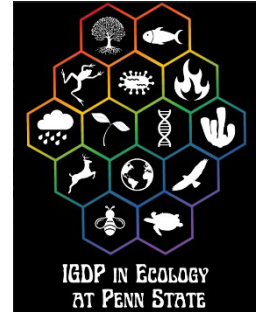


# NOTES FROM THE FIELD



The Biannual Newsletter of the Intercollege Graduate Degree Program in Ecology

The Pennsylvania State University



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## Small Change, Big Impact

*By: Madeline Luthard*

Efforts to promote diversity, equity, and inclusion (DEI) in the field of Ecology often draw parallels between ecological and scientific communities to illustrate the value of diversity. One could cite any number of classic Ecology papers to argue that diverse ecological communities are more stable, more resilient, more productive; the same must be true for groups of scientists. But is a group of scientists actually a community? Relying on ecological metaphors to validate our DEI work can miss some essential elements of a true community, where all members are valued for their personhood rather than just their contributions to our field.

For many people, the world of science lacks a sense of belonging, security, and identity. Both explicit and implicit messaging sends signals about who belongs in scientific spaces, who can feel at ease in these environments, and whose identity allows them to move through their career without assumptions being made about their intrinsic merit. Some of these signals stem from the histories of racism, sexism, ableism, and homophobia, among others, within the structures of academic institutions. At the same time, many of these signals manifest in professional and interpersonal interactions that unintentionally invalidate people who hold marginalized identities. From my perspective, this is the scale at which we hold the power to send and amplify new signals that intentionally validate our colleagues and peers. We can achieve this change in many ways, but one way is to use the powerful tool of purposeful language. Enacting small language changes in professional settings can have a big impact on the everyday experiences of the people with whom we interact. Using language in this way can foster a culture that is more welcoming to scientists of all backgrounds and can help us create scientific communities that really feel like communities.



*Art from paints derived from soils*

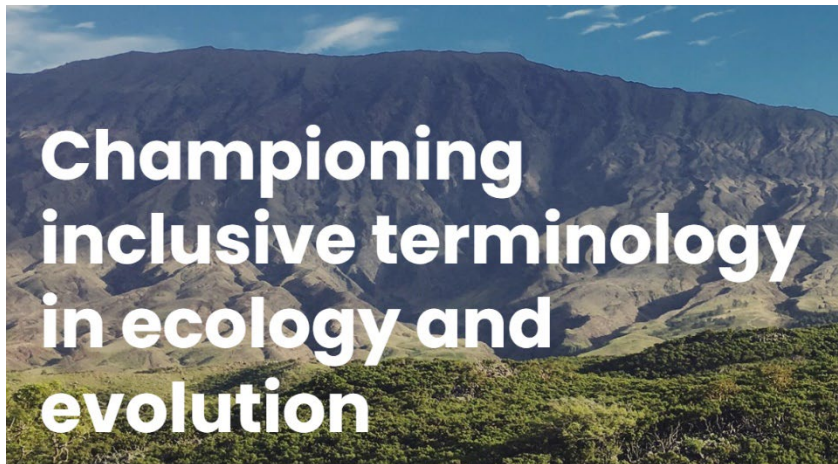
One group making strides in this direction is The EEB Language Project ([www.eeblanguageproject.com](http://www.eeblanguageproject.com)), a group that manages an online repository of terms commonly used in Ecology and Evolutionary Biology (EEB) disciplines that are harmful or of problematic origin. The repository is built from thousands of submissions by members of the EEB community and is still growing. On the website, individuals can submit additional terms using an anonymous form and can find suggestions for inclusive replacement terms. The website also includes additional resources, like links to papers and other efforts focused on inclusive language in EEB. Earlier this year, the scientists behind The EEB Language Project published

a paper highlighting how problematic terminology in EEB contributes to patterns of exclusion and structural harm<sup>1</sup>. I connected with one of the authors, Dr. Marcella Baiz, who is a postdoctoral scholar working with Dr. David Toews here at Penn State and asked about her experience with the project. Regarding her motivation to contribute to The EEB Language Project, Dr. Baiz said:

Institutional change is hard, and effects can take a long time to see, but changing the terms we use in our own writing and speaking is an individual action with no barriers. To me, it is an easy

way to take action about something I care about, which is fostering a more warm and welcoming EEB community.

Commenting on potential barriers to changing EEB terminology, Dr. Baiz noted that making these changes can sometimes feel difficult, especially if the terms in question do not affect us personally. However, we all put a lot of effort and thought into our work as Ecologists, spending countless hours refining a manuscript before submission or perfecting the visuals for an upcoming presentation. Small adjustments to the terminology we use is an easy step that can make an outsized difference to those engaging with our writing, teaching, and outreach. Indeed, replacing harmful scientific terminology benefits the discipline of Ecology as well as the individuals who practice it. Dr. Baiz commented that “a lot of inclusive terms that can be used in place of harmful terms tend to be more descriptive and precise,” which is “good for science.” Dr. Baiz added that “these individual language choices are the foundation of the larger changes that are already starting to happen in our field.” And these larger changes are certainly happening. For example, a new common name was recently adopted for the moth species *Lymantria dispar*, now called the spongy moth, because of advocacy by the Better Common Names Project within the Entomological Society of America ([www.entsoc.org/publications/common-names/better-common-names-project](http://www.entsoc.org/publications/common-names/better-common-names-project)). Creating an environment where EEB practitioners of diverse identities and experiences can feel safe and welcome is essential and begins with each of us.



*Snip from EEB website*

While trying to use inclusive language in our work might seem like a small action, it is one area over which we have direct control as individuals. Action at larger scales, such as working to correct structural power imbalances in academia and in our broader society, takes far greater human power and resources. We should certainly do what we can to advocate for change at this scale, but being more intentional about our language

in professional interactions is a step towards building a more inclusive environment and one of the many incremental shifts that facilitates broader change. Intentional word choice can become a daily practice of growth and compassion knowing that “[i]t is a privilege to be able to choose your words carelessly”<sup>2</sup>, and we have so many opportunities to be more careful every day.

Our identities shape the way we move through the world, and that includes the scientific world. As we carry out our professional responsibilities, we are still ourselves: humans with feelings, past experiences, lives beyond our offices or laboratories. Adding “scientist” to the identities you hold is so powerful, and we must send signals to one another that everyone can find a sense of community here in the captivating (and often frustrating) pursuit of science.

I want to thank Dr. Marcella Baiz for contributing her insight on inclusive terminology and The EEB Language Project.

## References

1. Cheng, S. J., Gaynor, K. M., Moore, A. C., Darragh, K., Estien, C. O., Hammond, J. W., Lawrence, C., Mills, K. L., Baiz, M. D., Ignace, D., Khadempour, L., McCary, M. A., Rice, M. M., Tumber-Dávila, S. J., & Smith, J. A. (2023). Championing inclusive terminology in ecology and evolution. *Trends in Ecology & Evolution*. <https://doi.org/10.1016/j.tree.2022.12.011>.
2. Ateş, F. (2016). "Female vs. Women: On Writing Adjectives, Nouns, And Inclusive Language". Medium.com. Published 17 March 2016; Accessed 15 March 2023. <https://medium.com/athena-talks/female-vs-women-on-writing-adjectives-nouns-and-inclusive-language-3b80398f59fb>.

## The Student Becomes the Teacher: Instructing Classes as a Graduate Student at Penn State

By: *Marissa Kopp*

A teaching-centric career is a common pathway for post-graduate ecologists, but the experiences that help top candidates snag those positions may not be so common. Data for recently (2016–2018) hired tenure-track ecology professors in North America suggest that “Experience *as an instructor of record* is almost essential to be hired for a [tenure-track] faculty position at the most teaching-intensive institutions [...]” (Fox 2020, emphasis added). However, for most graduate students, serving as an instructor of record (rather than a teaching assistant) remains a relatively untapped opportunity. This article highlights some resources available to Ecology graduate students interested in stepping into the instructor role at Penn State.



*A fun exercise in the Kaye lab*

### *Finding the Class*

There are two avenues for teaching as a graduate student: teaching an existing class or teaching a class that you designed. The first option requires significantly less preparation, but finding the right class may prove challenging. For example, the opportunity may happen to crop up when an advisor goes on sabbatical, but there is no guarantee that the semester is right for your timeline nor that the topic is right for your expertise. The second option assures that the course aligns with your degree timeline and interests; however, you shoulder the burden of building a new class and eliciting student interest. Either way, sitting down with your advisor, committee, or your program coordinator will provide useful insight and help gauge the feasibility of teaching or designing a course. The course design process could be eased by taking advantage of free resources detailed in the next section.

### *Finding the Pedagogical Resources*

Penn State’s Schreyer Institute for Teaching Excellence houses a wealth of resources for all stages of teaching—from designing your first lecture, to preparing a teaching philosophy statement for the job market. One option for graduate students to enhance and recognize their teaching competency is the [Graduate School Teaching Certificate](#), which guides students through key skills such as planning lessons,

teaching with inclusive methods, and motivating students. Adding the certificate to your CV signals strong teaching commitment to potential employers, but less time-intensive commitments may also be effective (Fox 2020). For example, Schreyer also hosts one-time training workshops, weekly drop-in working groups, and an archive of [teaching tools and resources](#). Whether you're seeking deep discussions on more inclusive learning or just need a syllabus template, the Institute for Teaching Excellence lives up to its name—an excellent one-stop shop for all things teaching.

Another key resource is Penn State's World Campus, which provides short, self-directed courses for Online Faculty Development (or "OL" courses). Some courses are as simple as introducing Canvas, Penn State's learning management system. Other courses tackle more complex pedagogical theories, such as [Universal Design for Learning](#). No matter your level of prior experience in teaching, Penn State offers many free resources to ensure your first experience in front of a classroom is a success.

### *Finding the Technological Resources*

The COVID pandemic has shaped, and arguably amplified, the role of technology in the classroom. In some cases, this may include changing the classroom format to include asynchronous or blended models. Teaching partly or entirely online comes with challenges, such as keeping students engaged or assuring equitable access to technology. Penn State's "[Keep Teaching](#)" site hosts resources to facilitate these virtual components of teaching, including best practices for virtual office hours and study groups.

Yet even classes that are fully in-person depend on technology. For basic technological needs, Penn State's Information Technology, Learning, and Development offers services to train and support instructors on using Canvas, Kaltura, Zoom, and more. This includes free consultations with their "Tech Tutors," who offer virtual and in-person assistance for integrating technology into teaching. For advanced technological needs, consider collaborating with Penn State's [Teaching and Learning with Technology](#) team. This team works to weave cutting-edge technology into learning experiences, such as creating adaptive texts for visually impaired learners or exploring immersive engagement through 3-D virtual spaces. Their real-life "Learning Spaces" include initiatives to change classroom structure for more collaboration and active learning (e.g., the ASI 110 Experimental Classroom).

### *Finding the Financial Resources*

Teaching is an investment of your time and effort that deserves compensation. Graduate students can seek this compensation internally or externally. Within Penn State, there are fellowships that specifically target graduate student teaching opportunities, such as the Harrar Fellowship in the Ecosystem Science & Management Department. However, you are not limited to teaching-specific funding opportunities. Many Ecology graduate students have successfully woven teaching into external grant funding. For example, the USDA National Institute of Food and Agriculture (NIFA) Predoctoral Fellowship requires a Career Development Plan section, which is an opportunity to pitch instruction as a training activity that directly builds toward your career goals. Linking short-term teaching opportunities to long-term career success can strengthen your professional development section in grant proposals and (hopefully) help hook the funds to devote to your teaching experience.

### *The Bottom Line*

Serving as an instructor of record during graduate school is a rewarding challenge that can set you up for success in a teaching-centric career. Take advantage of Penn State's ample pedagogical, technological, and financial resources to make the most of your teaching experience.

## References

Fox, J. (2020). A Data-Based Guide to the North American Ecology Faculty Job Market. *Bull Ecol Soc Am* 101(2):e01624. <https://doi.org/10.1002/bes2.1624>

## Anderson Award Reflection

*By: Olivia Trase*

Attending the Plant-Herbivore Interactions Gordon Research Seminar and Conference as a result of receiving the Andersen Travel Award was an incredibly inspiring experience. The diverse range of talks and presentations provided me with a unique opportunity to engage with leading experts in my field and gain valuable insights into the latest research developments. The conference also provided a platform for me to share my own research, receive constructive feedback, and network with other scientists. I was able to establish new collaborations, exchange ideas, and learn about exciting new research opportunities that I would not have otherwise been aware of. Attending the GRC helped me become a better scientist by exposing me to new ideas, approaches, and perspectives that challenged my existing assumptions and expanded my knowledge base.

In terms of my own research, I was given many interesting ideas about my study system during my poster session, and I now have plans to experiment in new ways with plant volatiles, entomopathogenic nematodes, and western corn rootworm. I have also been working on ways to make processing of gas-chromatography mass spectrometry data more efficient and I was able to discuss the current status and future potential of GCMS data processing with scientists at the forefront of the field. Together, we were able to test a new R package for GCMS data processing and come up with ideas to improve compound identification.

The conference was especially important for my professional development and networking. I was able to attend this conference at a particularly meaningful time as I am beginning to investigate opportunities for after I defend my PhD. I networked with scientists in industry and professors all over the world that I will be able to contact about future job opportunities, post-doctoral positions, and collaborations.

Moreover, the conference provided me with a renewed sense of enthusiasm and passion for my work, as I was able to connect with like-minded scientists and share my own research with a wider audience. As with many PhD students in their third or fourth years, I was feeling uninspired and tired of my research. I felt as though my research wasn't novel, that I wasn't getting enough done, and that I couldn't wait to be finished. Attending this conference and getting to talk about the cutting-edge research in the field renewed my sense of wonder and meaning toward my work and gave me many ideas for experiments than I thought possible. I discovered that the projects I've been working on are unique, and multiple other scientists expressed their appreciation for my work and the need for someone with my skillset to solve these problems.

I am confident that the knowledge and experiences gained from attending the GRC will prove invaluable as I continue to pursue my scientific career and I am so grateful to have been able to attend.

## Recent Alumni Outside Academia

*By: Curt McConnell*

After taking a job in industry, I wanted to see what other recent graduates were up to outside of academia. As graduate students, we often consider post-docs and professorships, but in some cases, our exposure to non-academic positions is limited. To a few recent grads in industry, government, or non-profit, I asked the following questions:

- 1) What kind of projects are you working on?
- 2) How have the skills you gained from the Ecology program helped you in your career?
- 3) Is there any ecological context to your work?
- 4) Do you have any advice that would be helpful to a current student?
- 5) What would be the “next step” in your career?

### **Rachel Rozum ('22)**

Data Analyst at Antares Group

Remote

I work as a data analyst for a renewable energy consultant company called Antares Group Inc. We have various types of clients, including universities, government agencies, and utilities companies. So far, I've been involved in tracking greenhouse gas emissions, solar panel siting and energy projections, and evaluating the viability of biomass energy projects. My graduate research focused on nutrient pollution and biomass energy, so that was definitely an asset in getting this job. But I think they were especially interested in my experience with coding, GIS programs, and working with big datasets. I honestly love my job. I was never really sure what I wanted to do after grad school, but academia was the default. And as the default, there can be a lot of stress and stigma around leaving academia. But if it doesn't give you what you want, leave. A lot of the skills we learn while working on our graduate research are highly transferable, so don't discount them!

### **Noah Winters ('22)**

Data Scientist/Bioinformatician at Battelle Memorial Institute

Columbus, OH



Generally at Batelle, we perform contract research for companies, other nonprofits, and federal/state governments. I'm not allowed to give a lot of details, but my main work is focused on the evolutionary genetics of viruses. My work may not appear ecological at first glance, but it is actually deeply rooted in many of the concepts covered in the Ecology IGDP coursework and qualifying exam, e.g. micro- and macro-evolution, intraspecies competition, selective pressure etc. The Ecology IGDP has a focus on developing quantitative skills, all of which are very helpful when applying for your first job. I also think the emphasis on writing and communicating complex ideas was incredibly worthwhile. The

quality of your work is really only as good as your ability to communicate it. There's an old adage "Hard skills get you jobs but soft skills get you promoted" and I have, at least so far, found this to be more accurate than I previously imagined. I think it is easy for graduate students to think they have few skills that are transferable beyond academia, but this is absolutely not true. Be generous with yourself. And a few bullet points, in no particular order:

- Make a LinkedIn
- When you are offered a job, counter it.
- If you're looking at industry positions, tailor your CV to a 1-page resume.

The nice thing about contract research organizations/government contractors is that there are often two parallel paths, a managerial one and a technical one. I am currently on a technical path and am deciding whether I want to grow as a bioinformatician or pivot to be more of a manager.

### Shannon White ('19)

Research Biologist at the USGS Eastern Ecological Science Center

Remote



I usually juggle several projects at a time, most of which relate to using genetic and demographic modeling to improve management for fish and wildlife populations of conservation concern. These projects range from reintroduction of imperiled brook trout in the mountains of North Carolina to much larger studies of Atlantic sturgeon habitat use and movement across the entire eastern seaboard. I'm often required to work on studies that are outside my academic comfort zone, but the wide breadth of knowledge and analytical skillsets that I developed while an Ecology student allows me to

confidently and quickly pivot to different taxa, ecosystems, or statistical analyses. This flexibility is important in my position, where research priorities can quickly change depending on collaborator needs or available funding sources. Collaboration and networking are key. The purpose of a graduate degree isn't to learn everything, but to learn how to be an Ecologist. Sometimes that involves having a specific skill (statistics is a good one!), but often it means knowing how to form effective collaborative networks to produce the best science as fast as possible. Start building professional contacts now by attending conferences and being active in the Ecology Program. And, try to find opportunities to practice



communication and people management skills. Even organizing large social events or productive lab meetings will teach you a lot about effective communication strategies. I really enjoy working in a fast-paced environment where I collaborate with other state and federal researchers to answer questions that have direct consequences for how we manage threatened species.

### Ellen Brandell ('21)

Wildlife Research Scientist, Colorado Parks and Wildlife (CPW)  
Fort Collins, CO



I am the lead wolf researcher for the state of Colorado. The process of reintroducing wolves into Colorado will begin by December 2023, and there is currently a small number of wolves occupying the state. I am in the process of designing and starting several research projects focused on wolf behavior and the effects of wolves on community dynamics in Colorado. For example, my research projects include wolf-prey dynamics and wolf habitat selection. The Ecology program prepared me for this position in several ways. The fundamental courses gave me a strong

background in ecology and experimental design, which is the basis for my position. The structure of the Ecology program allowed me to spend considerable time developing and conducting fieldwork, which is an essential component of my position. Through the program, I was mentored by established ecologists and wildlife researchers who helped me develop my knowledge and skills. My advice to current students is to seek out resources to learn new skills that you enjoy and will benefit your career. There are endless opportunities to learn programming languages, software, or statistical methods. Having the initiative to acquire innovative or essential skills will make you more competitive for jobs, will expand your capabilities, and will build your confidence. Within CPW, there are several avenues to "move up the ladder". As a wildlife research scientist, I can be promoted up a "level" after meeting certain qualifications such as publishing papers, collaborating on research, or being an editor for a journal. Additionally, there are Research Leader positions and other supervisory positions.

### Sarah Isbell ('22)

Research Scientist, Pasa Sustainable Agriculture  
Remote



I am a Research Scientist with Pasa Sustainable Agriculture. It is a fully remote job, although I do get to travel often for farm visits, research sampling, and Pasa events. I am a member of Pasa's farm-based research team, working on several ongoing projects--a soil health benchmarking study, a crop nutrient variation study, and a farm business financial benchmarking study. I also represent the Pasa research team through speaking engagements and collaborations with external groups. The skills I gained in the PSU Ecology program in agroecology, soils, data analysis, and outreach all contribute to me succeeding in this position. My advice to current students who may be interested in working for a specific group would be to reach out to them well ahead of graduation, and ask about potential collaborations, possibilities for upcoming open positions, or

opportunities to apply for funding to work together. Building connections through networking and collaborating can take you far! The next steps in my position are to contribute to scaling up the projects I am working on with Pasa, and to identify and pursue new avenues of research that will serve farmers. A current focus is connecting climate-smart agricultural practices aimed at improving soil health to outcomes both on-farm and within surrounding ecosystems.

### Curt McConnell ('23)

Scientist, Sustainability Sciences, Indigo Ag.

Remote



At Indigo I am responsible for conducting the science behind sustainable agricultural decisions. It goes without saying, but I wouldn't be in this position without the skills I learned through the Ecology Program, particularly the modeling, dataset management, and publication experience I gained in the Kemanian and Kaye labs. Having publications demonstrating my skillset was definitely a plus, particularly because it was evidence of the goal alignment between Indigo and myself. I continue my ecological work in biogeochemistry in agroecosystems, so it truly is an

extension of my ecology background. Over the next few years at Indigo, I hope to continue researching and work my way up through the various scientist levels. My advice to current students is to start looking for jobs during the tail end of your degree to help gauge the job market and determine where you may best fit. Get those publications out and learn some new skills, and for many of you, having the basics of programming and statistics is seemingly always in demand.

### David Munoz ('19)

Senior Manager of Data Analytics, The New Teacher Project

Remote



I am Senior Manager of Data Analytics at TNTP, an education consulting nonprofit. I work permanently remote and have projects in New York, Massachusetts, and Washington D.C on topics ranging from strategic planning, talent pipelines, quality academic experiences, and equity and justice. One of my current client-based projects is a three-year research and leadership development program called the School Leaders of Color Collective. It is fun taking the research expertise I gained in my PhD and using it to create compelling data stories to motivate and influence school districts and philanthropic foundations. My other role is the Data Practice Lead, codifying best data science practices and leading professional learning for the 52 analytics staff in my company. While my work doesn't have an ecological focus, I leverage my experiences at Penn State: project management, research, equity and justice, and program development. Regarding advice, I guess I would

say you are always more than your content expertise. Getting a scientific degree gives you tons of transferable skills. Know that there are tons of paths to blaze, and there is no shame in choosing the one that fits your goals! I don't have next steps career-wise (pretty content), but I look forward to growing in my advocacy for environmental justice outside of work. Last year our neighborhood defeated a new

natural gas power plant (instead it will be a renewable energy hub for offshore wind), and I am contributing to some campaigns for this upcoming NY legislative session.

## Publications from Ecology **Students** 2022-2023

Belles, A. B., **Beatty, K. E.**, Rodman, C. H., & Connolly, C. J. Publish, Don't Perish: Recommendations for Mitigating Impacts of the New Federal Open Access Policy.

Custer, G.F., **Bresciani, L.** and Dini-Andreote, F., 2022. Ecological and evolutionary implications of microbial dispersal. *Frontiers in Microbiology*, 13.

Espíndola, W.D., **Cruz-Mendoza, A.**, Garrastazú, A., Nieves, M.A., F. Rivera-Milán, F. and Carlo, T.A., 2023. Estimating population size of red-footed boobies using distance sampling and drone photography. *Wildlife Society Bulletin*, p.e1406.

**Gutierrez, G.M.**, LeCroy, K.A., Roulston, T.A.H., Biddinger, D.J. and López-Uribe, M.M., 2023. *Osmia taurus* (Hymenoptera: Megachilidae): A Non-native Bee Species With Invasiveness Potential in North America. *Environmental Entomology*

**Jones, L.J., Singh, A.**, Schilder, R.J. and López-Uribe, M.M., 2022. Squash bees host high diversity and prevalence of parasites in the northeastern United States. *Journal of invertebrate pathology*, 195, p.107848.

King, W.L., Kaminsky, L.M., **Richards, S.C.**, Bradley, B.A., Kaye, J.P. and Bell, T.H., 2022. Farm-scale differentiation of active microbial colonizers. *ISME Communications*, 2(1), p.39.

**Kopp, M.**, Alving, D., Blackman, T., Kaye, M., Duncan, J. and Kaye, J., 2023. Critical zone perspectives for managing changing forests. *Forest Ecology and Management*, 528, p.120627.

**Kopp, M.**, Kaye, J., Smeglin, Y.H., Adams, T., Primka IV, E.J., Bradley, B., Shi, Y. and Eissenstat, D., 2022. Topography Mediates the Response of Soil CO<sub>2</sub> Efflux to Precipitation Over Days, Seasons, and Years. *Ecosystems*, pp.1-19.

Martins, R.A., Greenspan, S.E., Medina, D., **Buttimer, S.**, Marshall, V.M., Neely, W.J., Siomko, S., Lyra, M.L., Haddad, C.F., São-Pedro, V. and Becker, C.G., 2022. Signatures of functional bacteriome structure in a tropical direct-developing amphibian species. *Animal Microbiome*, 4(1), pp.1-14.

**Messeder, J.V.S.**, Guerra, T.J., Pizo, M.A., Blendinger, P.G. and Silveira, F.A., 2022. Seed dispersal ecology in Neotropical Melastomataceae. In *Systematics, Evolution, and Ecology of Melastomataceae* (pp. 735-759). Cham: Springer International Publishing.

Ordóñez-Parra, C.A., **Messeder, J.V.S.**, Mancipe-Murillo, C., Calderón-Hernández, M. and Silveira, F.A., 2022. Seed Germination Ecology in Neotropical Melastomataceae: Past, Present, and Future. In *Systematics, Evolution, and Ecology of Melastomataceae* (pp. 707-733). Cham: Springer International Publishing.

Pope, N.S., **Singh, A.**, Childers, A.K., Kapheim, K.M., Evans, J.D. and López-Urbe, M.M., 2023. The expansion of agriculture has shaped the recent evolutionary history of a specialized squash pollinator. *Proceedings of the National Academy of Sciences*, 120(15), p.e2208116120.

Sutherland, J., Bell, T., **Trexler, R.V.**, Carlson, J.E. and Lasky, J.R., 2022. Host genomic influence on bacterial composition in the switchgrass rhizosphere. *Molecular ecology*, 31(14), pp.3934-3950.

Wagner, T., Schliep, E.M., North, J.S., Kundel, H., **Custer, C.A.**, Ruzich, J.K. and Hansen, G.J., 2023. Predicting climate change impacts on poikilotherms using physiologically guided species abundance models. *Proceedings of the National Academy of Sciences*, 120(15), p.e2214199120.

Wagner, T., Schliep, E.M., North, J.S., Kundel, H., Ruzich, J.K., **Custer, C.A.** and Hansen, G.J., 2022. Data in Support of Predicting climate change impacts on poikilotherms using physiologically guided species abundance models.

**Yates, C.F., Trexler, R.V.**, Bonet, I., King, W.L., Hockett, K.L. and Bell, T.H., 2022. Rapid niche shifts in bacteria following conditioning in novel soil environments. *Functional Ecology*, 36(12), pp.3085-3095.

## Awards

Congratulations to Laura Jones and Caylon Yates for receiving the Alumni Association Dissertation Award

### Title page photo credits

from left to right, top to bottom:

Isabella Petita: pollinator on wild lupine

Isabella Petita: controlled burn by PA Bureau of Forestry and Game Commission

Curt McConnell: cover crop roots

Isabella Petita: controlled burn

Madeline Luthard: calf at Hameau Farm

Amanda Zak: snowshoe hare track

Curt McConnell: long-term no-tillage site

Madeline Luthard: art from paint made from soils

Chyvyonne Jessick: end of field season for Deer Forest Study

This publication is available in alternative media on request.

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