



Ecology Fall Newsletter

Fall 2023



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What is Community to Me? A personal reflection from Maisie

By: Maisie MacKnight

My name is Maisie MacKnight, and I am the coordinator for the Fall 2023 Ecology newsletter. I am a fifth year PhD Candidate in Dave Miller's Applied Population Dynamics lab. I am also now a budding education and social scientist focused on equity and advocacy work. I came into the Ecology program excited to learn about quantitative ecology and aspects of movement and amphibian ecology for my dissertation. Although my time at Penn State has given me these learning opportunities, I also learned more about diversity, equity, and inclusion (DEI), mentoring, teaching, and community-building than I could have ever anticipated. The many opportunities from the Ecology Program, my advisor's home department of Ecosystem Science and Management, and my own curated network of mentors have expanded my professional development skills and given me an expanded new set of professional values that I will carry with me to the next chapter of my career. Therefore, I wanted to take the opportunity to use this newsletter to feature the ecology program community while drawing connections to my own experiences, insights, and reflections from my time as an Ecology graduate student.

When I came to Ecology Interview Weekend during the cold, polar vortex of February 2019, I was met with an overwhelmingly warm and welcoming community. Although I didn't have the words to articulate these ideas at the time, the robust community within the Ecology program was one of the deciding factors that led me to pursue my Ph.D. at Penn State. Since then, I've thought a lot about how to give back to the people and program that have welcomed me into their community.

During my time as a graduate student, my thoughts on community and what it means to build and belong to community have greatly changed. When I first began my program, I mostly thought about ecological communities. I saw how different species filled different niches and how biodiversity led to more robust communities in the wake of global change. However, my transition into DEI-focused and social science spaces, along with the COVID-19 pandemic, has challenged me to reflect on communities as they pertain to people. Starting graduate school in fall 2019, my mental model of community shifted as I navigated graduate school before, during and post the pandemic, calling into question what we owe to each other with each passing era. To me, currently, community is a group of people that are working towards a shared common goal. I have found community in many spaces during my time as a graduate student and living in State College, and my constellation of communities has helped me feel grounded as I pursue my degree. Therefore, community to me is both the individual groups and their goals, but also the network of communities that help me feel supported. To learn about how others in the Ecology program think about community, please see the 2023 cohort introductions.

The evolution of my mental model of community has also facilitated changes in my understanding of how to build community. My three years serving on the Ecology Graduate student Organization's (EGSO's) executive board gave me the agency to foster inter-cohort connections, even during a global pandemic. My role in establishing regular highway clean up

events and revamping the Ecology Peer Mentoring program helped me in serving the Ecology graduate student community and giving back to the local State College community. Fellow graduate students, the EGSO is a great space to build and find community.

To me, building community also extends into our scholarship and teaching practices. As an instructor of record, I developed and taught a course that inhabited the intersection of ecological and social sciences, and this course required my students and me to balance different perspectives and areas of expertise while acknowledging that these different ways of knowing or forms of knowledge and identities shape our current experiences. To me, the interdisciplinary nature of the Ecology program offers the space for students to explore and pursue interdisciplinary scholarship. I expand on my own experiences in the article *Using art as ecologists: How do we practice interdisciplinary science?* To capture the interdisciplinary nature of our program, this newsletter highlights people's work, through both service and scholarship, that bridges ecological sciences, experiences in academia, and community building.

Best practices for community building and engagement calls us to reflect on the question: "what values do key partners hold?". We do the same in our research when we connect methods, results, and discussions back to our research objectives. For effective stakeholder engagement and research alike, these values and objectives must be at the forefront. Therefore, I aim to frame the experiences, achievements, and goals of the Ecology program under the central theme of community, with the values of the Ecology program at the forefront. Based on my own experiences, I have summarized the Ecology Program's values into three main categories: The Ecology program values scholarship, as demonstrated in the awards and publications of its members and the training that graduate students receive. The program aims to support its community members through seminars social events, and cohort-building programs and values these connections. Members of the community also have worked to make the program more inclusive. These values are interdependent, and they work together to support our interdisciplinary program.

I have structured this newsletter to reflect these values as reflected in the table of contents. The first section explores how we define community. The next section reflects the program's value of scholarship, highlighting interdisciplinary student research and reflections. The next section reflects the program's values of inclusivity and fostering connections by including summaries from the alumni spring 2023 seminar series and. This section highlights community building efforts from faculty, and graduate students. The interdependence of these three domains is highlighted throughout the newsletter.

Meet the 2023 Graduate Student Cohort!

“What is community to you?”



Simi Aruwajoye (Advisor: Nita Bharti): Simi earned her BS in Biology in 2018 from The University of Louisiana at Monroe and her MPH in Epidemiology with a Global Health Certificate in 2020 from The University of Texas School of Public Health in Austin. She spent the last three years serving as an Epidemiologist fostering COVID-19 surveillance and research in the state of Texas. Her research breath will span across infectious disease ecology and epidemiology, transmission dynamics in humans, and social/behavioral ecology. Her research will primarily focus on viral emerging/re-emerging diseases and vaccine-preventable diseases in the US and Africa and using interdisciplinary analytical methods and scientific approaches to improve public health surveillance and solve vaccine-related issues.

Community means a sense of belonging to me.



Hanshi Chen (Advisor: Tong Qiu): My research interests focus on understanding the complex interactions between terrestrial ecosystems and human societies. I'm interested in quantifying the responses of vegetation to climate change and understanding the subsequent impact of these responses on ecosystem services, which are crucial for the well-being of both humans and wildlife.

In my opinion, people with similar interests will form a "community", in which they gather together and share their knowledge with each other. Just like the Ecology program makes us group together, learn knowledge about our favorite fields, and communicate with each other. We are the Ecology community!



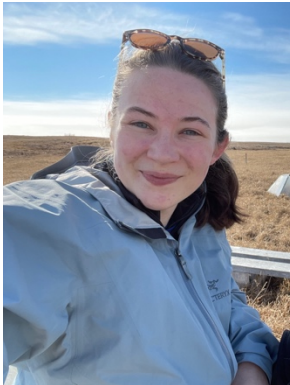
Stephanie J. Gonzalez she/her/hers (Advisors: Dave Miller and Amanda Sparkman (Westmount College): Hi, I am a first-generation graduate student pursuing a doctorate degree in Ecology. My research interests are rooted in life history theory and seek to understand how different populations are affected by their environments. My hobbies include laughing, getting lost in music/ books/video games, appreciating nature, and exercising. A fun fact about me is that I will first say “hi” to a dog, and then say “hi” to their owner.

The emotional aspects of a community to me includes being surrounded by people who accept each other for who they are, empathize with one another, and support/uplift each other. On the other hand, “community” can have deeper roots by connecting people based on similar experiences (hometown, K-12 grade, upbringings, culture, etc.) or interests.



Jonah Gray he/him (Advisors: Jason Kaye & Estelle Couradeau): I'm interested in the soil microbial ecology of agroecosystems. Particularly, I'm interested in how management practices impact the microbial community, and how these changes are relevant to soil greenhouse gas emissions. Outside of research, you can find me hiking, biking, camping, or spending time with my cats, Lola and Yumi.

Community is any group of people that you support or supports you. We have a variety of communities that we subscribe to and interact with daily. Each community provides different forms and levels of support that will change based on your needs or the needs of the community.



Nina Gropp she/her (Advisor: Christina Grozinger): Nina came to Penn State to get her master's with Christina Grozinger working on plant-pollinator interactions under global change. She is from Michigan, where she earned her undergrad in biology and researched arctic plant ecology and arctic pollination. Nina is sustainably and environmentally focused, so she follows a vegan lifestyle, loves spending time outdoors, and incorporates climate change solutions into her research.

To Nina, community is a space in which people care for each other.



Olivia Hodgson (Advisor: Ty Wagner): I study contaminants in aquatic ecosystems, and my graduate research is focused on PFAS in the Susquehanna River. In my free time, I enjoy reading and hiking. I'm from the State College area, went to Penn State Erie for undergrad, but I am back at University Park for my Master's degree.

A community is a supportive space where you can both celebrate your success and commiserate with others.



Di'Carlo Jackson Jr (Advisor: Dr. David Miller): I focus on population studies involving reptiles. I will soon embark on research involving insular dwarf species in the Channel Islands of California. Beyond my academic pursuits, I enjoy engaging in activities such as basketball, weightlifting, and cooking. Notably, I've received high praise for my delicious birria tacos.

To me, a community is a group of individuals united by shared interests, fostering connections, and building mutually advantageous relationships. These communities serve as welcoming spaces, where people can comfortably seek assistance and aid each other in their individual pursuits.



Luiza Lazzaro she/her (Advisor: Margot Kaye): I'm Luiza Lazzaro, a new PhD student in Dr. Margot Kaye's lab. My journey in ecology began at the Federal University of Sao Paulo during my undergraduate studies, and I continued to fuel my passion for forestry with a master's degree at Auburn University. I've always had a deep love for forest ecology, which led me to spend a year living in the Atlantic Forest in Brazil and conducting fieldwork in the southern United States. During my Ecology Ph.D. program at Penn State, I'm focusing on the restoration of non-timber forest products and exploring the legacy effects of native and invasive tree species in Pennsylvania. I love to travel and explore new places, and here's a fun fact: I've already visited 30 American states.

To me, community means having good people around to lean on during both the highs and lows.



Liz McAlpine-Bellis (Advisors: Julian Avery and Dave Miller): Liz started her career as a political campaign manager, then worked in emergency medicine for eight years before deciding that turtles were way more interesting and becoming a herpetologist. She is currently studying thermal adaptation and habitat selection in local populations of box and wood turtles, to better understand how they will adapt to climate change. In her (limited) free time, she likes searching for salamanders, shopping for strangely shaped houseplants, and traveling to remote islands to dive and look at interesting fish.

Community represents the people we gather around ourselves for advice, support, and sometimes snacks. It's our chance to choose the people that really matter to us.



Mary Katherine McCafferty (Advisor: Laura Leites): I am a PhD student in the Quantitative Forest Ecology Lab with Laura Leites studying population response to climate variation in tree species native to the eastern US. I earned my B.S. in Applied Mathematics from Cal Poly in San Luis Obispo, CA in 2022 and subsequently worked as a conservation crew member in Hurricane, UT and then a biological technician in Palm Springs, CA for American Conservation Experience prior to starting at Penn State. In my free time, I enjoy hiking, running, playing volleyball, and crafting!

Community to me simply means having people to share life with.



Kelsey Mercurio (Advisor: Liana Burghart): Before coming to Penn State, Kelsey worked for the Natural Resources Conservation Service in Massachusetts and as a lab technician at the University of New Hampshire, where she completed dual bachelor's degrees in Biochemistry, Molecular and Cellular Biology and Sustainable Agriculture and Food Systems. She is a co-founder of a participatory research project collaborating with smallholder farmers in the village of Nghumbi, Tanzania, which aims to improve soil health and soil fertility. Kelsey hopes to continue working with farmers in Nghumbi as part of her graduate work focusing on the legume-rhizobia symbiosis. In her free time, Kelsey enjoys running, dance, singing, gardening, camping, and spending time with friends and family.

To me, community means looking out for each other, learning what makes each person excited, and finding a place to call home wherever you are.



Sophia Mucciolo she/her (Sarah Hermann): After working in the Hermann Lab as an undergraduate for a few years, Sophia decided to stay at Penn State for graduate school. Her current research, still advised by Sara Hermann, focuses on predator-prey interactions in the monarch-milkweed system. Outside of science, she enjoys looking for wildlife (especially birds and bugs), making nature-themed art in various forms, and knitting sweaters for her cat to wear on their walks.

To me, community is a space that supports learning, discovery, and making mistakes. All members of a community are valued and heard. Communities foster collaboration and give full consideration to multiple perspectives.



Laura K. Schuck she/her (Advisor: Gui Becker): I'm a first-year master's student in the ecology program. I'm crazy about frogs and microorganisms, so I joined Becker Lab to merge these two worlds. We've discovered a frog that is immune to the frog-killing fungus that is decimating amphibians worldwide, and I'm researching what makes this frog so special. I believe it's the unique bacteria community that lives on their skin. I'm a Brazilian girl, so of course, I love playing Brazilian songs like samba on my guitar. I also love wildlife photography.

Community, to me, is more than just coexisting with other beings; it's about interacting and making a difference!



Rainey Rosemond (Advisor: Armen Kemanian): I am a graduate student pursuing a Ph.D. in Ecology under Dr. Armen Kemanian. My research area of interest includes agroecology and climate smart practices on dairy farms. My background is heavily focused on animal science and dairy production. My hobbies include reading, hiking, kayaking, and photography.

To me community means having a support network that spans professional and personal relationships.

Using art as ecologists: How do we practice interdisciplinary science?

By: Maisie MacKnight

When I think about solutions for addressing complex problems, I think about transdisciplinary and interdisciplinary approaches. Interdisciplinary programs, such as the Ecology program, train students to think beyond their subfields to address complex global change problems. My training gives me access to multiple fields, allowing me to recognize and apply unifying frameworks across disciplines. In doing so, I aspire to work within the intersections of seemingly unrelated fields.

As I practice trans- and interdisciplinary science, I use these skills to ask questions about the sociopolitical context of ecological science, especially when it comes to applied science. In doing so, I gained access to new verbal tools to express my ideas, and in-turn these verbal tools make me a more well-rounded ecologist. For example, institutions train natural resource managers to consider holistic management of ecosystems. This “systems thinking” approach requires managers to consider action plans that benefit the overall health of an ecosystem, rather than specifically targeting the health of a single species. My ability to use holistic management is more complete now that I can use systems thinking tools from the social sciences and community-building spaces to incorporate the sociopolitical context necessary to address multiple impacts complex ecological problems. This nexus space between biophysical and social sciences also calls into question how we as scientists evaluate expertise and how we value knowledge. My time at Penn State is training me to hold ecological knowledge on the same level as social sciences, utilizing frameworks and theories from both disciplines, and questioning the perceived barriers that separate these disciplines.

We are still reckoning with the challenges of using interdisciplinary training in a workforce that relies on offices, departments, and sectors. However, there are some examples in which groups have come together, drawing on the expertise of each discipline, to arrive at innovative solutions. Loth’s *Using Art as City Problem Solver* features Boston’s artist in residence program² to promote creative thinking to support municipal government. The article features specific examples that foster interdisciplinary connections and collaborations to bolster the efficacy of solutions and visitor engagement with difficult, systemic problems.

Drawing from the lessons of Loth’s article, I decided to feature ecology-themed art, provided by Ecology graduate students, to symbolize the interdisciplinary nature in which we are being trained to assess knowledge across multiple field, and to create context for individual and collective learning. While I am not suggesting that these forms of art provide the same amount of inference as a scholarly research article, they offer space in which two seemingly disparate fields can come together. The cover features work from Ecology graduate students. All these works use art as a medium to help convey something about ecology in personal and approachable ways, and in doing so, they draw on the strengths of both disciplines to achieve a common goal—sharing our ecology more widely with others.

Cover credits (top to bottom)

- Fruit painting by Sarah Glass
- Elephant watercolor painting by Sarah Richards. Watercolors are made using soil pigments by soil science graduate student, Zoelie Rivera-Ocasio.
- Drawings of green chameleon, blue mushroom, sea slug, and jellyfish by Shannon Buttimer.
- Photograph of glass frog by Shannon Buttimer.
- Outreach exhibit by Grace Gutierrez and Jules Cruz. Grace and Jules built the cavity mason bee nest using paper mache. Jules crocheted the bee colony.
- Mushroom graphics (bottom left + bottom right) by Amy Wroblewski.

Reflection on Community Engagement in Ecology

By: Amy Wroblewski

Something that isn't often talked about in Ecology, but something I think many of us experience, is how emotionally intensive our research can be. We study habitat destruction, pollution, disease, and rare species. There are often lines drawn between "the public" and "research", and for graduate students in particular, outreach and communication with local communities is often discouraged. It takes time. It is messy. And we are often told it is not necessary.

In my time at Penn State, I have learned that ecological research that engages the public takes about twice as long as you'd expect it to and is extremely messy. In the process your research goes down meandering paths that you could not expect or plan for. People become busy. Phone calls get forgotten about. A key conversation happens while grabbing pizza with people after a long day of mushroom hunting, when your phone is dead and you don't have a notepad to write down everyone's ecological concerns.

However, I would push back against the idea that this work isn't necessary for graduate students and for Ecology as a whole. Work with people and communities is a skill that has to be taught and developed, just like ecological field work or wet lab work. You learn to actively listen and make connections and grow a type of empathy that is rarely used in normal day-to-day conversations.

In my case, for the past few years I've been working with mushroom hunters (and mycologists) in the Mid-Atlantic region. The ecological questions I've been investigating have stemmed from mushroom walks that have become conversations about Pennsylvania forestry policy, invasive species, unpredictable weather, and climate change. These conversations are not forced, they come up through building trust, getting involved, and learning to ask the right questions. I could have read endless papers on mushroom biology, or even social science papers that are decades old on foraging in places far from Central PA. None of them would have prepared me for actual community building and connection making.

However, what I really want to stress is that this has been some of the most rewarding work I have done. Being able to go back to a person and say "hey, you remember that conversation we had a few months ago? Well, I did some digging and I have a cool idea for a project and I want your thoughts" usually is responded to with excitement. At least amongst mushroom hunters, there are whole communities who care deeply for our local ecosystems. They want to work with researchers at Penn State and other universities, but do not know who to ask or how to get in touch. Or they have not been empowered to view their ecological knowledge and insights as valuable. As researchers, we have resources that we can share, and by working together with communities in the area, we can work together to answer and solve bigger and even more engaging ecological problems.

National Science Foundation – International Experience Reflection

By: Francesca Ferguson

It took me traveling around the world to truly see how our water quality issues in the States aren't that different than others around the world. Let me take you on a journey back to how I realized this. This past summer, I was part of a National Science Foundation – International Experience for Students Program (NSF-IRES) in Melbourne, Australia. I joined four PSU undergraduate students and a faculty member to collaborate with Monash University faculty and students to better understand water quality stressors and explore possible solutions in the Gippsland Lake Region. This region is a top priority for the Australian Research Council due to its significance for agriculture and recreation. Thus, we went to help Monash University understand how agricultural activities within this region may be influencing water quality. Coincidentally, the first parallel between the Gippsland Region and my ongoing research in the United States within the Chesapeake Bay watershed was impossible to ignore. Much like the Gippsland Region, the Chesapeake Bay watershed faces similar challenges in supporting agricultural activities while maintaining adequate water quality.



Figure 1: The group of Penn State students and faculty member that traveled to Monash University in Melbourne, Australia. From left to right are Lauren McPhillips (faculty), Landis Crawford (undergraduate), Elena Halmi (undergraduate), Niya Tyler (undergraduate),

While in Australia, we were investigating topics such as understanding 1.) soil nutrients in agricultural paddocks to pinpoint the sources of nutrients entering the watershed, 2.) beneficial nutrient-removing processes, and 3.) the presence of emerging contaminants (ECs) such as personal care products, pharmaceuticals, and agrochemicals. My usual research in the United States revolves around the fate, transportation, and ecotoxicological influence of ECs in freshwater lotic systems; so, I was enthusiastic to be able to bring my expertise in this field to Australia. During my PhD here at Penn State, I have honed my expertise in ECs, but I haven't spent much time working with nutrient dynamics. Therefore, during my time in Australia, I had the opportunity to fill this knowledge gap learning about the world of nutrient fate, transport, and cycling within soils and groundwater and how it is directly linked to water quality. This newfound expertise will be immensely valuable to me since 1/3 of our freshwater lotic systems here in PA are impaired by nutrients and sediment from agricultural sources.

While I was able to learn more about nutrients in waterways, I was simultaneously able to teach others about the intriguing world of assessing and understanding emerging contaminants in aquatic systems. To understand ECs within the region, we deployed a passive sampling system called a Polar Organic Chemical Integrative Sampler (POCIS). POCIS works by being deployed within an aquatic environment for an extended period, allowing the membrane to accumulate

contaminants. I used this device for my research in the United States, and to our knowledge, we were the first group of researchers to deploy POCIS in Australia. As we analyzed the chemicals captured by the POCIS, we made a surprising discovery - some of the chemicals quantified in Australia were also present in my water samples back in the United States. It was astonishing to think that despite being thousands of miles apart, with different agricultural practices, watersheds, management strategies, and regulations, we are detecting similar emerging contaminants! This is yet another parallel between Australian and United States waterways, serving as a powerful reminder that environmental challenges can be universal.

To me, this experience allowed me a first-hand opportunity to truly see that our water quality challenges aren't that different and provided me with a deeper understanding of the interconnectedness of global water quality issues, underscoring the importance of collaborating cross-borders. While we focused on agricultural influences on water quality, these parallels are not exclusive; they are in every field of science, so our research and findings genuinely have the potential to have far-reaching, global significance that can help address various environmental challenges that we all are facing. So always remember, that no matter how small a discovery might be, it could lead to an "ah ha" moment for someone else miles away.



Figure 2: Francesca Ferguson teaching Penn State undergraduate and Monash collaborators how to deploy a Polar Organic Chemical Integrative Sampler to investigate emerging contaminant concentrations in the Gippsland Watershed.

Research Highlight from Recent Alum: A Wild Goose Chase

By: Karen Beatty

Typically, when people stumble upon a flock of geese, they back away slowly, carefully watching the birds to make sure none of them take an unexpected hop forward, flailing their wings and hissing. Canada geese (*Branta canadensis*) don't have the best reputation; they're often considered a nuisance species. But to many Pennsylvania hunters, they're a prized harvest. My research aims to better understand how Canada geese use the landscape and how their movement patterns are affected by hunting activity. So, earlier this summer, I embarked on a wild goose chase (the phrase originated as the name of a horse race, so technically I did *not* embark on a wild goose chase).

As it turns out, catching geese is not much of a chase at all. Canada geese molt their flight feathers once a year, during which time they're unable to fly. Biologists take advantage of this phenomenon and carefully corral them into holding pens. Then, it's a matter of picking them up just right so their wings and legs are held in place. Personally, I found that calm confidence often triumphs over a rowdy bird. This year Highly Pathogenic Avian Influenza was a primary concern, so extra precaution was taken to protect ourselves and the birds. Biologists wore disposable gloves and eye protection, and we disinfected boots, clothing, and gear between sites.

The bird banding process is well-practiced – the Pennsylvania Game Commission bands thousands of waterfowl each year. Biologists determine the age and sex of each bird, then a certified bird bander uses special pliers to wrap an aluminum band around each bird's ankle. Each band has a unique 9-digit number. When the bird is caught again, whether alive or dead, biologists can trace how long it was alive and model population trends. My role in this process was to fit a GPS transmitter on birds in the form of a neck collar. Once a bird is released, I begin collecting its location and velocity every 10 minutes. We've been collaring geese and collecting data since summer 2020, and, while my data collection for this research ends in 2023, a GPS collar can last for several years and will continue collecting data for as long as it and the bird are alive.



Figure 1: Photo: Karen holds an adult female Canada goose (*Branta canadensis*) fitted with a GPS neck collar.

Karen recently defended her thesis research which focused on the movement ecology of Canada geese. Karen will start a John A. Knauss Marine Policy Fellowship at NOAA Fisheries in next year.

Reflections from Anderson Award Recipients

Reflection by: **Luana Bresciani**



Attending to ESA (Ecological Society of America) Conference 2023 was an amazing experience. It allowed me to talk with a lot of people, share experiences, and catch collaborations. I was able to meet people and learn more about the Ecology field and science novelty that I wouldn't know just focusing on my own research. A novelty that, to some extent, can also be applied in my area.

The opportunity to present my work as a talk was also an excellent exercise to practice my science communication skills that came from preparing the presentation, answering questions, and talking with people after the presentation. The study topic of my thesis, the dynamic of microbial coalescence (i.e., the mixing of previously separated communities) – that I presented, is mainly focused on environmental context. However, because microbial coalescence is a common phenomenon in nature, studies have been done on agricultural, industrial, and medical systems. The ESA Conference was important to connect my work and myself with people from different areas studying microbial systems and specially coalescence which expanded my view of fundamental science.

ESA Conference fitted perfectly with students need for having a broad view of ecology, connecting academy to industry and fundamental work to applied fields. Therefore, I really recommend all the Ecology students to attend next year. I'll be there!



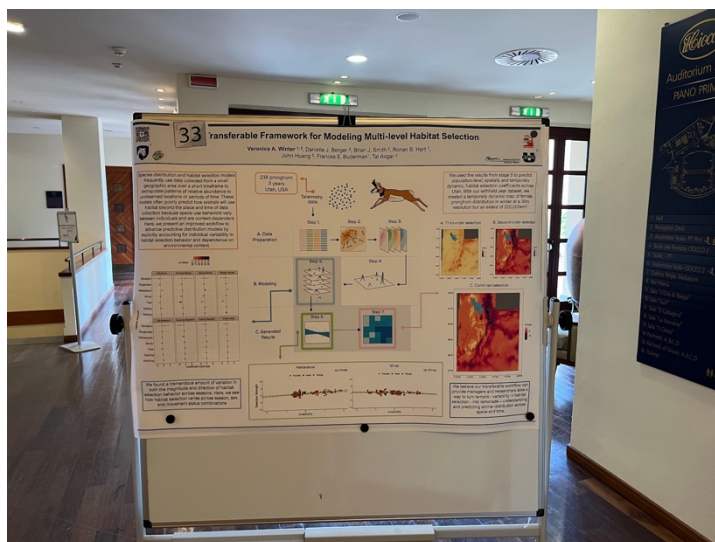
Reflection by: **Veronica Winter**

This year, I had the honor of being awarded the Andersen Award, which granted me the chance to participate in a Gordon Research Conference and Seminar on animal movement ecology in Lucca, Italy. The Gordon conference follows a unique format that fosters interactions between recognized experts in the field and early-career scientists. The event encompassed a 5-day Gordon Research Conference (GRC) and a 2-day Gordon Research Seminar (GRS). Notably, the GRS preceded the GRC and was exclusively tailored for early-career individuals, including the

speakers, moderators, and attendees. The conference had a limited attendance of 200 individuals, creating an ideal environment for networking and collaboration among esteemed figures and emerging researchers.

During this movement ecology meeting, I had the opportunity to meet an incredible cohort of graduate students and post-doctoral researchers from various parts of the world, all engaged in cutting-edge research on animal movement. Additionally, I had the benefit of connecting with prominent figures in the field whose work has significantly influenced my own research endeavors.

At the conference, I presented my master's work on pronghorn movement in Utah. My study involved analyzing individual movements and scaling them up to understand population-level habitat selection. Furthermore, I predicted this selection into the future across the entire state of Utah. Alongside presenting a poster at both the GRS and GRC, I was also chosen to give a 5-minute speed talk to the entire conference, a unique opportunity offered to a select few. These concise talks took place during each session and aimed to captivate the audience's interest and encourage them to visit the presenter's poster. This, in turn, initiated engaging discussions about my research.



Overall, this experience early in my PhD enabled me to meet and collaborate with experts in the field, share my research findings, and broaden my horizons on a global scale, extending beyond the boundaries of regional meeting. I would like to express my gratitude to Dr. Frank A. Andersen and the Ecology program for granting me this invaluable opportunity.

Reflection by: Amy Wroblewski

There was a soft buzz in the air, people clustered into small groups, the chairs were arranged in a circle, but many people sat on the floor, on tables, wherever they could find room. One group pulled out sketchbooks, another had a massive pile of embroidery thread nestled between them. Occasionally, a burst of laughter would ring out or a conversation would get quiet and tense.

Of all places for this to be happening at, it was an academic conference. This summer I traveled to Boise, Idaho for Botany 2023. I helped to facilitate a workshop before the conference on decolonizing botany and plant sciences. These conversations are fairly new in plant science as well as ecology, which makes them all the more necessary. However, they can also be tense. The impacts of settler colonialism can bring about feelings of anger and grief if it is the first time someone is directly engaging with them.

So, we designed the workshop around these strong emotions, making them part of the learning process. The workshop began with 30 people introducing themselves through their positionality. This goes beyond pronouns and position- people could share anything they found relevant for the group to know. We learned about peoples struggles, hobbies, and goals through this process, and by the coffee break it felt like we all knew each other beyond our academic titles.

We then broke off into discussions, which were a series of open-ended questions based on what people stated their goals to be coming out of the workshop. Many of the conversations focused on how to make meaningful change in academia, the government, and the classroom. And then, after the hard conversations that we prepared everyone for, we had a crafting session. The crafting session was the idea of Dr. Az Klymiuk, a Cree Métis scholar from the University of Manitoba. The goal was to get people working with their hands to help them process the implications of decolonization and connect with others about the material.

Running the workshop at Botany 2023 was truly a joy. If you would like to run a similar workshop or would like to learn more about decolonization in science, please take a look at the tool kit that we put together for the workshop. This is a living document, so if there are resources you think would be a good addition to the tool kit, please reach out and I will add them (acw208@psu.edu).



Decolonizing Botany Toolkit: <https://sites.google.com/view/decolonizing-botany-workshop/home>

Awards and Publications

Congratulations to:

- **Amy Worbleski** who received an award for the Best Graduate Student Poster Presentation at the 2023 PA Botany Symposium.
- **Maisie MacKnight** who received the Ecosystem Science and Management's Outstanding Graduate Student Teaching Assistant Award.
- **Kelsey Mercurio** and **Jack Boyette** who received National Science Foundation's Graduate Research Fellowships.
- **Karen Beatty** who was selected as a Presidential management Fellows Finalist and awarded a NOAA Seas Grant John A. Knauss Marine Policy Fellowship.
- **Emma Rice, Olivia Trase, Madeline Luthard, Sarah Richards, and Jennifer Harris** who received predoctoral fellowships from the U.S. Department of Agriculture's National Institute of Food and Agriculture's (USDA-NIFA) Agriculture and food Research Initiative (AFRI).
- **Madeline Luthard** who received the College of Agricultural Science's Katherine Mabis McKenna Award.

Ecology Graduate Student Publications (as of May 2023):

- Butler, C., K. Turnham, A. Lewis, M. Nitschke, M. Warner, D. Kemp, O. Hoegh-Guldberg, W. Fitt, M. van Oppen, and T. LaJeunesse.** 2023. Formal recognition of host-generalist species of dinoflagellate (*Cladocopium*, *Symbiodiniaceae*) mutualistic with Indo-Pacific reef corals. *Journal of Phycology* 59:698-711.
- Emmons, S. C., Z. G. Compson, M. C. Malish, M. H. Busch, V. Saenz, K. T. Higgins, and D. C. Allen.** 2023. DNA metabarcoding captures different macroinvertebrate biodiversity than morphological identification approaches across a continental scale. *Environmental DNA* 00:1-14.
- Fautt, C., K. Hockett, and E. Couradeau.** 2023. Evaluation of the taxonomic accuracy and pathogenicity prediction power of 16 primer sets amplifying single copy marker genes in the *Pseudomonas syringae* species complex. *Molecular Plant Pathology* 24:989-998.
- Glass, S. E., R. M. McCourt, S. D. Gottschalk, L. A. Lewis, and K. G. Karol.** 2023. Chloroplast genome evolution and phylogeny of the early-diverging charophycean green algae with a focus on the Klebsormidiophyceae and Streptofilum. *Journal of Phycology* 00:1-14.
- Gonzalez, S., A. D. Sherer, and R. Hernández-Pacheco.** 2023. Differential effects of early life adversity on male and female rhesus macaque lifespan. Authorea. *In press*.
- King, W., C. Yates, L. Cao, S. O'Rourke-Ibach, S. Fleishman, S. Richards, M. Centinari, B. Hafner, M. Goebel, T. Bauerle, Y. Kim, C. Nicora, C. Anderton, D. Eissenstat, and T. Bell.** 2023. Functionally discrete fine roots differ in microbial assembly, microbial

- functional potential, and produced metabolites. *Plant Cell and Environment* 46:3919-3932.
- Kopp, M., J. Kaye, Y. H. Smeglin, T. Adams, E. J. Primka, B. Bradley, Y. Shi, and D. Eissenstat.** 2023. Topography Mediates the Response of Soil CO₂ Efflux to Precipitation Over Days, Seasons, and Years. *Ecosystems* 26:687–705.
- Pope, N., **A. Singh**, A. Childers, K. Kapheim, J. Evans, and **M. López-Uribe.** 2023. The expansion of agriculture has shaped the recent evolutionary history of a specialized squash pollinator. *Proceedings of the National Academy of Sciences of the United States of America* 120(15): e2208116120.
- Simpson, A. M., S. A. Nutile, **O. C. Hodgson**, A. E. Russell, J. D. Keyes, C. C. Wood, and R. J. Buckanovich. 2023. Evaluating the trophic transfer of PCBs from fish to humans: Insights from a synergism of environmental monitoring and physiologically-based pharmacokinetic modeling. *Environmental Pollution* 336:122419.
- Trexler, R.,** M. Van Goethem, D. Goudeau, N. Nath, R. Malmstrom, T. Northen, and **E. Couradeau.** 2023. BONCAT-FACS-Seq reveals the active fraction of a biocrust community undergoing a wet-up event. *Frontiers in Microbiology* 14. 1146751.

Announcing a new Ecology affiliated Dual-Title!

Microbiome Science students complete all requirements for their major graduate program as well as requirements for the Microbiome Science Dual Title Ph.D. These include:

- Having a Microbiome Sciences co-adviser
- Taking courses counting for 15 credits from the approved list of courses in the Microbiome Sciences curriculum table
- Passing a comprehensive exam that includes a Microbiome Sciences component; and,
- Completing a dissertation that addresses one or more topics within the field of microbiome sciences.

Ecology students can now pursue a dual-title degree in “Ecology and Microbiome Sciences”. For dual-title degrees, students matriculate into a main program (Ecology) and then add the dual title. The following content was taken from the Department of Plant Pathology and Environmental Microbiology’s Dual title in Microbiome Sciences webpage. For more information on the program’s objectives, course requirements, and process for application, please visit their [website](#).

Interdisciplinary training across Microbiome Sciences will prepare students for this rapidly growing research area in academia and government. It will also prepare students for a wide array of research careers in the private sector, including medical, agricultural, and environmental sciences, and integrated study of the sustainable approaches for managing ecosystems.

This program will provide students with the intellectual foundation for integrated and mechanistic understanding of relationships within and beyond microbiomes.

The Microbiome Sciences Dual-Title Degree Program is administered by the Department of Plant Pathology and Environmental Microbiology for the participating graduate programs. The dual-title degree program is offered through participating programs in the College of Agricultural Sciences (Plant Pathology) with additional programs joining soon.

For more information, contact Faculty in Charge Dr. Mary Ann Bruns (mvb10@psu.edu) or Graduate Program Head Carolee T. Bull (ctb14@psu.edu) or Graduate Program Administrator (kah6753@psu.edu).

Alumni Seminar Series Reflections

By: Maisie MacKnight

Last year, the ecology program celebrated its 50th anniversary. In celebration, the spring seminar series featured former graduates of the Ecology Program. The seminar consisted of 10 alumni that all came back to University Park to share their current work with members of the Ecology Program.

It was an incredible opportunity to build community within the Ecology Program as current graduate students were able to see former Ecology graduate students successful in their subdisciplines. Current graduate students Marissa Kopp and Madeline Luthard co-hosted two speakers, Alison Grantham and Denise Finney, on behalf of their advisor, Jason Kaye. Grantham is the Principal Scientist and Founder of Grow Well Consulting, and Finney is an Associate Professor of Biology at Ursinus College. Reflecting on their current roles, Luthard said that she, “found it immensely valuable to explore paths beyond an R1 research-centric academic career. Both alumnae skillfully, and honestly, discussed their leap from earning an ecology PhD to flourishing in new spaces”. Kopp agreed, and she added that, “a key highlight, for me, was how their perspectives integrated a refreshing dose of reality: Both mentioned the logistics of balancing family, salary, geography, and their sanity with professional aspirations”. Many students appreciated the reminder that figuring out how science fits into our lives is a continuous journey—before we're scientists, we're people.

The alumni series was beneficial to Ecology faculty as well. Prior advisors of the seminar speakers reflected on the joys of having their former students return to campus. Kat Shea, former PhD advisor for Laura Russo, said, “It was a delight to have Laura back at PSU! She has done so much exciting work since she left, and it was fascinating to see how her original research has developed and grown”. John Tooker, former advisor to Anjel Helms, also agreed, and he felt immensely proud, “to learn of the great work that she is leading with her own lab--see her succeeding and knowing that I played some small role in helping her achieve her goals is extremely gratifying”. Tooker added that he, “felt like a proud papa introducing her to my current students and members of the Ecology program.” Likewise, Shea emphasized that her former student Russo, “fit right back into the lab and to the ecology program during her visit”. Anjel recounted to Tooker after her visit that, “my time at Penn State was so enjoyable that she was thrilled to be included as an example of a successful recent graduate”.

Bury Your Imposter Syndrome

By: Estelle Couradeau and Maisie MacKnight

Estelle Couradeau, Assistant Professor in Ecosystem Science and Management (ESM) has led the discussion about something that most academics feel, but rarely talk about—imposter syndrome. Her keynote talk during the Fall 2022 Ecology Mini-symposium sparked conversations throughout the program and lead to the “Bury Your Imposter Syndrome” event, co-hosted by the Ecosystem Science and Management Diversity Equity and Inclusion (DEI) Committee and the Ecology Graduate Student Organization (EGSO).

Imposter syndrome is described as the baseless feeling of not being qualified enough and the fear of being revealed as fraud is pervasive in academia (reports from 70%-80% are common). It is especially widespread among women and minorities that are less likely to find role models that hold the same identities. As discussions around imposter syndrome are becoming more common place¹, it is important to recognize that naming this feeling a “syndrome” places the blame on the victims. We reiterate that imposter syndrome is fueled by unwelcoming environments paired with a lack of representation². In their 2021 article, Ruchika and Burey tell the story of a Black American woman reporting that “What had started as healthy nervousness — ‘Will I fit in? Will my colleagues like me? Can I do good work?’ — became a workplace-induced trauma that had her contemplating suicide”. Even if these feelings may be normal at first, they can spiral and worsen when our community is not offered the opportunity to foster a sense of belonging.



Figure 3: Participants from the “bury your imposter syndrome” event. Graduate students, postdocs, faculty and staff joined to raise awareness of the prevalence of imposter syndrome in academia.

Estelle Couradeau @Gloeomargarita · Jan 28, 2020
My mom buried my #imposter syndrome in her garden, I did not know it was dead but she told me it was 🌱 I really hope that thing can not resuscitate 🌱 Thanks mom @BCouradeau 🌱



Figure 4: Tweet from 2020 showing the original tombstone of my imposter syndrome buried by Couradeau's mom in her backyard.

Couradeau set out to create an event to answer this need for our community. This community-building activity for graduate students, staff, and faculty was based on a clever idea from her mom, Brigitte Couradeau. In 2020, she tweeted a photo of a tombstone replica symbolizing the burial of her daughter's imposter syndrome. Couradeau reflects, “Her tombstone tweet was a symbolic gesture that was very meaningful to me, allowing me to become comfortable as I move forward in my career.” This gesture sparked the idea to create an ephemeral graveyard of imposter syndromes. The goal of this event is to make imposter syndrome visible, by creating an ephemeral graveyard of imposter syndrome tombstones that will offer a strong visual acknowledgment of its spread and offer a platform for the ESM and Ecology Program community to exchange about their academic experience enhancing the sense of belonging of all community members.

On September 29th, 2023, graduate students, faculty and staff of Ecology Program and the Department of ESM were invited to make a small tombstone named after their imposter syndrome and plant it into the lawn as part of the ephemeral graveyard. Participants received ice cream from the creamery and were given opportunities to exchange ideas and testimonies. The event was covered by film student, Carolyn DeRosa, who took videos and testimonials of the event and will be creating a documentary featuring the event to continue the discussion about how to acknowledge and address imposter syndrome within academia. The event shed light on the pervasive nature of the imposter syndrome in our community and provided an informal forum for all participants to learn from each other and create a sense of community. To our knowledge, this was the first event of its kind at Penn State and probably in the country, establishing our program as a leader in implementing innovative solutions to enhance DEI.



Figure 5: Tombstones made by members of ESM and Ecology Program in honor of their shared imposter syndrome. Total number of tombstones was 79.

Please thank Estelle, the ESM DEI Committee, the EGSO Officers, and Carolyn DeRosa for their hard work. The documentary should be released soon!

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