group settled in for an open-air class led by Rogers. Lecture visuals included living fish: a few-month old gar and a shoal bass caught by Gipaya.

"Georgia is way more diverse on almost every axis you can measure than any state in the Union," Rogers said.

He explained that the Flint is one of the most

ecologically rich river basins in the Southeast. "We have three ecosystems touching each other here. In terms of fish and bivalves, the only place in North America more diverse than this is in Alabama."

The convergence of distinct branches makes the Apalachicola–Chattahoochee–Flint River Basin a perfect case study in water management challenges faced across the U.S.

COURSE IMPACT

Over the course of two weeks, students gained an integrated view of the river basin and of the social, economic, and ecological factors that weave together to present a tangle of water issues, and also work in concert to offer possible solutions.

"It does feel like the highlights move on with you. You have to take this kind of experience as a holistic perspective," said course participant Jonathan Parrish. "We're able to see each step of the ACF basin. And I think each one just kind of adds another piece to the entire puzzle that we're learning about."


At least one member of the class already feels the significance of what she gained through the Ecological Problem Solving course—and not just academically.

"This course helped me grow as a person," Pearce Buxton said. "It was incredibly impactful. I learned how



PHOTO BY CHERYTH YOUNGMANN

to adapt to new environments very quickly and how to manage my time for school more efficiently. I was able to work harder than before and think more critically. This trip also provided me with a lot of new friends...[it] provides every ecology student an opportunity to find their Odum family."

To learn more about the students' experiences on their tour of the ACF, you can read an expanded version of this story at t.uga.edu/8iD. 

DISEASE ECOLOGY RESEARCH BRIEFS

ASYMPTOMATIC PERTUSSIS MORE COMMON THAN BELIEVED

By Jillian McKoy, Boston University. A 2021 study from the Odum School and the Boston University School of Public Health suggests that most adults and many children who contract pertussis, or whooping cough, display no symptoms—a reversal of what many experts believed about the infection. The paper built on a study in which researchers discovered a series of weakly positive pertussis infections after collecting nasal swab samples from 2,000 mother/infant pairs in Zambia every two to three weeks for several months, using quantitative PCR (qPCR) diagnosis. The recent paper more closely analyzed the study and compared the symptomatic cases to the asymptomatic cases, discovering that about 70% of infected mothers displayed no symptoms, and about 25% of infected babies displayed no symptoms. Infants with only mild symptoms (cough or runny nose) comprised over 50% of infections. “We expected this in mothers,” said co-lead author Christian Gunning, a postdoctoral researcher who works with senior author Prof. Pejman Rohani in the Odum School. “But mild and asymptomatic infection in infants was assumed to be quite rare. And what we see here is the opposite—severe pertussis in infants is the exception rather than the rule.” The study has implications for how qPCR tests are interpreted and could leverage even weak signals to aid in response to disease outbreak. It was funded by the Bill and Melinda Gates Foundation and the National Institutes of Health National Institute of Allergies and Infectious Diseases under award number R01AI133080. Read more: t.uga.edu/87w.

UNDERSTANDING PATHOGEN SPILLOVER, A HOLISTIC PICTURE

By Amanda Budd, AB '23. A study from the University of Georgia published in *Zoonoses and Public Health* examines how different disciplines think about zoonotic spillover—the process of a pathogen transmitting from wildlife or livestock to infect humans. Because pathogen spillover involves interactions among animals, humans, pathogens, and the environment, perspectives from multiple disciplines are needed to understand its processes, which range from human behaviors that affect people's exposure to wildlife to molecular mechanisms that control pathogen entry into host cells. The study, conducted by Cecilia Sánchez, PhD '19, Joy Vaz, MS '21, and Prof. John Drake, analyzed 88 review papers across 10 disciplines, including veterinary science and molecular biology, and identified nine common mechanisms for pathogen spillover along with eight gaps in research. “We were thinking about how we can be sort of siloed in our respective academic disciplines and so the interest was, how do other disciplines outside of ecology think about the process of spillover and how diseases are transmitted?” explained Sánchez, now a research scientist with EcoHealth Alliance. By pinpointing these similarities and differences, the researchers hope that their findings will be useful for directing interdisciplinary work and encouraging more collaboration across disciplines when looking at disease spillover. Read more: t.uga.edu/88X.

WHAT CAUSES DISEASE OUTBREAKS?

By John King, BS '90. Since 1974, contaminated water has been the most common driver of large-scale zoonotic infectious disease outbreaks, research from the Center for the Ecology of Infectious Diseases at the University of Georgia indicated. The next two greatest drivers are unusual weather patterns and changes in the abundance of disease vectors like mosquitos and ticks. In a study published in the Royal Society journal *Philosophical Transactions B* in 2021, researchers investigated over 4,400 zoonotic infectious disease outbreaks. They identified the 100 largest in terms of numbers of human cases, all of which infected thousands to hundreds of thousands of people. From the full list, they also selected 200 outbreaks at random to serve as “case controls.” The majority of these included 43 or fewer cases. They then compared the characteristics of large-scale and control outbreaks. “We know that factors like exposure to wild mammals, habitat disruption, international trade and travel, and contact with contaminated food and water are important considerations. Our research was designed to understand what proportion of outbreaks various drivers contributed to,” said lead author Patrick Stephens, at the time an associate research scientist in the Odum School who is now at Oklahoma State University. “To our knowledge, this study is the first to do so for a global sample of outbreaks of many diseases.” Stephens worked with CEID researchers Nicole Gottdenker, PhD '09, of the College of Veterinary Medicine and John Drake, Annakate Schatz, and J.P. Schmidt, PhD '06, of the Odum School. Read more: t.uga.edu/88Y.

PARASITIC WORMS IN DOGS, CATS MAY JUMP INTO PEOPLE

By Madison Wilson, AB '18. Parasitic worms that infect companion animals such as dogs and cats are more likely to make the leap into humans than other worm species, according to 2021 research from the University of Georgia's Center for the Ecology of Infectious Diseases. The study identified three species of worms that don't currently infect people but have a more than 70% chance of crossing into humans in the future. “The close relationships that we have with pets is the predominant reason why people might become infected with new species of parasitic worms,” said Ania Majewska, PhD '19, lead author of the study who is now a FIRST Postdoctoral Fellow at Emory University. “Everyday behaviors like playing with and feeding our pets increase opportunities for those parasites to infect people.” Published in *The Royal Society journal Philosophical Transactions B*, the study focused on 737 parasitic worm species that predominantly infect wild and domesticated mammals. Of these, 137 are known to be able to infect people. The researchers categorized the worm species' traits and built a machine learning model to determine which characteristics were most often associated with transmission into humans. Prof. John Drake was the study's senior author. Read more: t.uga.edu/7H5.

DOGS, FROGS, AND COPEPODS: MODEL PROVIDES CLUES ABOUT GUINEA WORM TRANSMISSION

BY AMANDA BUDD, AB '23

Research from the University of Georgia provides insight about how the parasite responsible for Guinea worm disease in humans may be maintained by dogs, frogs, and small crustaceans known as copepods. The findings, published in the *International Journal for Parasitology* in 2021, suggest that reducing copepod populations might be the most effective control method for this transmission route.

Guinea worm has long taken a devastating toll on human health in parts of Africa. People typically come in contact with the parasite by drinking water contaminated with infected copepods. When ingested, it causes Guinea worm disease, which can lead to death or disability along with follow-up health problems.

Efforts to eliminate human contact with the parasite by providing access to clean drinking water have been largely successful, and cases of Guinea worm disease have declined significantly in recent years. However, complete eradication of the disease has been complicated by the presence of infected domesticated dogs.

"We've seen an increasing number of cases in domestic dogs and this is a worry because the parasites hiding out in dogs might compromise some of the control efforts that are focused on reducing human exposure," said Assoc. Prof. Richard Hall of the Odum School of Ecology and College of Veterinary Medicine, the study's senior author.

Like humans, dogs can become infected by drinking contaminated water. But dogs may also acquire the worm by eating frogs that, as tadpoles, consumed infected copepods. Infected dogs can then shed worms into water bodies used by people, increasing human exposure risk.

The researchers, led by John Vinson, PhD '20, a postdoctoral associate in the Odum School and Center for the Ecology of Infectious Diseases, developed a mathematical model to explore the role of frogs in Guinea worm transmission. The model calculated the



PHOTO BY CHRIS CLEVELAND

theoretical transmission potential of Guinea worm among copepods, frogs, and dogs under a variety of scenarios. In one, frogs play no role; in the second, frogs consume infected copepods but do not transmit the parasite; and in the third, frogs both consume infected copepods and transmit the parasite to dogs.


Surprisingly, the model showed that frogs are often helpful in preventing Guinea worm transmission to humans.

"A lot of the times the presence of frogs would reduce transmission potential because they were vacuuming up the copepods and weren't leading to transmission or infection in the dogs," Vinson said.

The researchers also found that having more dogs present did not necessarily mean there was a higher outbreak risk. The model showed that high numbers of dogs could mean that worm-carrying copepods are typically eaten before the worms mature enough to be infectious to dogs, thus lowering transmission potential.

Vinson said this finding indicates that prevention measures geared toward reducing or controlling the dog population may not be the answer, and in some circumstances the transmission potential increases as the number of dogs decreases.

"The best way to reduce transmission would probably be focusing on trying to control the copepod populations," Vinson said. "Because doing that would reduce the pathway of direct consumption of the copepods by dogs, and consumption through the tadpoles and frogs. But we should be cautious that these interventions do not harm other aquatic organisms in the community."

The study, "Alternative transmission pathways for guinea worm in dogs: implications for outbreak risk and control," was funded by donations made to the Carter Center. It is available online at doi.org/10.1016/j.ijpara.2021.05.005. 

PRECISION CONSERVATION SAVES TIME, MONEY—AND SPECIES

BY SARAH BUCKLEITNER

A tiny, rainbow-finned fish lives in the swiftly flowing waters of Georgia's Etowah River. Known as the Etowah darter (*Etheostoma etowahae*), it exists only in the Etowah River Basin, mainly inhabiting the mountain streams of North Georgia.

The Etowah darter is only one example of the diverse array of freshwater fish, amphibians, crayfish and mussels that live in Georgia, including many endemic, imperiled species. However, the state is also a bustling transportation hub, with 1,253 miles of interstate highway and the busiest airport in the world.

In a recent project that brought together the University of Georgia's River Basin Center and Institute for Resilient Infrastructure Systems, the Georgia Department of Transportation, the Georgia Department of Natural Resources, and the U.S. Fish and Wildlife Service, researchers pinpointed ways to facilitate important construction projects around the state while tailoring conservation practices to each imperiled species' needs.

"Many of the recommendations for preventing negative impacts to federally listed species are boilerplate, standard guidance that don't consider each species' unique biology," said lead researcher Seth Wenger, an associate professor in the Odum School of Ecology and director for science of the River Basin Center. "What we really needed was for a team to examine the sensitivities of each species and come up with a streamlined system to allow GDOT to apply the most appropriate management tools."

This form of "precision conservation," as Wenger called it, is intended to improve species protection while reducing costs to GDOT as they work to maintain the state's roads and bridges.

"The tricky thing was to design a system that incorporated all the different kinds of information that this kind of project required," Wenger said. "We wanted to ensure that our recommendations were achievable in the real world."

The RBC gathered experts on over 100 imperiled species of fish, mussels, amphibians, and crayfish in the state of Georgia to develop profiles that assessed species sensitivity to the various disruptions common in construction work—sedimentation, noise, contaminants, physical impact—as well as sensitivity to post-construction effects of stormwater runoff.

That's where IRIS came in, with a team of engineers and landscape architects working together to develop stormwater control measures that GDOT could implement to help purify and reduce runoff from highways and into streams. These innovative control measures are designed to make an impact both during construction and long after projects are built.

"With the help of Alfie Vick and Jon Calabria, both IRIS affiliates in the College of Environment and Design, and the team at GDOT, we were able to develop several effective and flexible combinations of pollution control measures that can be used in conjunction with

other tools to help protect stream habitat and sensitive species from runoff," said Brian Bledsoe, a professor in the College of Engineering and director of IRIS.

To help quantify their precision conservation efforts, the researchers compiled information into a "Total Effect Score," a weighted metric that takes into account how each construction activity impacts each imperiled species, based on its unique biology.

"[The Total Effect Score] was a really creative way for the River Basin Center to tackle this issue. It allowed for the flexibility of avoidance and minimization measures while still ensuring protection for imperiled species,"

said Chris Goodson, ecology section manager at GDOT, adding that it creates "a formula for how you could replicate our approach anywhere in the world."

The third element of the project was setting the stage for GDOT to implement this new framework through a programmatic agreement, which will solder the compact between the DNR and GDOT as a new way to navigate imperiled species protection.

Katie Hill, research professional at the Carl Vinson Institute of Government, provided expertise on how these changes to GDOT's process would work within the larger framework of the Endangered Species Act.

"There are so many different wins for GDOT, for the public, for the species. Ultimately, it's just a better way to build," Goodson said.


An expanded version of this story is available online at t.uga.edu/89l. 



PHOTO BY ANDREW NAGY

UGA PARTNERSHIPS YIELD TANGIBLE RESULTS IN FIGHTING FLOODPLAIN INVASIVE SPECIES

BY KATIE TONG, AB '23

What happens when research scientists and conservation practitioners work together to restore Georgia's floodplains? Collaborative efforts by ecology graduate students and conservation practitioners at the State Botanical Garden of Georgia show just how successful such partnerships can be.

Linsey Haram, PhD '18, and Rachel Smith, PhD '19, began their floodplain restoration research project in 2017 in collaboration with Heather Alley, a conservation horticulturist with the Botanical Garden, a unit of Public Service and Outreach at UGA. For three years they, along with Odum School undergraduates Diane Klement, AB '20, and Hannah Mone, BS '21, conducted experiments to determine the most effective methods of removing invasive plants. They published their findings in *Restoration Ecology* in 2021.

"Emphasizing the value of academic and nonprofit partnerships for this type of work is super important," said Haram, who is now an AAAS Science & Technology Policy Fellow at USDA-NIFA.

Alley has dedicated years to restoring the floodplain bordering the Middle Oconee River and has worked to rid this area of invasive species, organisms whose introduction causes harm to the ecosystem they colonize. For many ecosystems, such as floodplains, invasive species pose a threat to biodiversity, compete for resources with native plants and animals, and damage the overall health of the environment. Restoring floodplains to their pre-invasion state is a challenge, as conservationists must determine the most effective method of removing invaders while also having the least negative impact on the delicate ecosystem they are trying to restore.

Stiltgrass is a low-lying plant species native to Asia that is now widespread across much of the U.S. It forms dense stands that disrupt forest ecosystems, and has become especially problematic in floodplains. Because floodplains provide numerous services both economically and environmentally, they are an important area to protect.

The floodplain restoration project at the Botanical Garden presented a unique opportunity for collaboration. Smith and Haram, with their invasive species expertise, and Alley, with her years of on-the-ground experience, worked together to design a controlled experiment to analyze what method and frequency of application was most effective for stiltgrass removal.



PHOTO COURTESY OF LINSEY HARAM

The team established ten experimental blocks to test the effectiveness of restoration methods—combinations of herbicide, native planting, and native seeding—and application frequency—single and annual. The native plant of choice was river oats. Alley explained that as a cool season perennial, river oats would already be "full and robust" by the time stiltgrass began to sprout in the warmer season.

"We found that combining herbicide and native planting was the most effective way of reducing the invasive annual stiltgrass," said Smith, now a postdoctoral researcher at the University of Virginia. The combination of a single application of herbicide and river oats planting helped reduce the mass of stiltgrass within the floodplain, while also minimizing the harm to non-targeted native plant species.

This detailed restoration project provides empirical evidence for practitioners to use in restoring floodplains from invasive species, offering an effective, data-driven methodology for stiltgrass removal. And by bringing together Smith, Haram, and Alley, it demonstrates how bridging the gap between researchers and practitioners can lead to strides in conservation practices.

The study, "Academic-conservation partnership reveals trade-offs in treatment method and frequency needed to restore invaded floodplain," is available online at doi.org/10.1111/rec.13597. 🌱

NUTRIENTS A LARGER FACTOR THAN TEMPERATURE IN COLORADO MOUNTAIN STREAM ECOSYSTEMS

BY AMANDA BUDD, AB '23

A 2021 study in *Freshwater Science* demonstrates how nutrients and temperature interact to influence stream ecosystem processes. The findings provide insight into how streams might respond to changes in climate and land use, and could inform algae mitigation strategies.

Scientists have long known that concentrations of nutrients, particularly nitrogen and phosphorus, affect ecosystem processes in streams. These processes include the growth of algae and the recycling of nutrients by aquatic insects like mayflies.

Environmental factors such as light, temperature, and the speed of the stream current can enhance or inhibit the response of stream organisms to nutrients.

Freshwater ecologists Whitney Beck and LeRoy Poff of Colorado State University and Amanda Rugenski of the Odum School sought to untangle the relative influence of nitrogen concentrations and these environmental factors, which vary from place to place and seasonally. They conducted an experimental study in eight Colorado mountain streams at varying elevations and at different times of the year. As elevation increased in these streams, temperature decreased and nitrogen levels rose. The researchers added nutrients to each stream in July and September 2016 and measured algal growth during both time periods and insect response to changes in temperature and nitrogen concentration in July.

The team expected that the lower temperatures at higher elevations would limit algal growth under higher nitrogen levels, but instead found that algae increased at these elevations, as did nitrogen ratios in waste excreted by insects.

“When temperature decreases, you often see the algae decrease as well because algae just don’t grow as well in the cooler temperatures, but we actually found the most algae at our cool, high-elevation streams,” Beck explained.

The same proved true for seasonal differences, with more algal growth in autumn than in summer.

The researchers believe this may indicate that temperature is not as important as nutrient levels to predict insect nutrient excretion and algal growth for the streams in this area.




PHOTO BY AMANDA RUGENSKI

Because algal growth and invertebrate excretion can influence stream ecosystem health and productivity, the findings of this study have implications for stream management strategies and climate change response.

“When we’re looking at how we’re going to mitigate climate change responses, it’s really important to know what areas are going to be the most vulnerable and what factors are going to contribute to that vulnerability,” Rugenski said.

The research also provides insight on how streams should be managed to preserve water quality for recreation or other uses.

“This type of research that looks at what will work to control the growth of algae is very important to help manage nutrients and streams,” Beck said. “Studies like this that can tease apart which one is more important, temperature or nutrients, and under what conditions, could be really helpful for thinking about how biological communities are going to respond to climate change.”

The study, “Limiting nutrients drive mountain stream ecosystem processes along an elevation gradient,” was funded by the National Science Foundation. It is available online at doi.org/10.1086/714441. 

CLIMATE CHANGE COULD INCREASE COSTS OF REPRODUCTION IN PLANTS, STUDY FINDS

BY AMANDA BUDD, AB '23

A 2021 study from the University of Georgia sheds light on how plants respond to stressful environmental conditions presented by climate change. In a paper published in *Proceedings of the Royal Society B*, researchers showed that plants grown in drier conditions simulating the effects of climate change exhibited higher costs of reproduction than those grown under current conditions. The findings offer clues about how plant populations might respond to climate change and could provide guidance for developing conservation strategies.

The term “costs of reproduction” refers to the idea that living organisms that invest their energy in current reproduction have less available to invest in future needs, such as survival, growth, and reproduction.

Former postdoctoral researchers Elena Hamann and Susana Wadgymar, with senior author Jill Anderson, an associate professor in the Odum School and department of genetics, studied how drier conditions that accompany climate change alter costs of reproduction for *Boechera stricta*, a montane flowering plant in the mustard family.

“The idea was to investigate whether climate change, which usually imposes more stressful conditions, can change these costs of reproduction and how that may affect the evolution of populations along elevation,” said Hamann, the paper’s lead author.

The study took place over the course of six years in the Rocky Mountains. The researchers set up experimental gardens at five different elevations within the plant’s natural range. High elevation sites are cooler, with later snow melts, shorter growing seasons, and increased soil moisture relative to low elevation sites.

To simulate climate change, the team experimentally manipulated snow in the gardens. Each year they applied an early snow removal treatment in half of the plots to mimic reduced winter snowpack, early spring snowmelt, and lower water availability during the growing season. In the control gardens they left the snowpack intact. They monitored survival, flowering success, and fecundity—or number of seeds produced—of the plants.

At the lowest elevation sites, which are naturally warmer and drier, they found pronounced costs of reproduction under both the control and early snow removal treatments: plants that reproduced well in the first year had shorter lifespans and were less likely to reproduce again in the

future. Additionally, early snow removal at mid-elevations caused this same effect, relative to control conditions. According to Hamann, these results indicate that costs of reproduction will likely increase as climate change proceeds.

Surprisingly, at higher elevations, the pattern was




reversed: plants in snow removal plots had lower costs of reproduction relative to those in control plots. The researchers hypothesized that the early snow removal extended the otherwise short growing season at these elevations.

Hamann said that taken together, the findings supported their hypothesis that climate change has an impact on the costs of reproduction for the plants.

“It basically shows that climate change is affecting and shifting these costs of reproduction and that selection is likely to act on it,” she said.

Anderson and Hamann hope that this study will enable researchers to identify plant populations that are particularly vulnerable to climate change and plan appropriate management practices to conserve biodiversity in a rapidly changing climate.

The study, “Costs of reproduction under experimental climate change across elevations in the perennial forb *Boechera stricta*,” was made possible through funding from the National Science Foundation. It is available online at doi.org/10.1098/rspb.2020.3134. 

JORO SPIDERS LIKELY TO SPREAD BEYOND GEORGIA

BY LEIGH BEESON

If you live in Georgia, it's hard not to notice the state's latest resident. The bright yellow, blue-black, and red spiders' golden webs will be all over power lines, in trees around town, and even on your front porch this summer.

The Joro spider was first spotted here around 2013 and has since spread across the state and Southeast. But new research by Odum School research scientist Andy Davis and undergraduate ecology major Benjamin Frick suggests the invasive arachnids could spread through most of the Eastern Seaboard of the U.S.

There's really nothing we can do to stop them. But that's not necessarily bad news.

Joros don't appear to have much of an effect on local food webs or ecosystems, said Davis. They may even serve as an additional food source for native predators like birds.

"People should try to learn to live with them," he said. "If they're literally in your way, I can see taking a web down and moving them to the side, but they're just going to be back next year."

Published in *Physiological Entomology*, the 2022 study contrasts the Joro spider with its relative, the golden silk spider, which first moved to the Southeast from the tropics around 160 years ago. The golden silk spider hasn't been able to spread beyond the Southeast due to its vulnerability to cold. Before the study, scientists didn't know whether the Joro spider faced similar geographical limitations.

Davis and Frick used records from iNaturalist to track sightings of the spiders across Georgia throughout the year. They also performed tests to compare the species' cold tolerance, including measuring their metabolic, heart, and survival rates during a brief freeze.

They found that despite their similarities, the Joro spider has about double the metabolism of its relative, has a 77% higher heart rate, and can survive a brief freeze that kills off many of its cousins. These findings mean the Joro spider's body functions better than its relative's in a cold environment. And that means the Joros can likely exist beyond the borders of the Southeast.

It's not just cold-hardiness that makes the Joro likely to spread beyond its current region.

In their native Japan, which has a very similar climate to the U.S. and is approximately the same latitude, Joro spiders colonize most of the country.

Joros can travel by using their silks to carry them across the wind to new locations, a behavior called ballooning. But humans also factor into the equation.

"The potential for these spiders to be spread through people's movements is very high," said Frick. "Anecdotally, right before we published this study, we got a report from a grad student at UGA who had accidentally transported one of these to Oklahoma."

But that's still no reason to panic. The spiders are relatively harmless to people and pets, making their presence more of a nuisance than dangerous. Joros won't bite unless cornered, and their fangs are often not large enough to break human skin.

"There's really no reason to go around actively squishing them," Frick said. "Humans are at the root of their invasion. Don't blame the Joro spider."


The study, "Physiological evaluation of newly invasive jorō spiders (*Trichonephila clavata*) in the southeastern USA compared to their naturalized cousin, *Trichonephila clavipes*," is available online at doi.org/10.1111/phen.12385. 



PHOTO BY ANDY DAVIS



ECOREACH GROWS WITH HELP OF AMERICORPS VISTA

BY CATHERINE CAMPBELL, AB '23

In 2022 the Odum School of Ecology's student-run environmental outreach program, EcoReach, welcomed its first ever AmeriCorps VISTA member, Mackenzie Teeter (above, center.) Only a few months into Teeter's year-long assignment, the impact of her dedication and consistent involvement in the organization was already evident.

"Mackenzie is a rock star; she is incredibly organized and very motivated," said doctoral student Julie Blaze, EcoReach coordinator. "She keeps the flow of the organization really moving."

The AmeriCorps Volunteers In Service To America (VISTA) program works to strengthen communities across the country by sending qualified full-time volunteers like Teeter to help local organizations expand their impact. Doctoral student Daniel Suh, EcoReach treasurer, had previously worked with AmeriCorps and was able to apply for a program volunteer through the UGA AmeriCorps VISTA network.

Teeter also had a history working for AmeriCorps, having completed a year-long service program in Alaska and California after high school. Following her graduation from Iowa State University she joined the VISTA program, which allowed her to choose a project based on her specific interests. Teeter's passion for the environment, science, and working with kids led her to EcoReach at UGA, where she immediately began putting her experience in leadership, volunteer organization, and running environmental programs to use.


EcoReach works to inspire environmental awareness and stewardship in the communities around UGA. The organization operates through the work of ecologists, undergraduates, and graduate students who develop and employ programs, outreach projects, and fundraisers that support STEM education for K-12 students. During the disruptions caused by Covid-19, EcoReach managed

to continue connecting with the community through virtual activities and presentations. As the organization began to ramp back up in-person events during spring 2022, Teeter's role involved organizing, planning events, recruiting volunteers, and collaborating with other organizations both on and off campus.

Some of those events included Georgia Questival, a children's program at the State Botanical Garden of Georgia, and the Wetlands Family Day open house with the Jefferson County School District, where Teeter helped organize educational booths. She and members of EcoReach are also participating in the Oconee Rivers Audubon Society's "Binoculars for Young Black Birders" project, which aims to raise \$10,000 to provide binoculars and educational materials for local K-12 classrooms and summer camps, and to provide additional classroom and event programming for students. And EcoReach is working with the Athens-Clarke County Library on after summer school programs related to pollinators and marine biology.

As their AmeriCorps VISTA, Teeter has played a large role in fostering existing partnerships, such as with the ACC library, as well as expanding their network. In her first three months, EcoReach developed five new partnerships, and continues to grow.

Not only does this cooperation allow for opportunities to spread knowledge about environmental and ecological issues, it also provides a chance for UGA students and faculty to connect with the community around them and practice communicating scientific concepts. This year, with the addition of an AmeriCorps VISTA member, EcoReach is even more equipped to bridge the gap between the academic world within UGA and the outside community.

"It's been really enjoyable," Teeter said. "I love the people I'm working with, I love the work we're doing, and I'm excited for what the future brings." 

DISCOVERY AT THE RIVER'S BEND

BY KATIE TONG, AB '23

Ecologists in the Odum School are launching new research and teaching at the HorseShoe Bend ecological research site

HorseShoe Bend, an ecological research site located near the University of Georgia's main campus in Athens, has a rich history dedicated to scientific discovery, teaching, and training focused on ecosystem processes and the natural environment.

As one of the Odum School's primary research sites, HorseShoe Bend was founded at the confluence of opportunity and initiative following its acquisition by the university in 1928. Although the College of Agriculture originally used this land for dairy cattle grazing, their need for pasture outgrew the available space. This presented an opportunity for Eugene Odum, UGA professor and inaugural director of the Institute of Ecology, to develop a staging area for long term ecological research. In 1965, Odum secured permission to begin ecological experiments at the 35-acre field station, and in 1984 the site was officially assigned to the Institute of Ecology.

Characterized by a mixture of upland fields and forest dominated by oak, pine, and river birch, HorseShoe Bend was named after its natural topography, as the site is bordered by a deep bend in the North Oconee River.

EARLY RESEARCH

Some of the earliest ecological research at HorseShoe Bend focused on the effects of a common pesticide on the above-ground community of small-seeded grasses, insects, and small mammals. Gary Barrett, then a graduate student working under Odum's direction, launched this work in 1965. Initial studies established field plots that were used in subsequent agroecosystem research, including effects of fertilization on secondary succession. Later, as the first Odum Chair in Ecology, director of the Institute of Ecology from 1994–96, and director of the field station for nearly 20 years, Barrett studied landscape ecology and small mammal population dynamics, including species interactions between golden mice, white-footed mice, and southern flying squirrels.

For more than five decades, HorseShoe Bend has



afforded ecologists the opportunity to conduct large-scale field perturbations. Soil ecologists David Coleman and Dac Crossley, professors emeriti in the Odum School, created plots to study how no-tillage versus conventional tillage affects carbon storage and soil microbes. Studies conducted during the 1980s and 1990s at the site allowed Coleman and Crossley, together with Prof. Emeritus Paul Hendrix, to measure nutrient turnover and the many organisms that participate in this complex process. Coleman described how this site was one of the few locations for research focused on how tillage practices affect ecosystem function, and also provided active learning opportunities for numerous UGA graduate and undergraduate students.

"Rather than having students read about somebody doing an experiment, they got to actually do soil respiration measurements here," said Coleman.

FIELD EXPERIENCE WITHIN REACH

Present-day Odum faculty underscore the continued importance of this site and its facilities for long-term ecological research and experiential learning.

Two buildings in the upland forest habitat offer research, classroom, and office space, and are frequently used by introductory- and upper-level ecology courses. A pole barn and a cement block house provide storage in the lowland field. Trails run along riparian corridors, the north- and south-facing slopes, and old field habitats throughout the site. Odum School researchers and students continue to develop new facilities for training and scientific discovery at HorseShoe Bend.

"Recently it's become much more heavily utilized for our ecology classes and for our research labs, and we are seeing a resurgence of ecological research and teaching at the site," said Sonia Altizer, Odum School interim dean and Georgia Athletic Association Professor of Ecology.

Kait Farrell, PhD '17, the undergraduate lab coordinator for the Odum School, described a typical research

experience for students as a process of visiting the site, understanding its ecology, and developing a question that can be answered throughout the semester, with frequent data collection from HorseShoe Bend made possible by its convenient location within walking and biking distance from main campus.

“Students like it because it puts the course content into practice,” Farrell said.

ASKING NEW RESEARCH QUESTIONS

Altizer described this research site as a rare gem because it allows students and faculty to conduct extensive and long-term experiments in close proximity to main campus.

Starting approximately four years ago, Altizer’s students set up flight cages in the upper and lower fields to conduct outdoor experiments to test how monarch butterfly migratory behavior is affected by environmental variables. In addition, a recent graduate student conducted research at the site to explore whether monarchs use social information (cues from other individuals) in their migratory orientation.

HorseShoe Bend has hosted numerous other projects in recent years, like studies of the invasive Joro spider (see story on page 16), authored by Odum faculty member Andy Davis and undergraduate Benjamin Frick. Davis also teaches an Ecological Physiology class at the site, demonstrating the versatility of this location for the support of student learning.

Ongoing work by Assoc. Prof. Jackie Mohan and Paul Frankson examines belowground forest ecosystem processes such as soil respiration and nutrient cycling at the site.

Recently-hired faculty like Takao Sasaki have launched new projects at HorseShoe Bend, boosting its visibility. Sasaki used the facility to house homing pigeons, studying how they make decisions by scanning information among their group mates. Sasaki, along with his students, raised pigeons in a loft at the site and released them several miles from home to study their flight patterns. Due to the site’s versatility and space, Sasaki was able to conduct his experiments in a natural environment.

“If you want to study the river, it’s there. If you want to study the forest area, it’s there. Or if you want to study homing pigeons like I do, that’s possible too,” Sasaki said.

Alex Strauss, who joined the faculty in fall 2020, researches plant and aquatic infectious diseases.

“I am really excited about just the potential the HorseShoe Bend site holds for a number of different projects,” he said.

One of these studies examines fungal pathogens that infect the leaves of tall fescue, a common forage grass found in the Southeast. Strauss explained that Coleman and Crossley’s earlier study of ecosystem impacts of tillage vs. no tillage resulted in a field of tall fescue, perfect for his current work.



PHOTO COURTESY DAVID COLEMAN

PROF. EMERITUS DAVE COLEMAN (RIGHT) WITH PROF. EMERITUS D.A. CROSSLEY UNDERNEATH A BRIGHT YELLOW UMBRELLA TO PROTECT THEM FROM THE SUN WHILE WORKING AT THE HORSESHOE BEND SITE

REBUILDING FOR THE FUTURE

Faculty member John Wares has stepped up to the challenge of rebuilding the trail network at HorseShoe Bend, critical for maintaining the area. Wares, a professor with a joint appointment in Ecology and the department of genetics, has used his background in trail advocacy to repair old trails and construct new ones. This work began as a means of encouraging people to check out the site during the early phase of the Covid-19 pandemic, at a time when most classes and activities had shifted online.

“From my point of view, it is starting to regain some visibility as a really close field station for us,” said Wares.

Faculty colleagues and students joined Wares in a three-day trail restoration project, which improved the site’s utility. This work brought accessibility back to the site and boosted the number of projects that can use what HorseShoe Bend has to offer.

It is clear that HorseShoe Bend has a long history with the university and the Odum School of Ecology, and, with its resurgence of research activity, it continues to be a crucial academic resource. Its proximity to campus, natural ecology, and overall versatility make this valuable field site an exciting opportunity for faculty and students to engage in an array of diverse projects in ecology. The confluence of opportunity and initiative in the ’60s laid the groundwork for this area to become a contemporary nexus of creative ecological research.

With the continued work of Odum faculty and students, the future of HorseShoe Bend as a multi-use field station is even more promising. 🌱

JOHN SCHACKE MERGES PASSION FOR MARINE MAMMALS WITH RESEARCH AND TEACHING

BY CATHERINE CAMPBELL, AB '23

Between teaching courses on marine mammal biology and conservation and serving as the director of the Georgia Dolphin Ecology Program (GDEP), Odum School of Ecology part-time Assistant Professor John Schacke goes above and beyond for his passions.

It all started with a plane ride along the Georgia coast with a friend.

After several years practicing clinical psychology at the master's level, Schacke had received his doctorate in family development from UGA in 1984 and set up a private practice in Athens. Schacke has a commercial pilot's license, so in the late 1980s when an acquaintance who worked with a dolphin research group in Savannah asked Schacke to take him flying along the Georgia coast to count dolphins, he said yes.

"I was introduced to his group and long story short, I was intrigued by the idea of volunteer science," Schacke said. "I really got fascinated by the whole thing and found out that it resonated with me both intellectually and emotionally, to the point where I decided on a career change."

Schacke joined the research group and eventually, with his friend Dan Odell, whom he describes as a "luminary" in marine mammal science, began the self-funded research program that would become GDEP.

"We selected the central Georgia coast as our study site because it hadn't received much attention before. Over time we were able to get some grant support that enabled us to get students involved and gradually build up the scope of GDEP to the point where we're now covering half the Georgia coast," Schacke said.

GDEP studies populations of bottlenose dolphins from Ossabaw Sound to Doboy Sound. They look primarily at abundance, distribution, residency, habitat use, and social organization. With photo identification, the team is able to keep track of the dolphins without making physical contact, based on visible differences in their dorsal fins.



JOHN SCHACKE,
ASSISTANT PROFESSOR

"From these photographs we can identify individual dolphins, observe family and kinship relationships, and see how dolphins are utilizing features and areas of their habitats in their daily lives," Schacke said.

GDEP's work providing information on dolphin stock structure to the National Oceanic and Atmospheric Administration is vital in filling what was once referred to as the "Georgia gap" in stock assessment data. They now have about 11 years' worth of data to analyze and contribute.

While his career seems to have taken a drastic turn, Schacke said he draws on his background in human psychology in analyzing the behaviors and social interactions of the dolphins he studies.

"Dolphins are highly social creatures and their brains are, in some ways, very similar to ours. They set up hierarchies like we do, they establish social bonds like we do, they have natal groups and kinship groups like we do. It's not unreasonable to expect to see some of the behaviors that we find in human relationships and human society also in dolphin relationships and societies," Schacke said.

At Odum, Schacke teaches a spring course on the biology and conservation of marine mammals, which he says also contributes to the GDEP by informing his research and what he does in the field. Before the disruption of Covid-19, he taught a Maymester course on the Georgia coast taking a team of undergraduate and graduate students to Savannah and Charleston to visit conservation sites run by NOAA, the Georgia Department of Natural Resources, and the Skidaway Institute of Oceanography.

"Teaching keeps me sharp," he said. "These students are smart and they challenge me constantly, and it's one of the things I love about teaching."

Schacke's advice to students struggling to determine their career path is to take the time to explore and be open to the role of serendipity.

"College is a time for students to explore their interests and try out different things. What I encourage students to do is to not put on the blinders, don't get so focused on one thing that you miss other opportunities. If something grabs your attention, run with it," he said. 🌱

ADVANCING DIVERSITY, EQUITY, AND INCLUSION IN ECOLOGY

During the 2021–2022 academic year, the Odum School's Diversity, Equity, and Inclusion Committee developed a series of concrete steps, measurable goals, and accountability strategies for the Odum DEI action plan. These efforts will better align the Odum School's plan with the University of Georgia's Diversity and Inclusive Excellence Plan by the fall. In parallel with these planning efforts, the Odum School community launched several activities to build an inclusive culture and improve engagement.

An important goal of Ecology's strategic plan is to provide annual workshops for Odum School faculty, staff, and students on topics ranging from countering unconscious bias to developing inclusive mentoring practices. In December 2021, the DEI committee hosted the first of these workshops for faculty, staff, and graduate students. It was led by Paris Lawrence, then the assistant director of diversity education in UGA's Office of Institutional Diversity.

Another goal of Ecology's DEI plan is to reduce barriers to full participation for all students. With that end in mind, in fall 2021 the Odum School launched the new Ecology Undergraduate Student Support Fund, designed to expand undergraduate ecology majors' access to experiential learning opportunities such as study away, service-learning courses, research experiences, internships, and scientific meetings and workshops. Twelve undergraduates were supported by this new fund in spring 2022, which was jump-started by more than \$14,000 in donor gifts from the Giving Tuesday Campaign in November 2021.

To expand and diversify mentorship opportunities, the Odum School aims to attract more visiting scholars, seminar speakers, and guest lecturers from historically marginalized communities or whose visit includes addressing issues of diversity, equity, or inclusion. The Ecology seminar committee is already building this goal into invited speaker planning, while simultaneously gathering baseline data about previous seminar speakers to track efforts over time.

To increase awareness about the Odum School—and the field of ecology generally—among a more diverse pool of prospective students, Ecology is increasing our investment in outreach efforts like EcoReach, our student-run environmental education program. The Odum School recently allocated funds for a graduate student assistant to serve as the EcoReach coordinator, and this past year the organization recruited an Americorps VISTA member to assist EcoReach in connecting with more communities around UGA (see story on page 17).

In terms of the discipline of ecology, Odum School members are taking on leadership roles in two larger DEI initiatives. The school recently became a partner organization of Diversity Joint Venture for Careers in Conservation, described on its website as “a partnership of federal and state agencies, universities, non-governmental organizations, foundations, and professional societies that work together to increase the number of women and people of color in the conservation workforce.” The Odum School is represented on the DJV management board by Assoc. Prof. Krista Capps, who was elected in April 2022.



PHOTO BY JEREMY MONROE

Ecology members also lead Emerge, a project of the Society for Freshwater Science, which launched in 2021 with funding from the National Science Foundation. Led by Prof. Amy Rosemond, Undergraduate Coordinator Amanda Rugenski, and Program Coordinator Breanna Ondich, with colleagues from Georgia Southern University; the University of California, Berkeley; and Virginia Commonwealth University, Emerge is already making an impact. The program is designed to increase participation and retention of students and early career scientists from groups under-represented in STEM fields. In its first year, Emerge accepted a cohort of 26 Fellows and offered a suite of online and in-person activities including a river exploration trip, monthly online collaboration meetings, and in-person workshops on visual communication and on using R software to analyze National Ecological Observatory Network (NEON) data. Year two successfully launched at the Joint Aquatic Sciences Meeting in Grand Rapids, Michigan, in May 2022. Emerge partner and filmmaker Jeremy Monroe of Freshwaters Illustrated released a short video introducing the program, which can be viewed at www.sfsemerge.org/. It was also featured in the 2022 STEM for All Video Showcase.

The Odum School's DEI committee members for 2021–2022 were Rico Holdo (chair), Kait Farrell, and Lizzie King (faculty); undergraduate Kailah Massey, AB '22; graduate student Supraja Rajagopal; and staff members Kate Galbraith and Beth Gavrilles. ➡

2021 AWARDS & HONORS 2022



Graduate student **CAROLINE AIKINS**, MS '22, received a 2022 Presidential Management Fellowship from the U.S. Office of Personnel Management.



Doctoral student **REBECCA ATKINS** was selected as a 2022 John A. Knauss Marine Policy Fellow by NOAA and Sea Grant. This highly competitive one-year fellowship places early career professionals in federal government offices in Washington, D.C., to gain hands-on experience transferring science to policy and management. Atkins was placed with the Office of the Assistant Administrator in the NOAA National Ocean Service. She was also inducted into the Blue Key Honor Society in 2022.



JEFFREY BEAUVAIS, a doctoral student in Integrative Conservation and Ecology, was selected as a 2023 John A. Knauss Marine Policy Fellow finalist, one of 86 people from across the country so honored. His fellowship begins in February 2023.



Meigs Teaching Professor and Associate Dean for Research and Operations **JEB BYERS** was elected a Fellow of the American Association for the Advancement of Science in 2022 for "distinguished contributions to the field of ecology, particularly in invasion biology, parasite ecology, ecosystem engineers, and range boundaries in marine environments, as well as excellence in teaching," according to the announcement from AAAS. Byers also received the 2022 Lamar Dodd Creative Research Award from the UGA Office of Research, which is given to recognize an overall scholarly body of work that has had a major impact on the field of study and established the investigator's international reputation. In 2022, Byers was also named a Lothar Tresp Outstanding Honors Professor by the Morehead Honors College.



Lecturer **SCOTT CONNELLY**, PhD '09, received the 2022 Outstanding Faculty Member Award from the UGA Disability Resource Center. He was nominated by students registered with the center in recognition of his support during the Covid-19 pandemic.



Associate Professor **KRISTA CAPPS** was named to the Women in STEM Leadership program at the Alan Alda Center for Communicative Science at Stony Brook University in 2022. She and **AMANDA RUGENSKI**, Undergraduate Coordinator and Lecturer, were accepted into the UGA Active Learning Summer Institute for 2022.



Doctoral students **CAROLYN CUMMINS** (Ecology), **ALYSSA QUAN** (Integrative Conservation and Ecology), and **CAROL YANG** (Ecology) received 2022 Outstanding Teaching Assistant Awards, which are given in recognition of superior instructional skills in the classroom or laboratory. The awards are sponsored by the UGA Office of Instruction and administered by UGA's Center for Teaching and Learning.



CAROL YANG also received a 2022 Excellence in Teaching Award, the top teaching award for graduate students at UGA. Sponsored by the UGA Graduate School and administered by the UGA Center for Teaching and Learning, this highly competitive award recognizes UGA graduate students who have demonstrated superior teaching skills and contributed to teaching beyond their own classroom responsibilities.



Distinguished Research Professor **JOHN DRAKE** was named a Regents' Professor in 2022, an honor bestowed by the University System of Georgia Board of Regents on faculty whose scholarship or creative activity is recognized both nationally and internationally as innovative and pace-setting.



Undergraduate ecology and genetics major **ELIZABETH ESSER**, BS '22, received a UGA Presidential Award of Excellence, which is given to students in their final year of study who represent the top 1% of undergraduates at UGA and who excel in academics, service, and leadership.

2 0 2 1 AWARDS & HONORS 2 0 2 2



Professor **WILLIAM FITT** traveled to Brazil in 2022 on a Fulbright Fellowship to study the role of climate change in allowing the introduced upside-down jellyfish *Cassiopea sp.* to establish a foothold in Brazil. He is collaborating with professors, research scientists and students at the marine station in São

Sebastião, the Marine Biology Center (CEBlmar) at the Universidade de São Paulo and Department of Marine Biology at the Universidade Federal Fluminense (UFF) in Rio de Janeiro, and the AquaRio Aquarium in Rio de Janeiro, giving seminars and teaching students at those institutions.



Lecturer and Undergraduate Coordinator **AMANDA RUGENSKI** received a 2022 Creative Teaching Award from the UGA Office of Instruction, given to faculty who have demonstrated exceptional creativity in using an innovative technology or pedagogy that extends learning beyond the traditional classroom or for their creative course design or implementation of subject matter that improves student learning outcomes in their courses.



Doctoral student **JULIANA HOYOS** received a 3-year scholarship from the Department of Science, Technology, and Innovation of Colombia (COLCIENCIAS) in 2022 to support her graduate studies in Ecology.



Lecturer **J.P. SCHMIDT**, PhD '06, was in Brazil during summer 2022 on a Fulbright Fellowship.



Lecturer **ALLI INJAIN** was accepted into the UGA Service-Learning Fellows cohort of 2022-2023.



Assistant Professor **ALEX STRAUSS** was selected for the 2022-2024 Lilly Teaching Fellows program at UGA.



Undergraduate ecology major **CAITLIN LYONS**, a member of the UGA Equestrian Team, was named to the 2021-2022 Winter Southeastern Conference Academic Honor Roll.



Master's student **CORINNE SWEENEY** received the 2022 Katherine S. McCarter Graduate Student Policy Award from the Ecological Society of America.



Doctoral student **KELLY PETERSEN** was the inaugural recipient of the Owen Fellowship from the Longleaf Alliance.



Undergraduate ecology and biology major **TEJAS REDDY**, a UGA Honors student, was named a 2022 Udall Scholar in recognition of leadership, public service and commitment to issues related to the environment.



Professor **AMY ROSEMOND** was named a Distinguished Research Professor in 2022, a title bestowed to honor senior faculty members who are internationally recognized for their innovative body of work and its transformational impact on the field.



Master's student **BENJAMIN TAYLOR**, BS '17, received a James L. Carmon Scholarship Honorable Mention from the UGA Office of Research. This scholarship recognizes UGA graduate students who have used computers in innovative ways.



Doctoral student **ANNA WILLOUGHBY** received the Beverly Hirsh Frank Graduate Fellowship for Women in Science for 2022-23 from the UGA Graduate School.

SPRING FLING

2 0 2 2



PHOTOS BY BENJAMIN Z. TAYLOR, AB '17

The Odum School of Ecology celebrated the accomplishments and creativity of students, faculty, and staff at the annual Spring Fling awards dinner on April 29 at Flinchum's Phoenix, with Prof. Amy Rosemond and Lab Coordinator Kait Farrell serving as the evening's hosts. This year's theme was Earth Day 1970, with prizes for best costume going to the Hippie Dippies (aka the Altizer-Davis family), the Sun and Sunflower (undergraduates Isaac Wood and CJ Hannan), and the Rock Stars (undergraduates Lindsay Jason, Preston Harden, Kate Moore, and Sam Nestor) in the grown-up category and to Oscar Davis—

the “still extinct in 1970” T-Rex—in the kids' section. The evening concluded with music from the '70s, '80s, and beyond by Basementality, a hyperlocal rock band featuring Prof. Jeb Byers; ecology doctoral student Christian Swartzbaugh; retired English faculty member and former director of the Sustainability Certificate Program Ron Balthazor; and Jason Roberts, a faculty member in the religion department who teaches courses on sustainability. They were joined by special guest performers Hannah Hall—a biology student minoring in ecology—on vocals and Prof. Pej Rohani on lead guitar. 🌱

ODUM SCHOOL OF ECOLOGY AWARDS

RON CARROLL AND CAROL HOFFMAN
COSTA RICA TRAVEL AWARD

Christopher Brandon
Kelly Nguyen

JOSH LAERM MEMORIAL OUTSTANDING
ECOLOGY UNDERGRADUATE AWARD

Christopher Brandon

ODUM SCHOOL EXPERIENTIAL LEARNING PROGRAM

David Adle
Christopher Brandon
Amanda Budd
Skyler DeWitt
Emilie Dudgeon
Austin Goss
Ethan Hackmeyer
Alexander Hall
Kelly Nguyen
Skye Remko
Sydney Speir
Ally Whiteis
Isaac Wood

THELMA RICHARDSON AND FRANK GOLLEY
UNDERGRADUATE SUPPORT AWARD

Amanda Budd
Sydney Speir

BEST STUDENT PAPER AWARD

Dessa Benson
“Forest dynamics models for conservation,
restoration, and management of small forests”
Forests, April 2022, Vol. 13, Issue 4
DOI: 10.3390/f13040515

DISTINGUISHED GRADUATE STUDENT
TEACHING AWARD

Carolyn Cummins

FRANK GOLLEY MEMORIAL AWARD

Carolyn Cummins

GRADUATE DIVERSITY AWARD IN ECOLOGY

Jordan Argrett

STUDENT RESEARCH LARGE GRANTS

Shelby Bauer
Maria Luisa Müller Theissen

STUDENT RESEARCH SMALL GRANTS

Jordan Argrett
Michael Belovitch
Laura Naslund
TJ Odom
Katie Schroeder

ODUM TRAVEL GRANTS

Viviana Bravo
Max Kelly
Emma Kelsick

EMPLOYEE OF THE YEAR AWARD

Jennifer Mathews

OUTSTANDING FACULTY INSTRUCTORS OF THE YEAR

Scott Connelly
Andy Davis

DEAN'S AWARD

Beth Gavrilles

KEYSTONE STAFF AWARD
(FORMERLY THE PURPLE HEART AWARD)

Tyler Ingram
Brian Perkins

CONGRATULATIONS GRADUATES!



PHOTO BY BENJAMIN Z. TAYLOR, AB '17

GRADUATE STUDENTS

CLASS OF 2021

Ashley Ballew, MS Ecology
 Katherine Christie, MS CESD
 Kyle Connelly, MS CESD
 RajReni Kaul, PhD Ecology
 Emily (Maddie) Monroe, MS Ecology
 Sarah Ottinger, MS Ecology
 Robert Richards, PhD Ecology
 Kelsey Solomon, PhD Ecology
 Joy Vaz, MS Ecology
 William White, MS CESD

CLASS OF 2022

Caroline Aikins, MS Ecology
 Anna Baynes, MS ICAS
 Dessa Benson, PhD Ecology
 Megan Hopson, PhD Ecology
 Talia Levine, MS ICAS
 Jessie Motes, MS Ecology
 Rebecca Park, MS ICAS
 Kelly Ridenhour, MS ICAS
 Isabel Wargowsky, MS Ecology

UNDERGRADUATES

CLASS OF 2021

Constantina Constantinides, BS Ecology, *cum laude*
 Thomas Fitzpatrick, BS Ecology, *cum laude*
 Maxine Heffron, BS Ecology, *magna cum laude*
 Hannah Maddux, BS Ecology
 Hannah Mone, BS Ecology, *magna cum laude*
 Tyler Richmond, BS Ecology
 Sabrina Sailer, BS Ecology
 Kyle Steen, BS Ecology, *cum laude*
 Maud van der Beek, AB Ecology

CLASS OF 2022

August Anderson, BS Ecology, *magna cum laude* with Honors
 Natalie Bachner, BS Ecology, *cum laude*
 Christopher Brandon, BS Ecology, *summa cum laude* with Highest Honors
 Anna Burkhart, BS Ecology
 Drew Di Francesco, AB Ecology
 Alannah Dodd, BS Ecology, *cum laude*
 Jesse Donck-Rains, AB Ecology, *magna cum laude* with Honors
 Jennifer Duncan, BS Ecology
 Stephen Durkee, BS Ecology, *magna cum laude*
 Elizabeth Esser, BS Ecology, *summa cum laude* with Highest Honors
 George "Mikey" Fager, AB Ecology
 Niki Gajjar, BS Ecology, *cum laude*
 Christopher "CJ" Hannan, BS Ecology
 Maylyn Hinson, AB Ecology, *cum laude*
 Chaya James, AB Ecology, *magna cum laude*
 Sidney Jones, BS Ecology
 Zachary Keung, AB Ecology
 John Knox, AB Ecology
 Kailah Massey, AB Ecology
 Mark Murray, BS Ecology
 Brandy Quick, BS Ecology
 Elizabeth Shaffer, BS Ecology, *cum laude*
 Farran Smith, BS Ecology, *cum laude*
 Nicole Steel, BS Ecology, *summa cum laude* with Highest Honors
 Savannah Thompson, AB Ecology
 Trevor Underwood, BS Ecology, *summa cum laude*
 Julia Weil, BS Ecology, *summa cum laude* with Highest Honors
 Madison White, AB Ecology, *magna cum laude*
 Destiny Willard, AB Ecology
 Tabitha Williams, AB Ecology
 Olivia Wilson, AB Ecology
 Adam Womble, BS Ecology
 Jenna Zellerer, AB Ecology



GSS AWARD WINNERS

PEOPLE'S CHOICE AWARD

Supraja Rajagopal

SESSION AWARDS

SESSION 1

Supraja Rajagopal

Individual and social learning of foraging routes in the rock ant *Temnothorax rugatulus*

SESSION 2

Samantha Bock

The adaptive significance of temperature dependent sex determination in the American alligator

SESSION 3

Kaylee Arnold

The gut microbial diversity of a Chagas disease vector varies across single and coinfection status throughout central Panama

SESSION 4

Erik Jones

How does soil carbon storage vary within ectomycorrhizal forests?

SESSION 5

Cali Wilson

Urbanization, food provisioning, and transmission-relevant behaviors in Florida white ibis

RAPID FIRE 1

Jordan Argrett

Plant parasitism and soil microbes: A tripartite interaction driving plant community structure

RAPID FIRE 2

Tucker Stonecypher

Wetland restoration: A new approach to restoring gopher frog breeding sites

UNDERGRADUATE POSTER AWARDS

1ST PLACE

Preston Harden

The effect of epiphyllous lichen cover on leaf water retention

2ND PLACE

Tejas Reddy

Abiotic and biotic drivers of detrital decomposition in bromeliads

3RD PLACE

Rose Barfield

Diversity and richness of mosses and liverworts in boulder habitats

GRADUATE STUDENT SYMPOSIUM 2022



University of Georgia Ecology students gathered in person and online to share their research plans and discoveries at the 28th annual Odum School of Ecology Graduate Student Symposium, held February 11–12, 2022. The event included oral presentations, research posters, and a keynote address by alumnus Marcelo Ardón Sayao, associate professor in the College of Natural Resources at North Carolina State University.


The symposium opened with a welcome from Interim Dean Sonia Altizer, and featured seven sessions with 26 talks by graduate students in the Ecology, Integrative Conservation, and IDEAS doctoral programs. Thirteen Ecology undergraduates also participated, presenting their original research at a poster session on Friday evening.

On Saturday, Ardón delivered the keynote address via Zoom. Born and raised in Costa Rica, Ardón received his doctorate in ecology from UGA in 2006, working under the mentorship of Distinguished Research Prof. Catherine Pringle. His dissertation, "Effects of leaf litter quality on decomposition dynamics in lowland Neotropical streams," focused on the effects of leaf carbon quality and nutrient content on leaf breakdown in streams at La Selva Biological Station in Costa Rica. After graduating from UGA, he completed a postdoc at Duke University and then began a position as an assistant professor at East Carolina University before

joining the faculty of North Carolina State in 2016. He has published more than 40 peer-reviewed papers and book chapters, and is the recipient of the Mercer Award from the Ecological Society of America for the best paper by an ecologist under 40, a CAREER award from the National Science Foundation, and the NC State University Graduate School's Outstanding Graduate Mentor Award.

Ardón and his students study how wetland and stream ecosystems respond to environmental changes accelerated by human activity, and whether management tools can restore their ecological functioning. His talk, "Biogeochemical signals in tropical streams and temperate coastal wetlands," drew upon lessons they have learned as they "combine long-term monitoring, field and lab experiments, remote sensing, citizen science, and kindness in an effort to forecast and adapt to the synergistic and non-linear effects of an uncertain future," according to the GSS program.

Ardón also spoke movingly about his late wife Erin Lindquist, PhD '03, who passed away in 2019 after a long battle with cancer.

The annual John K. Spencer Memorial 5K Run & Walk, which has become a traditional part of GSS, took place on Saturday morning at the HorseShoe Bend Ecological Research site. This event honors the memory of the late John Spencer, MS '16, who was beloved for his humor, generosity, enthusiasm and kindness. John studied urban streams and was passionate about freshwater ecology, conservation, and ecological restoration. The 5K's 34 participants raised \$920 for the River Basin Center's John K. Spencer research grants, which are given for projects that advance the RBC's goal of sustainable management of aquatic resources and ecosystems. 

LOGO BY ISABEL WARGOWSKY, BS '21/MS '22

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Parents & Families Day



PHOTO BY KATIE TONG, AB '23

Families of nearly three dozen Ecology undergraduates experienced the Odum School first-hand during Parents & Families Day 2022 on Feb. 26. The more than 100 attendees heard from faculty, students, and alumni at a series of talks and panel discussions; viewed undergraduate research posters on display throughout the building; and toured faculty research labs to learn about some of the topics their students are exploring.

The morning opened with a welcome from Interim Dean Sonia Altizer, followed by an overview of the undergraduate Ecology program from Amanda Rugenski, lecturer and undergraduate program coordinator. Lecturer Alli Injaian discussed highlights of the Bachelor of Science and Bachelor of Arts undergraduate programs in Ecology, such as study abroad and study away options, the Ecology undergraduate peer mentorship program, and service-learning classes that partner students with local non-profit organizations.

Attendees then participated in an interactive ecology class taught by Prof. Jeb Byers, who used the imaginative example of reported Bigfoot sightings to engage the audience. He asked participants to work in small teams to propose methods for testing whether Bigfoot was real, helping them realize that they already had an innate understanding of scientific approaches, and providing a segue to discuss how ecological principles help us understand the natural world around us.

Before lunch, a panel of third- and fourth-year students, moderated by Injaian, discussed their experiences at the school. Amanda Budd, AB '23, Jesse Donck-Raines, AB '22, Preston Harden, BS '22, Maylyn Hinson, AB '22, Jayce Marino, BS '23, and Sydney Speir, BS '23, shared their thoughts about the Odum School student experience.

During research laboratory tours, guests learned about marine ecosystems—and the many threats they face—from members of the Byers lab. Asst. Prof. Takao Sasaki and his graduate students showed videos of animal movement research featuring homing pigeons and ants. Faculty and graduate students with the River

Basin Center gave participants the chance to observe fish, dragonfly larvae, and other aquatic organisms while describing some of the center's science and policy research. At the Center for the Ecology of Infectious Diseases, attendees learned how environmental factors influence pathogen emergence and the CEID's efforts to improve pandemic preparedness.

The day wrapped up with a panel of recent Odum School graduates, who participated via Zoom. Miriam Edelkind-Vealey, BS '21, Juliet Eden, AB '21, Guy Eroh, BS '19, and Jenna McLoughlin, AB '21, discussed how their experiences at Odum shaped their career paths, and offered advice to current students.

Their recommendations included taking advantage of opportunities like study away, building relationships with professors and fellow students, seeking out Undergraduate Program Advisor Misha Boyd for guidance, and exploring widely.

Eden summed up the group's advice.



PHOTO BY KATIE TONG, AB '23

"Dabble in this, apply for something off Misha's list, go to that club meeting, try new things," she said. "That will help you build your confidence and build your skills, but also what you want to focus on. A lot of us won't go on to be 'ecologists,' we'll go on to all these different types of jobs. Sometimes that can feel a little bit like, 'Am I successful? Did I do the right thing?' You did, and it's awesome we get to use this degree in so many other ways." 🌱



PHOTO BY KATIE TONG, AB '23

COVICH HONORED AT JOINT AQUATIC SCIENCES MEETING

The Odum School is renowned for its strength in aquatic ecology and the trailblazing work by current and former faculty, research staff, and students. In May, the Odum community made a strong showing at the 2022 Joint Aquatic Sciences Meeting (JASM) in Grand Rapids, Michigan. The week-long conference, with over 3,000 attendees from around the world, featured close to 50 talks and poster presentations by current and past Odum School members.

On the second day of the conference, alumni, students, faculty, and friends of UGA Ecology gathered to celebrate Prof. Emeritus Alan Covich, who retired in 2021. An informal mixer, hosted by Interim Dean Sonia Altizer, drew over 100 attendees, including Covich's colleagues and former students from Oklahoma, Colorado State, and the Luquillo LTER program.

The evening began with time for friends old and new to converse and connect before a short program paying tribute to Covich. Speakers lauded his many contributions to freshwater science, to the field of ecology in general and tropical ecology in particular, to the Odum School and UGA, and to his mentorship of students.

Altizer praised Covich's leadership as director of the Institute of Ecology from 2003–2006, and then as a professor in the Odum School until his retirement in 2020. Now as emeritus professor, Covich remains active in the school, attending virtual seminars and defenses and asking insightful questions, participating in emeritus gatherings, and providing advice and guidance on fundraising and alumni affairs.

Seth Wenger, associate professor and director of science for the UGA River Basin Center, remarked on Covich's role in supporting and strengthening the Odum School's aquatic science program and UGA's commitment to it.

"UGA has never had a stronger advocate or louder cheerleader for freshwater ecology than Alan Covich," he said.

Todd Crowl, professor and director of the Institute of Environment at Florida International University, was one of Covich's first graduate students at the University of Oklahoma. He provided remarks about Covich's time there and at Colorado State University, and his work at the Luquillo LTER site in Puerto Rico.

A rousing game of trivia led by Odum School Assoc. Prof.

Krista Capps offered prizes for those who correctly answered questions about Covich's favorite aquatic organism (*Macrobrachium carolinus*), the funniest thing that ever happened to him in the field (it involved getting lost in the dark in the rainforest at El Verde without a flashlight one night in the 1980s), and how many other countries he and his students have studied freshwater ecosystems in (according to Covich, seven: Belize, Borneo, Brazil, Guatemala, Mexico, Panama, Puerto Rico—"not legally a country, but they have their own Olympics team!")

Covich concluded the program with remarks of his own, making it clear that he will not miss faculty meetings, but is remaining very much engaged.

"I look forward to providing advice to students and colleagues as they continue to discover new things about tropical streams," he said. "I want to encourage everyone to do more night-videos of shrimps and crabs...and always remember to take two flashlights so they can find their way back to the field station."

Capps created a tribute to Covich in the form of an online "Kudoboard," where friends can upload photographs, memories, and congratulations. To contribute, visit: www.kudoboard.com/boards/LEdbgiqt.



ALONSO RAMIREZ, PHD '01, AND ASSOC. PROF. SETH WENGER, PHD '06



NICK MARZOLF, MS '15, ALAN COVICH, AND CARLA ATKINSON, MS '08



DAVID MANNING, PHD '15, JON BENSTEAD, PHD '01, AND MIKE PAUL, PHD '99



LEROEY POFF OF COLORADO STATE UNIVERSITY, ALAN COVICH, AND JAMIE MARCH, PHD '00



ODUM GRADUATE STUDENT LAURA NASLUND AND PROF. AMY ROSEMOND



KELSEY SOLOMON, PHD '21, REBECA DE JESÚS CRESPO, PHD '15, PEDRO TORRES, PHD '20, AND ODUM GRADUATE STUDENT MAX KELLY



ODUM ASSOC. PROF. KRISTA CAPPS, DAVE WALTERS, PHD '02, JAMIE MARCH, PHD '00, MIKE PAUL, PHD '99, AND EVELYN GAISER, PHD '97



ODUM STUDENTS CORINNE SWEENEY, EMMA KELSICK, LAURA NASLUND, AND JESS MITCHELL; AND REU STUDENT SOPHIA GOMEZ OF FLORIDA STATE UNIVERSITY



INTERIM DEAN SONIA ALTIZER AND ALAN COVICH



ODUM GRADUATE STUDENTS NATE TOMCZYK, DENZELL CROSS, CHRISTIAN SWARTZBAUGH, CORINNE SWEENEY, AND KYLE CONNELLY, MS CESD '21



WYATT CROSS, PHD '04, PROF. EMERITUS BRUCE WALLACE, JAMIE MARCH, PHD '00, AND BOB HALL, PHD '96

EMERITUS UPDATE

The Odum School's emeritus faculty are a busy and productive group!

Eight local emeritus faculty (**DAVE COLEMAN**, **DAC CROSSLEY**, **CARL JORDAN**, **BERNIE PATTEN**, **JOHN PICKERING**, **JIM PORTER**, **KAREN PORTER**, and **BRUCE WALLACE**) enjoyed a picnic lunch and a tour of current research underway at HorseShoe Bend hosted by Interim Dean Sonia Altizer in November 2021. They heard from Dean Altizer as well as current faculty Andy Davis, Jackie Mohan, Taka Sasaki, and Alex Strauss, all of whom are conducting research at the site. Besides enjoying a beautiful afternoon and catching up with colleagues, the gathering allowed current faculty to learn about research in agroecology launched at the site decades earlier (see story on page 18). Dean Altizer has continued to host emeritus faculty lunches, both virtual and in person, during 2022, and plans are afoot to hold an Emeritus Faculty Symposium in the coming year.



(L-R) **BRUCE WALLACE**, **JIM PORTER**, **JACKIE MOHAN**, **DAVE COLEMAN**, **PAUL FRANKSON**, **TAKA SASAKI**, **SONIA ALTIZER**, **ALLISON WALTERS**, **PEJ ROHANI**, **CARL JORDAN**, **BERNIE PATTEN**, AND **ALEX STRAUSS**

DAVE COLEMAN points out where some of his field experiments took place at HorseShoe Bend.



ALAN COVICH presented a paper, "Interactions Among Shrimps and Crabs to Palm Fruit Fall in a Brazilian Stream," at the Joint Aquatic Sciences Meeting in Grand Rapids, Michigan, in May 2022, where he was honored at the UGA Ecology mixer (see story on page 28.) In June 2022 he presented a paper, "Effects of Severe Drought on Tropical Rainforest Streams: Impacts on Freshwater Shrimp in Puerto Rico," at the American Geophysical Union's Frontiers in Hydrology meeting in San Juan, Puerto Rico.



DAC CROSSLEY is Curator (emeritus) of Mites and Ticks in the Georgia Museum of Natural History, a task he enjoys. Dac writes, "Do you have chiggers in your yard? I'd like some samples." Dac continues to write western stories about Texas Rangers and bandits, having published five novels so far. Visit daccrossley.com to learn more about the books.



LAURIE FOWLER is living in Scaly Mountain, NC, where she has joined the Sky Valley-Scaly Mountain Volunteer Fire Department and Rescue Team. She is giving a keynote address at the 2022 River Basin Center Policy Symposium and Celebration in September.



WHIT GIBBONS and alumnus Jeff Lovich, PhD '90, published a new book, *Turtles of the World*, in 2021 (see Bookshelf), a lavishly illustrated and comprehensive guide to the 354 known species of turtles that exist today. It includes descriptions of each living turtle genus, organized by family, featuring distribution maps, species lists, and information about their biological traits. Many of the accounts also include conservation concerns, with at least one species in each family currently at risk of extinction. Whit also continues to write his long-running weekly "Ecoviews" column, which is carried in newspapers across the U.S. A number of those columns are compiled into book form in *Ecoviews* (1998) and *EcoViews Too* (2017), by Whit and Anne R. Gibbons, both from the University of Alabama Press.



GENE HELFMAN has turned to writing fiction. He published his debut novel, *Beyond the Human Realm*, in July 2021 (see Bookshelf.) The book, an animal story for adults about a captive male killer whale released into the wild, won the 2021 National Indie Excellence Award for Animal Fiction. Profits from the book are being donated to orca conservation. Gene recently completed the draft of a second eco-thriller, *Fins*, which he describes as "a shark-friendly parody of the sharks-out-to-destroy-the-world genre (think *Jaws*, *Sharknado*, etc.); it skewers the practice of cutting fins off sharks and disposing of the animals while still alive." Gene and his wife, Prof. Emerita Judy Meyer, live on Lopez Island off the northwest coast of Washington.

BOOKSHELF



Stream Ecology: Structure and Function of Running Waters, Third Edition

By J. David Allan, María M. Castillo, and Krista A. Capps, Assoc. Professor. Springer Nature, 2022.

A thoroughly updated and expanded edition of this essential textbook.



Savannah's Hoodoo Doctor: The Tyranny of Dogma

By William Crump, BS '75. Independent, 2022.

A semi-autobiographical magical realist journey through time in coastal Georgia. Part One of the *Healing Savannah* trilogy.



Savannah's Bethesda: Healing for All

By William Crump, BS '75. Independent, 2022.

Part Two of the *Healing Savannah* trilogy continues the narrator's journey through time.



Population Biology of Vector-borne Diseases

By John Drake, Distinguished Research Professor, M. Bonsall, and M. Strand, editors. Oxford University Press, 2021.

The first comprehensive survey of this rapidly developing field, part of the Ecology and Evolution of Infectious Diseases series sponsored by the UGA Center for the Ecology of Infectious Diseases.



LEFT TO RIGHT: CLELIA MAURY, GARO BATMANIAN, CARL JORDAN, CARMEN JORDAN, AND CHRIS JORDAN.

CARL JORDAN reported that he enjoyed a visit from his former student Garo Batmanian, PhD '90, and his wife Clelia Maury in July 2021. Garo is the Global Lead for Forests, Landscapes, and Biodiversity at the World Bank. Carl contributed a chapter, "Socioeconomics of Agroforestry for Coffee Production; Economic and Environmental Implications," to the second edition of *Integrating Landscapes: Agroforestry for Biodiversity Conservation and Food Sovereignty*, edited by another former student, Florencia Montagnini, PhD '85, Senior Research Scientist and Director of the Program in Tropical Forestry and Agroforestry at the Yale School of the Environment. It is due to be published by Springer in 2022. Carl is also the author of a new book, *Evolution from a Thermodynamic Perspective* (see Bookshelf) and is keeping busy with the interactive feature of the book's website: www.Thermodynamic-Evolution.org.



BERNIE PATTEN has expanded The Secret Sits (TSS) Pro Musica, the nonprofit music program he founded in memory of his late wife Marie in 2017. TSS supports music education, outreach, and research in Athens and northern New York state. During the summer of 2021, TSS developed a partnership with Paul Smith's College in the Adirondacks to pursue a new program element he calls Music-in-Nature/Nature-in-Music. You can read more about TSS here: thesecretsits.org.



JIM PORTER HAS SHOWN THAT UWUXO, SUCH AS THIS DEPTH CHARGE (PROBABLY A WWII ANTI-SUBMARINE 'ASH CAN') ARE DANGEROUS, NOT ONLY DUE TO THEIR EXPLOSIVE CHARGE, BUT ALSO DUE TO AT LEAST 7 CARCINOGENS THAT THEY LEACH OUT ONTO NEIGHBORING CORAL REEFS. TIFFANY WINN / MAUI DIVERS

JIM and **KAREN PORTER** are working in the Florida Keys in 2022 on Jim's current NSF grant, "The Use of 3-D Imagery to Assess Topographical Changes in Coral Reefs Under Stress," with Ecology undergraduate Alex Hall, BS '23, and Marine Sciences Ph.D. student Jacob Simon. Following on his work in Vieques in Puerto Rico, Jim has begun a long-term project in Hawaii on underwater unexploded ordnance, working with Jake McGrew, a former student in the Conservation Ecology and Sustainable Development master's program. This work is the subject of a public lecture for the Conservation Ecology Seminar series at UGA. In March 2022, Jim was part of an interdisciplinary panel on the war in Ukraine hosted by the UGA School of Law, where he discussed the long-term environmental impacts of war: bit.ly/ukraine-panel. 

BOOKSHELF



Beyond the Human Realm

By Gene Helfman, Professor Emeritus. Lumineer Press, 2022.

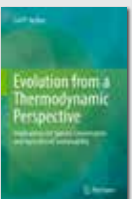
An animal story for adults, centered on the life of a captive male orca returned to the wild.



Turtles of the World: A Guide to Every Family

By Jeff Lovich, PhD '90, and Whit Gibbons, Professor Emeritus. Princeton University Press, 2022.

A comprehensive exploration of the biology of these charismatic and imperiled animals.



Evolution from a Thermodynamic Perspective: Implications for Species Conservation and Agricultural Sustainability

By Carl Jordan, Senior Research Scientist Emeritus. Springer, 2022.

Examines thermodynamic characteristics of ecosystems to better understand the sustainability of agriculture and the conservation of endangered species.



Biodiversity Islands: Strategies for Conservation in Human-Dominated Environments

By Florencia Montagnini, PhD '85, editor. Springer, 2022. Volume 20 in Springer's *Topics in Biodiversity and Conservation* book series.



2020s

ZACHARY ARNOLD, BS '20/MS CESD '21, was lead author on a paper in *PLOS One*, "Not just trash birds: Quantifying avian diversity at landfills using community science data," (doi.org/10.1371/journal.pone.0255391) with Assoc. Profs. Seth Wenger and Richard Hall as coauthors. Zach starts a position as an instructor at the Mount Vernon School in Atlanta in fall 2022. He was previously a visiting instructor at Georgia Southern University and then spent several months in Australia, where, he reports, "the birding has been phenomenal. 235 species."

DIANE KLEMENT, AB '20, was selected for a 2021-22 Marine Extension and Georgia Sea Grant Marine Education Fellowship on Skidaway Island. Fellows teach field, lab, and lecture classes to visiting school groups, assist with animal husbandry at the UGA Aquarium, and work closely with Marine Extension and Georgia Sea Grant's extension specialists to incorporate information about their projects into educational programming. Read more: t.uga.edu/87l. (Photo by Emily Kenworthy/Marine Extension and Georgia Sea Grant.)

CLAIRE TEITELBAUM, PhD '21, was lead author on a 2022 paper, "Habitat Specialization by Wildlife Reduces Pathogen Spread in Urbanizing Landscapes," (doi.org/10.1086/717655) in *The American Naturalist*, with Interim Dean Sonia Altizer and Assoc. Prof. Richard Hall as coauthors. Claire is currently a postdoctoral Quantitative Ecologist at the U.S. Geological Survey Ecological Science Center (formerly known as the Patuxent Wildlife Research Center) where she uses mathematical and statistical models to study the ecology of avian influenza viruses in wild birds.

2010s

ELIZABETH ASHLEY, BS '19, was lead author on a paper published in *Herpetologica* in 2021, "Effects of Salinity on Hatchling Diamond-Backed Terrapin (*Malaclemys terrapin*) Growth, Behavior, and Stress Physiology," (bit.ly/ashley-terrapin) based on research she conducted as an undergraduate. Asst. Research Scientist Andy Davis was a coauthor and John Maerz, a professor in the Warnell School of Forestry and Natural Resources who is an ecology courtesy faculty member, was lead author. You can read more about the study at bit.ly/tiny-terrapins.

MALCOLM BARNARD, BS '17, entered the Biology Ph.D. program at Baylor University in 2022 after receiving his M.S. in Marine Sciences from the University of North Carolina at Chapel Hill in 2021. At Baylor he will work in the Department of Biology and Center for Reservoir and Aquatic Systems Research co-advised by Steve Powers and Thad Scott.

KATHLEEN "KATY" BRIDGES, MS CESD '11, joined the faculty of the University of Arkansas at Monticello College of Forestry, Agriculture and Natural Resources as an assistant professor in 2022. Katy was previously a postdoctoral researcher at the Ohio State University

and at Louisiana State University, where she received a Ph.D. in soil science in 2018. She also worked as a regenerative agriculture specialist at Indigo. Read more in the *Deltaplex News*: bit.ly/bridges-uam.

WILLIAM BUNCH, MS '12, was named the Region 8 Regional Science Liaison at the U.S. Environmental Protection Agency in 2022. He was previously a life scientist with the agency with responsibility for Clean Water Act Section 404 permitting, mitigation, and jurisdictional determinations in Colorado, North Dakota, and Montana.

ALYSSA GEHMAN, PhD '16, was lead author on a paper, "Influences of land use and ecological variables on trematode prevalence and intensity at the salt marsh-upland ecotone," published in *Ecosphere* in 2021 (doi.org/10.1002/ecs2.3723), with Prof. Jeb Byers as senior author. Alyssa is a marine disease ecologist at the Hakai Institute and adjunct professor in the University of British Columbia Institute of Oceans and Fisheries.

LINSEY HARAM, PhD '18, was interviewed on NPR's *Science Friday* on Earth Day 2022 about marine life on the Great Pacific Garbage Patch (listen here: bit.ly/scifri-haram). Her paper on the topic, "Emergence of a neopelagic community through the establishment of coastal species on the high seas," was published in *Nature Communications* in December 2021 (doi.org/10.1038/s41467-021-27188-6). Linsey began a position as AAAS Science & Technology Policy Fellow at USDA-NIFA in 2021, and was previously a Postdoctoral Research Fellow at the Smithsonian Environmental Research Center and a Visiting Lecturer in Marine Ecology at Williams-Mystic, the Coastal and Ocean Studies Program of Williams College and Mystic Seaport Museum. See the story about her study with Rachel Smith, PhD '19, at the State Botanical Garden of Georgia on page 13.

Alumni Board Working Group member **SHAFKAT KHAN**, PhD '16, was appointed Director of Conservation with the Detroit Zoological Society in 2021. In this role, Shafkat is developing domestic and international programs on biodiversity conservation and climate change. Shafkat previously worked with Project Dragonfly, an interdisciplinary conservation master's program based at Miami University, Ohio. He has taught field courses in tropical biology, traditional ecological knowledge, and religion-based conservation in Guyana, Baja California of Mexico, and Western Ghats of India. Shafkat's non-Western background, including growing up in Bangladesh and living in Costa Rica for his Ph.D. field work, helps him challenge fortress and colonial practices in ecological conservation and mentor underrepresented minority conservation professionals and graduate students.

BILL MCDOWELL, PhD '14, received tenure and was promoted to Associate Professor of Biology at Merrimack College in 2022, where he is also a member of the Environmental Sciences and Sustainability faculty. (Photo courtesy of Merrimack College.)

VIRGINIA SCHUTTE, PhD '14, science media specialist, storyteller, and consultant, with colleague Bethann Garramon Merkle received a grant from the National Association of Science Writers to develop and present "SciComm STEP: Sparking Transitions for Experienced Professionals." According to the NASW website, "the three month virtual, cohort-based coaching program will help experienced science writers push past barriers to professional development and reach the next level in their careers." (For more info, see www.meteorscicomm.org/scicomm-step.) Schutte helps scientists, academic units, and science communicators connect with audiences to meet their professional goals. Learn more about what she's up to at www.virginiaschutte.com.

CECILIA SÁNCHEZ, PhD '19, published a paper, "Land use, season, and parasitism predict metal concentrations in Australian flying fox fur," in *Science of the Total Environment* in 2021 (doi.org/10.1016/j.scitotenv.2022.156699); coauthors include Interim Dean Sonia Altizer and alum **DAN BECKER**, PhD '17. Cecilia joined the global environmental health nonprofit EcoHealth Alliance as a research scientist in 2020, where she studies pathogen spillover from bats, rodents, and primates to humans in Southeast Asia.

RACHEL SMITH, PhD '19, is a postdoctoral researcher in the Department of Environmental Sciences at the University of Virginia. Rachel was lead author on a 2022 paper in *Conservation Letters*, "Restored oyster reefs match multiple functions of natural reefs within a decade," (doi.org/10.1111/conl.12883) that was covered by *UVA Today*. You can read the article, "Research Discovery a Pearl of Hope for Imperiled Oyster Reefs," at bit.ly/pearl-of-hope. And see the story about her study with Linsey Haram, PhD '18, at the State Botanical Garden of Georgia on page 13.

CHAO SONG, PhD '18, began a new position as a professor in the College of Ecology at Lanzhou University in 2022. Chao was previously a Research Associate in the Departments of Earth and Environmental Sciences and Fisheries and Wildlife at Michigan State University.

EMMA SPIEGEL, BS '19, writes: "I moved to Amsterdam in August of 2021 to start a Fulbright English Teaching Assistantship. Throughout the program, I've been working at a local vocational college to teach English in the Makeup Art and Urban Sports Training departments. It's been a great experience getting to know my students and colleagues, experiencing Dutch culture, and working on learning Dutch as well. The Netherlands has been a great place to live this past year. I was surprised by how well everyone speaks English here and how welcoming they all are to foreigners, although this can make it difficult to practice speaking Dutch because once people realize that Dutch is not your native language they will almost always switch to English. And although the Netherlands isn't exactly known for its cuisine, I'd recommend that anyone try *hagelslag* (chocolate



sprinkles) and *bitterballen* (fried snacks). I've also particularly enjoyed biking to work, despite the rainy weather most of the time, and travelling around the Netherlands (and other parts of Europe) by train. It's also nice that my last name 'Spiegel' is actually a Dutch and German word meaning "mirror" so everybody here can pronounce my name correctly!"

2000s

CHRISTINA FAUST, BS/MS '09, received a 2022 Rising Talent fellowship in Sustainable Development from the L'Oréal-UNESCO For Women in Science (FWIS) program, which recognizes exceptional early career women scientists in the U.K. and Ireland. She was also named to the 2022 class of 40 Under 40 by the UGA Alumni Association. Christina is currently a NERC (Natural Environment Research Council) Independent Research Fellow in the Institute of Biodiversity, Animal Health and Comparative Medicine at the University of Glasgow. As a landscape disease ecologist, her research aims to mitigate the emergence of zoonotic diseases in human populations. Her FWIS Award will be used to identify mechanisms and key environmental features that reduce zoonotic rodent viruses within restored forests in Scotland. Christina was previously a postdoctoral scholar in the Center for Infectious Disease Dynamics at Penn State University. She received her Ph.D. from Princeton University in 2016. (Photo courtesy of L'Oréal-UNESCO For Women in Science.)

Ecology alumni **MARK MILLS**, PhD '02, Professor and Chair of the Department of Biology, and **CARISSA GANONG**, PhD '15, Assistant Professor of Biology, both at Missouri Western State University, were joined by **DAVID W.P. MANNING**, PhD '15, for the Tri-Beta National Biological Honor Society induction ceremony at MWSU in St. Joseph, Missouri, on Nov. 17, 2021. David, an Assistant Professor of Biology at the University of Nebraska, Omaha, was the event's guest speaker. Beta Beta Beta is an honor society for biology students, particularly undergraduates, with more than 200,000 members across 626 chapters in the U.S. and Puerto Rico. It was founded in 1922, and according to its website, is "dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research."

TRACEY TUBERVILLE, MS CESD '98/PhD '08, received a Christine Stevens Wildlife Award from the Animal Welfare Institute in 2022. She will use the award to evaluate the suitability of repatriating or returning confiscated and rehabilitated Eastern box turtles back to the wild. And along with **KURT BUHLMANN**, PhD '98, and **BRIAN TODD**, BS '00/MS CESD '02/PhD '08, she also received the Robert C. Stebbins Research Award from the Desert Tortoise Council in 2022. The award "recognizes an individual or team with an outstanding record of research that contributes to the understanding of the desert tortoise species and the ecosystems they inhabit," according to a story in *UGA Research* (t.uga.edu/874). Tracey is a senior research scientist and Kurt is a senior research associate at the Savannah River Ecology Laboratory, and Brian is a professor in the Department of Wildlife, Fish and Conservation Biology at the University of California, Davis. (Brian Todd photo by Joe Proudman/UC Davis.)

ALEXANDRA WORDEN, PhD '00, was elected to the German National Academy of Sciences Leopoldina, the world's oldest academy of sciences, in 2022, and is a 2022 Harvard Radcliffe Institute for Advanced Studies Fellow. Alex is a professor and the unit head of Ocean EcoSystems Biology at the GEOMAR Helmholtz Centre for Ocean Research Kiel and Christian Albrechts University of Kiel and a Max Planck Fellow for Evolutionary Biology. She is also a marine investigator with the Gordon and Betty Moore Foundation; Adjunct Senior Scientist at the Marine Biological Laboratory; and Adjunct Professor at the University of California Santa Cruz.

1990s

Wisconsin Green Muslims, founded and led by **HUDA ALKAFF**, MS CESD '97, was selected as one of ten finalists for the 2022 American Climate Leadership Awards. The awards are given by ecoAmerica, a nonprofit dedicated to expanding climate leadership "beyond traditional environmental circles...building a diverse network of major institutions and thought leaders in five sectors – faith, health, communities, higher education, and business," according to their website. As a finalist, Wisconsin Green Muslims received \$10,000 and is featured on the ecoAmerica website at ecoamerica.org. And in 2021, Huda was named a recipient of the third annual Catalyst Award, given by Rachel's Network, a nonprofit environmental funding organization that

supports women environmental leaders. The Catalyst Award recognizes "women leaders of color for their commitment to a healthy planet," according to the press release announcing the recipients. The award includes a cash prize as well as networking opportunities and public recognition. Read more: bit.ly/alkaff-catalyst. (Photo courtesy of Women's Earth Alliance.)

BOB HALL, PhD '96, was named a Sustaining Fellow of the Association for the Sciences of Limnology and Oceanography (ASLO), an international scientific society with roughly 3,500 members. The ASLO Fellows program honors ASLO members who "have advanced the aquatic sciences via their exceptional contributions to the benefit of the society and its publications, meetings, and other activities." Bob is currently a professor of stream ecology at the University of Montana Flathead Lake Biological Station. (Photo courtesy of University of Montana.)

JIANGUO "JACK" LIU, PhD '92, received the 2022 Eminent Ecologist award from the Ecological Society of America. Jack is the Rachel Carson Chair in Sustainability and University Distinguished Professor in the department of Fisheries and Wildlife at Michigan State University, and is a member of the Odum School's inaugural Alumni Board Working Group. His broad research interests include coupled human and natural systems, sustainability, climate mitigation and adaptation, ecological economics, biodiversity, ecosystem services, household-environment interactions, and systems integration and modeling, among many others. The Eminent Ecologist award recognizes a senior ecologist "for an outstanding body of ecological work or sustained ecological contributions of extraordinary merit," according to an April 19, 2022, announcement from ESA. Read more: bit.ly/esa-liu-2022. (Photo courtesy of Michigan State University.)

FAUSTO SARMIENTO, PhD '96, is a professor of mountain science and director of the Neotropical Montology Collaboratory in the UGA Franklin College of Arts and Sciences geography department, and is also a courtesy faculty member of the Odum School. He received a 2022 Fulbright U.S. Global Scholar award to conduct work in Austria, Japan, and Chile. He will be researching and lecturing for two months in each country, as part of a project to establish a worldwide network in the field of montology (convergent, transdisciplinary mountain science). Read more at t.uga.edu/8a2.

IN MEMORIAM

We are deeply saddened to learn of the passing of these extraordinary individuals, members of the Ecology alumni community. We extend our deepest condolences to their families and friends.

Suzanne E. (Stibbe) Gamble, MS Entomology '95
of Wilmington, North Carolina

Oct. 27, 2021

Happy T. Reed, MS Forest Resources '80
of Marietta, Georgia

July 18, 2021

Meet the Odum School Alumni Board Working Group

BY ALLISON WALTERS

Alumni are our past, present, and future. With over 1,400 graduate and undergraduate UGA Ecology alumni living across the country and around the world, we are looking for more ways to connect, to celebrate accomplishments, and to involve alumni in the Odum School's events and goals. During spring 2022, we launched the Alumni Board Working Group, the first step toward establishing an Odum School Alumni Board.

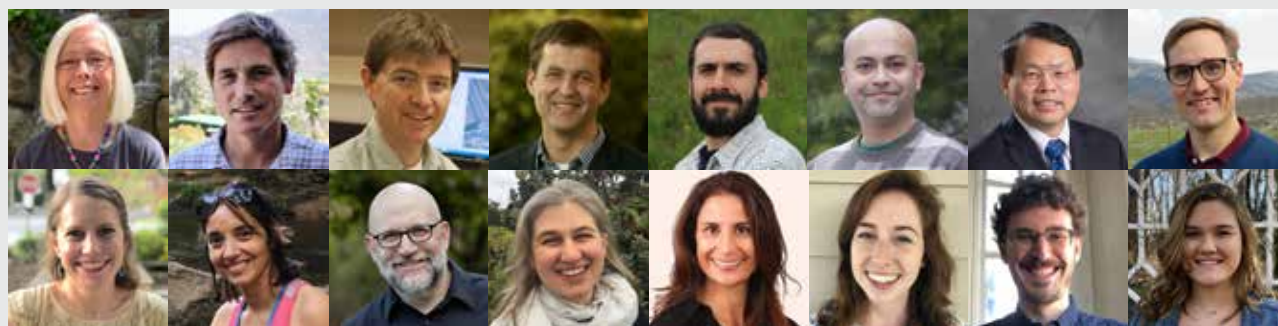
This inaugural group of sixteen is meeting monthly throughout the year, with a focus on defining the future Alumni Board's goals and leadership structure. Their perspectives, ideas, and involvement will help us inspire

engagement, enhance connections, and communicate more effectively with our alumni.

Priorities for the Odum School Alumni Board include supporting networking, career development, and communications; advising on strategic planning in the Odum School; and supporting philanthropy and alumni-focused events. We plan for the Working Group to evolve into the Alumni Board in 2023.

We are thrilled to be working alongside our alumni to advance ecological scholarship and engage a broader community. 🌱

ODUM SCHOOL ALUMNI BOARD WORKING GROUP



Liz Blood, PhD '81

Program Director, Ecosystem Science, Dynamics of Integrated Socio-Environmental Systems (DISES), Sustainable Regional Systems, and the Socio-Environmental Synthesis Center (SESYNC)
Division of Environmental Biology, Biological Sciences Directorate, National Science Foundation

Matt Bonds, PhD '06

Associate Professor of Global Health and Social Medicine, *Harvard Medical School*
Co-founder, *PIVOT*

David Bowne, MS CESD '97

Associate Professor of Ecology
Elizabethtown College

Tim Carter, PhD '06

President
Second Nature

Andrew Durso, BS '09

Assistant Professor
Florida Gulf Coast University

Shafkat Khan, PhD '16

Director of Conservation
Detroit Zoological Society

Jack Liu, PhD '92

Rachel Carson Chair in Sustainability, University Distinguished Professor, and Director, Center for Systems Integration and Sustainability
Michigan State University

Kyle McKay, PhD '14

Adjunct Faculty, *UGA Odum School of Ecology*
Research Civil Engineer, Environmental Laboratory, *U.S. Army Corps of Engineers*

Calley Mersmann, BS '11

Senior Strategist, Transit and Mobility
City of Cleveland, Ohio

Marirosa Molina, PhD '01

Senior Research Microbiologist, Office of Research and Development, Center for Environmental Measurement and Modeling
U.S. Environmental Protection Agency

Mike Paul, MS '94/PhD '99

Aquatic Ecologist
Tetra Tech Inc.

Emma Rosi, PhD '02

Senior Scientist
Cary Institute of Ecosystem Studies

Diane Sanzone, MS CESD '95/PhD '01

Vice President, Environment, West Division
Kleinfelder

Hayley Schroeder, BS '18

Doctoral student
Cornell University

Buck Tribble, BS '13

NIH Early Independence Fellow and John Harvard Distinguished Science Fellow
Harvard University

Irene Wright, AB '21

Master's student
UGA Grady College of Journalism and Mass Communication

**ALUMNI, WE WANT TO HEAR FROM YOU!
HOW DO YOU WANT TO ENGAGE WITH
THE ODUM SCHOOL COMMUNITY?**

**WHAT ADVICE OR RECOMMENDATIONS
DO YOU HAVE FOR THE ALUMNI BOARD?**

**PLEASE SHARE YOUR THOUGHTS
AT [BIT.LY/AWG-SURVEY](https://bit.ly/awg-survey).**

GARY W. BARRETT

1940 – 2022

Gary W. Barrett, Odum Chair emeritus and former director of the University of Georgia Institute of Ecology, passed away at his home in Athens, Georgia, on April 10, 2022. He was 82.

“Gary made extraordinary contributions to ecology through his leadership, research, and mentorship of students,” said Sonia Altizer, Georgia Athletic Association Professor and interim dean of the Odum School of Ecology. “Notably, Gary worked with several dozen M.S. and undergraduate students as part of his small mammal research program at the HorseShoe Bend ecological field station. As a Ph.D. student himself of the late Eugene P. Odum, former director of the Institute of Ecology at UGA, and holder of the Eugene P. Odum Chair in Ecology, Gary carried on Odum’s legacy and commitment to the field of ecology.”

Gary W. Barrett received his bachelor’s degree in biology *cum laude* from Oakland City University in 1961 and his master’s degree in biology from Marquette University in 1963. In 1967 he was awarded his doctorate in zoology (the precursor to ecology) from the University of Georgia under the mentorship of Eugene P. Odum, with whom he maintained a long friendship and fruitful academic partnership.

After graduation, Barrett taught biology at Drake University before moving to Miami University of Ohio, where he attained the rank of Distinguished Professor. During his time there, Barrett served as acting director and deputy director for research of the Institute of Environmental Sciences, coordinator of environmental education, and co-director of the Ecology Research Center.

Barrett returned to Athens in 1994 as the Eugene P. Odum Chair in Ecology, a position he held until his retirement in 2014, and served as the director of the Institute of Ecology from 1994–1996.

His many career accomplishments include serving as director of the National Science Foundation Ecology Program, chair of the Applied Ecology Section of the Ecological Society of America, president of the U.S. Regional Association of the International Association for Landscape Ecology (or US-IALE, now IALE–North America), and American Institute of Biological Sciences.

Barrett was the author of nearly 200 peer-reviewed publications—many with his students as co-authors—and nine books, including the fifth edition of *Fundamentals of Ecology*, with Eugene Odum.

He received many honors for his research and service, including the US-IALE Distinguished Landscape Ecologist Award in 2001, a Presidential Citation from AIBS in recognition of leadership and contributions to the biological sciences in 2000, and was named Miami University Sigma Xi Researcher of the Year in 1986. He was elected a Fellow of the American Association for the Advancement of Science in 1990.

Barrett received numerous awards for teaching and mentoring students, including the Most Outstanding and Effective Teaching Award from Miami University and the Excellence in Undergraduate Research Mentoring Award from the University of Georgia. He was also the recipient of the 2009 Ecology Purple Heart Award, given by Odum School of Ecology Graduate Students to recognize exceptional dedication to students.

“I’m very grateful to Dr. Gary Barrett for the mentorship and support he provided to me as a master’s student in his lab,” wrote Laura Skelton, MS ’02, on the occasion of the fiftieth anniversary of the Institute of Ecology. “One thing I especially remember about Dr. Barrett is his dedication to supporting undergraduate students, especially by involving them in his small mammal population research at HorseShoe Bend. He gave many undergraduate students the opportunity to not only assist with research, but to even lead their own studies and get them published.”

Barrett leaves his wife of 53 years, Terry Lynn Barrett; brother Max Alvin Barrett and brother-in-law Jack Lee; as well as grandchildren, great grandchildren, and nieces. He was predeceased by his parents, Ida Eilene and Perlie Wallace Barrett, and daughter Tiffany Lynn.

Donations in Barrett’s memory may be made to the following endowments:

Gary W. Barrett Endowed Scholarship
Miami University
926 Chestnut Lane, Oxford, OH 45056

Gary W. Barrett Endowment Scholarship
Oakland City University
138 North Lucretia Street, Oakland City, IN 47660

Tiffany Lynn Barrett Endowed Scholarship
Oxford Community Foundation
22 High Street, Oxford, OH 45056



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HONOR ROLL OF DONORS

Thank you to all our alumni and friends for your support. Below are the names of those who made gifts to the Odum School between May 1, 2021, and June 30, 2022.



Dear Friends,

I hope you've enjoyed reading this issue of *EcoVoice* as much as I enjoyed working on it. I'm especially pleased that we were able to focus on our undergraduate program this year, and that so many of these stories were written by our talented undergraduate interns: Amanda Budd, Catherine Campbell, Katie Tong, and Sam Patterson.

I'm also delighted to welcome Cheryth Youngmann, who has a joint appointment as the River Basin Center's communications coordinator and communications specialist for the Odum School. Her writing and editing skills are on display here (and be sure to check out the expanded version of her story about the Ecological Problem Solving class that appears on the Odum website.) Our communications team is rounded out by Ben Taylor, AB '17, who is finishing up his MS in ecology this year. Ben is responsible for the overall look and feel of *EcoVoice*, the Odum website, and most of our other communications. We've also been fortunate to work closely with Allison Walters, Development and Alumni Relations Coordinator, and Tim Welsh at Bulldog Print & Design, who handled this year's magazine design and layout.

I've had the great pleasure of serving as the communications coordinator for the Odum School and editor of *EcoVoice* for the last eleven of my twenty (!) years at Ecology. I've loved the opportunity to share stories about the vitally important research, teaching, and service that goes on here, and especially about our extraordinary community of alumni, students, faculty, postdocs, and staff. So it is with decidedly mixed feelings that I've made the decision to retire this fall. As I've told everyone who will listen, I want to take some long bike tours, and I figured I'd better retire now, while my knees still work.

It has been a real joy to be part of this community, and while I won't be on campus, I'm looking forward to remaining connected. I'll be following the latest goings on in future editions of *EcoVoice* and the monthly e-news, and I hope to see many of you at upcoming Ecology events.

With gratitude,

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Dear Friends of Ecology,

You are a dedicated group of supporters—alumni, current parents, parents of alumni, students, faculty, postdocs, staff, and friends—who are invested in our research and our people. We have accomplished so much this past year, and we have you to thank.

As our undergraduate program continues to grow, you responded to our need for increased student support and enabled us to create the Ecology Undergraduate Student Support Fund. Now, undergraduates have expanded experiential and service-learning opportunities, locally and abroad—and more than 12 Ecology undergraduates are receiving support carried into the 2022–23 academic year. That is more student support than ever before!

Parents (and students), you played a very important role through the Student Alumni Association Senior Signature campaign, benefitting both UGA and Odum. In addition to your philanthropy, you modeled support by attending this year's Parents & Families Day. Parents across campus who comprise the UGA Parents & Leadership Council awarded the Odum School three grants totaling just over \$5,000 to advance study away, mentorship, and experiential learning through the Ron Carroll and Carol Hoffman Costa Rica Travel Award, the Ecology Undergraduate Peer Mentorship Program, and the EcoReach Undergraduate SciComm Contest initiative.

You helped us reach our goal of funding summer research, travel, and supplies for two marine ecology students through the May 2022 Georgia Funder Adopt a Coastal Marine Ecology Student campaign.

The ability to gather in person has been imperative to keeping us engaged and connected—Waffle Wednesdays, weekly coffee hours, Parents & Families Day, Emeritus luncheons, graduations, seminars, and the establishment of our inaugural Alumni Board Working Group have all made this year very special.

You are the reason for these success stories. The Odum School looks forward to sharing more stories of the work you make possible.

On a personal note, I am leaving Athens in mid-July 2022 to move closer to family and pursue new opportunities, but the University of Georgia and the Odum School of Ecology will always be near and dear to me. I have enjoyed working with and getting to know you within my (almost) six years at the Odum School. Thank you for the opportunity to serve the Odum School and its very special group of people.

With kind regards,

— Allison Walters
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