Ecology Colloquium Spr 2026

Date	Topic/Speaker
26 Jan	***Ecology Seminar*** – Lunch with speaker, Meghan Blumstein, University of Virginia. Steidle 401
28 Jan	**Jacquelyn Molloseau** advised by Daniel Allen. *Assessing the Role of Sediment and Groundwater in the Road Salt Pollution of an Urban Lake System.*
02 Feb	***Ecology Seminar*** – Lunch with speaker, Holly Jones, Northern Illinois University. Steidle 401.
04 Feb	**Elizabeth Hughes** advised by Jason Kaye and Jonathan Duncan. *Spatial and temporal distribution of anaerobic, upland soils in the Shale Hills catchment.*
09 Feb	**Elizabeth McAlpine-Bellis** advised by Dave Miller and Julian Avery. *Correcting Sensor Readings to Model Body Temperatures.*
11 Feb	**Noah Manuszak** advised by Margot Kaye. *Using tree rings to reconstruct forest productivity between harvested and non-harvested stands in complex landscapes.*
16 Feb	**Kelsey Mercurio** advised by Liana Burghardt. *Investigating cowpea cover crops and root nodule microbiomes via farmer participatory research in semi-arid Nghumbi, Tanzania.*
18 Feb	**Rosella Cuomo** advised by Molly Bletz. *Microbes are friends? How beneficial bacteria impacts a frog's disease susceptibility.*
23 Feb	**Emily Roush** advised by Jon Sweetman. *The exploration of microplastics in wetland soils.*
25 Feb	**Ibrahim Fagbohun** advised by Daniel Allen and Jon Sweetman. *Investigating the survivability of sensitive macroinvertebrate taxa in restored streams.*
02 Mar	***Ecology Seminar*** – Lunch with speaker, Elias Dueker, Bard College. Steidle 401.
04 Mar	**Hannah Braslau** advised by Daniel Allen. *DISTANCe Determining InStream Transport and Natural Complexity of eDNA: How environmental factors contribute to the degradation of eDNA over distance and time.*
09 Mar	*Spring Break – No Class*
11 Mar	*Spring Break – No Class*
16 Mar	**Isaac Carachilo** advised by Jason Keagy and Tyler Wagner. *A Landscape Transcriptomics Approach for Evaluating the Effectiveness of Riparian Buffers to Reduce Stress in Brown Trout (Salmo trutta)*
18 Mar	**Matthew Chotlos** advised by Jason Keagy and Tyler Wagner. *Per- and Polyfluoroalkyl Substances (PFAS) in Invasive Channa argus Populations: A Transcriptomic Approach to Studying Contaminant Exposure in Wild Fish.* **Katie Kull** advised by Franny Buderman and Autumn Sabo. *Understory plant indicators of deer browse in Mid-Atlantic National Parks.*
23 Mar	***Ecology Seminar*** – Lunch with speaker, Breanna Forester, U.S. Fish and Wildlife Service. Steidle 401.
25 Mar	**Stephanie Gonzalez** advised by David Miller. *Intraspecific ontogenetic growth rates and asymptotic body sizes: Fast or Slow on the Road to Dwarfism?* **Abby Weber** advised by Franny Buderman. *Population Size and Space Use of American Black Bear in Pennsylvania.*
30 Mar	***Ecology Seminar*** – Rebekah Oomen, University of New Brunswick Saint John. Steidle 114.
01 Apr	**Zachary Bunch** advised by Christina Grozinger. *Monitoring insect diversity with AI enabled devices.* **Russell Wilson** advised by Tyler Wagner. *An endangered species in an urbanized environment: Atlantic sturgeon occupancy in the Hudson River harbor.*
06 Apr	*No Class – DCA @ Field Research*
08 Apr	**Kathryn Koo** advised by Gui Becker. *Multiscale Biodiversity Effects on Fungal Pathogen Dynamics in Tropical Amphibians.* **Erin Murray** advised by Jason Keagy. *How Multiple Stressors Shape Eastern Bluebird Nestling Development and Maternal Behavior Across an Urbanization Gradient.*
13 Apr	***Ecology Seminar*** – Lunch with speaker, Carla D'Antonio, University of California Santa Barbara. Steidle 401.
15 Apr	**Adriana Jordan Romos-Cobain** advised by Tomas Carlo-Joglar. *Measuring the effects of phylogenetic diversity and leaf cutter-ant herbivory on tropical tree seedling performance and survival.*
20 Apr	***Ecology Seminar*** – Lunch with speaker, Stephen Tulowiecki, SUNY Geneseo. Steidle 401.
22 Apr	**Gabrielle Pezich** advised by Jon Duncan and Lauren McPhillips. *Quantifying Biogenic Greenhouse Gas Emissions in Suburban Baltimore.*
27 Apr	**Alicia Costello** advised by Armen Kemanian. *Soil carbon turnover and residue carbon stabilization during the incubation of crop residue fermentation byproducts.*
29 Apr	**Laura Kauer Schuck** advised by Gui Becker. *Linking environmental microbial pool and pathogen exposure to host bacteriome recruitment across space and time.*

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Jacquelyn Molloseau advised by Daniel Allen.
Assessing the Role of Sediment and Groundwater in the Road Salt Pollution of an Urban Lake System.
While road salt is often necessary for safe driving conditions during colder months, it can create long-lasting issues within aquatic ecosystems, such as disrupting lake turnover. Because road salt is applied in the winter, logically salinity should spike during these months before returning to normal levels later in the year. However, this is often not the case with some systems exhibiting chronically high salt concentrations year-round. To determine potential sources of salt contamination during months when it is not being applied to roads, we investigated the salt retention capabilities of tributary sediments through a series of lab experiments. Additionally, we assessed whether groundwater in the affected systems was being polluted, as well.

Elizabeth Hughes advised by Jason Kaye and Jonathan Duncan.
Spatial and temporal distribution of anaerobic, upland soils in the Shale Hills catchment.
Very little is understood about the spatiotemporal distribution of anaerobic sites in upland soils, resulting in the associated C and N cycling processes to be left out from most upland ecosystem models, potentially underestimating these key fluxes. What we do know about these anaerobic sites in upland soils, however, is that they are largely controlled by the physical characteristics of soil (e.g. texture), soil moisture levels, and microbial respiration. We have seen evidence for increased hydrologic connectivity between the upland soils and intermittent stream in the Shale Hills catchment in Central Pennsylvania, resulting in patterns of elevated soil moisture levels and other related dynamics that could be creating the perfect conditions for anaerobic processes in these soils. My study utilizes a suite of field measurements to continue to uncover spatial trends in anaerobic conditions across time scales and better understand how these patterns might be contributing to our ecosystem fluxes.

Elizabeth McAlpine-Bellis advised by Dave Miller and Julian Avery.
Correcting Sensor Readings to Model Body Temperatures.
I will present the results of our first three years of fieldwork in which we tracked two species of turtle in the field in central PA. We took weekly temperature readings in situ and attached temperature loggers to the animals' shells. This presentation will discuss how we used these readings to model minute-by-minute animal body temperature.

Noah Manuszak advised by Margot Kaye.
Using tree rings to reconstruct forest productivity between harvested and non-harvested stands in complex landscapes.
Forest management and environmental conditions affect forest productivity and the capacity of forests to provide ecosystem services, leading to uncertainty about the future of these ecosystems (Au et al. 2020 and Kannenberg et al. 2019). Forests specifically located in the Appalachian region of the eastern United States grow across diverse topographies, and these have important implications for tree growth. My project will use tree rings to look at how topography and forest harvest intensity influences tree growth and carbon sequestration in recently harvested versus non-harvested stands in Penn State's Stone Valley Forest. With tree rings, we are able to see how forests change on an annual basis and gather important data about forest plots, such as carbon sequestration. My presentation will focus on how past literature findings link into future project objectives, along with my plans for the 2026 field season and subsequent data analysis.

Kelsey Mercurio advised by Liana Burghardt.
Investigating cowpea cover crops and root nodule microbiomes via farmer participatory research in semi-arid Nghumbi, Tanzania.
Legume cover crops and their symbiotic microbes provide ecosystem services that enhance crop yields, nutritional security, and sustainability in low-input agricultural systems, but barriers in research and implementation limit cover crop use and the effectiveness of nitrogen fixation on smallholder farms in semi-arid regions. The Mradi wa Kuboresha Afya na Rutuba ya Udongo Nghumbi has connected farmers, community development professionals, and researchers to optimize the use of legume cover crops in Nghumbi Village (Kongwa, Dodoma), Tanzania, and to understand cover crops' associations with diverse microbial partners. During a two-year field trial, we assessed upright and spreading cowpea varieties for dry season soil cover, yield, management considerations, and nodulation when intercropped between sorghum or maize across fifteen farms ranging in soil texture, then profiled root nodule microbiomes via 16S and nifH amplicon sequencing. I will present preliminary results on the ability of the tested systems to promote both soil cover and yields, as well as how overall and nitrogen-fixing bacterial communities varied across cowpea varieties, legacy treatments, and sites. Moving forward, we aim to understand how cowpea nodule microbiomes relate to soil characteristics, plant traits, and cropping system performance, while continuing collaborative efforts to enhance cover crop usage and nitrogen fixation in Nghumbi and beyond.

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Rosella Cuomo advised by Molly Bletz.
Microbes are friends? How beneficial bacteria impacts a frog's disease susceptibility.
Amphibians have a unique life history, which plays a role in high disease susceptibility, such as susceptibility to chytridiomycosis. Early life exposure to microbial diversity as a tadpole has been shown to positively impact an individuals ability to persist against disease post-metamorphosis. This suggests that microbial diversity across developmental stages plays a critical role in overcoming the natural immune suppression that individuals face as juveniles. We aim to examine how introducing anti-fungal bacteria into the water at the tadpole stage affects an individual's disease susceptibility post-metamorphosis, as juveniles.

Emily Roush advised by Jon Sweetman.
The exploration of microplastics in wetland soils.
Microplastics are small particles that come in a variety of chemical and physical characteristics that are impacting the environment. The goal of my project is two aspects, time and soil type. Chapter one focuses on how microplastics are moving through a sediment core in relation to time. The second chapter is looking at different drying methodology to figure out the best microplastic recovery regarding two different soil types.

Ibrahim Fagbohun advised by Daniel Allen and Jon Sweetman.
Investigating the survivability of sensitive macroinvertebrate taxa in restored streams.
Annually, millions of dollars are invested in stream restoration to improve the physical, chemical, and biological quality of streams. However, stream restoration only achieves the physical and chemical goals, leaving restored streams with depleted macroinvertebrate communities dominated by tolerant taxa, as in polluted streams. This poor biodiversity recovery raises the question, "Can restored streams support more biodiversity than they currently do, especially sensitive macroinvertebrate taxa? We address this question by transplanting whole macroinvertebrate communities to three restored streams in the piedmont region of Maryland and investigating their survival in these streams.

Hannah Braslau advised by Daniel Allen.
DISTANCe Determining InStream Transport and Natural Complexity of eDNA: How environmental factors contribute to the degradation of eDNA over distance and time.
Environmental DNA (eDNA) has been an emerging tool for biomonitoring applications, especially in aquatic systems. To date, eDNA based assays have primarily been used for presence/absence studies as there are many different factors that can contribute to the amount of eDNA present in a sample. Through this project, we aim to investigate how abiotic factors affect the concentration of eDNA in a natural stream with distance from source and time.

Isaac Carachilo advised by Jason Keagy and Tyler Wagner.
A Landscape Transcriptomics Approach for Evaluating the Effectiveness of Riparian Buffers to Reduce Stress in Brown Trout (Salmo trutta)
The effectiveness of riparian buffers for reducing nutrient and sediment inputs to streams has been well studied, but their impact on cold-adapted fish physiology is largely unexplored. To address this research gap, we are examining brown trout gene expression (gill transcriptomics) to assess the efficacy of riparian buffers to reduce environmental stress. To accomplish this, we are conducting a space-for-time substitution study in Pennsylvania by monitoring eleven riparian stream buffer sites of varying age (three young [5-10 years], four intermediate [5-20 years], and four mature sites [15+ years]) to understand how buffer development influences stress in naturally reproducing brown trout. Increased riparian buffer development (e.g., increased percent canopy cover) is expected to be associated with a decrease in thermally stressed brown trout as indicated by expression of certain heat shock proteins. Genes responsive to stress generally are expected to be upregulated in fish sampled in both the summer and fall, with preliminary analyses suggesting gene expression differs by sampling season, buffer development, and their interaction.

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Matthew Chotlos advised by Jason Keagy and Tyler Wagner.
Per- and Polyfluoroalkyl Substances (PFAS) in Invasive Channa argus Populations: A Transcriptomic Approach to Studying Contaminant Exposure in Wild Fish.
Emerging contaminants have the potential to reshape aquatic communities and the ecosystem services they provide, especially in urban environments. Per and polyfluoroalkyl substances (PFAS) are of particular concern due to their persistence in the environment, global distribution, and their potential for adverse ecosystem and human health effects. Fish consumption is a significant pathway of human PFAS exposure. Northern snakehead (C. argus) are a non-native invasive fish species in the eastern United States that can thrive in urban environments and have been increasingly targeted for recreational fishing. Although recent studies have identified elevated PFAS concentrations in sport fish and many snakehead populations occur in PFAS-contaminated areas, data on PFAS in northern snakehead populations is limited. This study aims to (1) quantify PFAS occurrence and concentrations in northern snakehead populations across an urban development gradient, and (2) use a landscape transcriptomics approach to identify molecular markers associated with sublethal PFAS exposure. Fish tissue PFAS and transcriptomic analyses are ongoing and will be presented to investigate the link between game fish and human PFAS exposure risk while characterizing PFAS-related physiological effects in wild fish.

Katie Kull advised by Franny Buderman and Autumn Sabo.
Understory plant indicators of deer browse in Mid-Atlantic National Parks.
White-tailed deer (Odocoileus virginianus) are abundant in the eastern United States and directly affect the composition of forest understories through browse preference and intensity. Previous work in eastern National Parks has demonstrated a significant ‘regeneration debt’ attributed to invasive shrubs and white-tailed deer browse, meaning that tree seedlings and saplings are not surviving into the midstory at the rate needed to maintain closed-canopy forests. Suspecting that deer browse impacts to the herbaceous plant community may also be significant, this study utilizes permanent long-term monitoring plots in eight National Park Service sites to examine trends in preferred and avoided indicators species as well as assesses the value of these indicators in long-term monitoring.

Stephanie Gonzalez advised by David Miller.
Intraspecific ontogenetic growth rates and asymptotic body sizes: Fast or Slow on the Road to Dwarfism?
There are five reptile species (Pituophis catenifer, Coluber constrictor, Elgaria multicarinata, Uta san, Sceloporus occidantalis) that inhabit both the California mainland and the California Channel Islands (i.e., Santa Cruz and Santa Rosa Island). However, three of the five island species (P. catenifer, C. constrictor, and E. multicarinata) are smaller than their mainland counterparts and thus exhibit insular dwarfism. This island-mainland population comparison provides a natural laboratory setting to compare life-history traits including ontogenetic growth rate—a fundamental driver of body size. Using capture mark recapture longitudinal data, I employed Von Bertalanffy growth models to calculate and estimate the mean growth coefficients (k) and asymptotic body sizes (Lmax) for the three insular dwarfed species as well as their mainland counterparts. By quantifying differences in growth rate and asymptotic size between island and mainland populations, this study clarifies how ontogenetic growth contributes to insular dwarfism and associated life-history trade-offs in Channel Island reptiles.

Abby Weber advised by Franny Buderman.
Population Size and Space Use of American Black Bear in Pennsylvania.
Understanding population abundance and habitat associations is beneficial for wildlife management — for example, factors that may affect populations such as harvest season length and sporting-implement type could be adjusted in response to current habitat conditions. Following regulation changes that expanded harvest opportunities in 2019, Pennsylvania’s statewide black bear (Ursus americanus) numbers fluctuated between an estimated abundance of 15,000–20,000 from 2019–2022, with wildlife management units (WMUs) exhibiting variable population trajectories. In response, a statewide black bear monitoring program was implemented which aims to fit 160 bears annually, targeting all sex-age classes except for cubs, with GPS collars from 2024–2028. The GPS collar data will be used in combination with ear tag, harvest, and fecundity data to generate a Bayesian integrated population model at the study area level, and the GPS data will also be used to quantify resource selection across two spatial levels using a step selection function at the third order (i.e. within home range) and a resource selection function at the second order (i.e. placement of home range). By combining demographic and habitat use information, we can provide a robust evaluation of the current state of black bear management in Pennsylvania.

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Zachary Bunch advised by Christina Grozinger.
Monitoring insect diversity with AI enabled devices.
AI-enabled insect monitoring enables large-scale, continuous data collection with fine temporal and spatial resolution, addressing key limitations of traditional insect sampling. Although malaise traps are highly effective passive samplers of flying invertebrates (especially Diptera and Hymenoptera), their reliance on manual specimen collection and sorting limits the number of traps per experiment and decreases the feasibility of capturing fine-scale temporal resolution. Integrating malaise traps with AI-powered, camera-based identification systems reduces labor demands while increasing sampling frequency and spatial replication. This automated framework enables near-continuous, non-destructive monitoring of insect activity and can be readily adapted to other passive traps, such as blue vane traps, across diverse ecological contexts.

Russell Wilson advised by Tyler Wagner.
An endangered species in an urbanized environment: Atlantic sturgeon occupancy in the Hudson River harbor.
Atlantic Sturgeon (Acipenser oxyrinchus) are large bodied anadromous fish that are federally endangered throughout most of their range in the United States. Their migratory life history exposes them to a multitude of threats as they traverse multiple habitats. The harbor in the Hudson River is one of the most trafficked cargo ports in the United States and hosts constant vessel traffic. This project aims to identify times when vessel strikes pose the greatest risk to Atlantic Sturgeon as they navigate in this heavily urbanized waterway.

Kathryn Koo advised by Gui Becker.
Multiscale Biodiversity Effects on Fungal Pathogen Dynamics in Tropical Amphibians.
Hypothesized associations between biodiversity and pathogen risk have long been debated. However, how biodiversity at multiple biological scales affects wildlife health remains to be explored. The fungal pathogen Batrachochytrium dendrobatidis (Bd) has caused global declines in amphibian species. Habitat complexity, amphibian community diversity, and the amphibian skin-associated microbial community (skin microbiome) diversity can affect Bd dynamics in amphibian communities. Our objective is to test whether biodiversity effects at one of these biological scales (habitat, host, and microbiome) amplify or dampen diversity at other scales, and if these cross-scale interactions ultimately increase or reduce Bd prevalence in tropical amphibian communities, to broaden our understanding of the relationships between biodiversity and disease. We expect habitat complexity to indirectly reduce disease prevalence in amphibian communities by enhancing both host species diversity and skin microbiome diversity.

Erin Murray advised by Jason Keagy.
How Multiple Stressors Shape Eastern Bluebird Nestling Development and Maternal Behavior Across an Urbanization Gradient.
Wildlife is increasingly exposed to a host of anthropogenic stressors as the human population continues to grow; however, research studies that inform wildlife management and conservation policies often focus on a single, isolated stressor. How multiple stressors affect animal behavior and physiology in combination remains a major knowledge gap in the literature, inhibiting effective management. The Eastern bluebird, Sialia sialis, relies on human-made nest boxes for reproduction, and is therefore exposed to heightened levels of human disturbance such as noise pollution and heat stress from urban heat islands. My proposed research assesses (1) the effects of heat and noise on nestling growth and fledge timing, (2) how heat and noise affect maternal care, and (3) how urbanization is related to adult problem solving and neophobia. This study takes a novel approach by utilizing Raspberry Pi computers for continuous, remote monitoring of female incubation and provisioning without human interference.

Adriana Jordan Romos-Cobain advised by Tomas Carlo-Joglar.
Measuring the effects of phylogenetic diversity and leaf cutter-ant herbivory on tropical tree seedling performance and survival.
Tropical forests harbor most of Earth's biodiversity, yet we still lack a clear understanding of how biodiversity influences forest regeneration in species-rich, tree-dominated systems. My research tests how phylogenetic diversity of tree communities affects seedling growth and survival, and whether these effects are modified by herbivory from leaf-cutter ants, a major ecological filter in tropical forests. Using a large-scale field experiment in rural São Paulo, Brazil, we are planting mid successional tree seedlings across plots spanning a gradient of phylogenetic diversity, with half of the seedlings protected from leaf-cutter ants. This work links biodiversity theory with biotic interactions to improve predictions of tropical forest recovery and inform restoration strategies.

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Gabrielle Pezich advised by Jon Duncan and Lauren McPhillips.
Quantifying Biogenic Greenhouse Gas Emissions in Suburban Baltimore.
Suburban ecosystems are inherently heterogeneous, yet their influence on greenhouse gas (GHG) dynamics remains poorly understood. This study quantifies spatial and temporal variability in biogenic carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions across four dominant urban land cover types in Baltimore: residential lawns, urban forests, riparian zones, and stormwater detention ponds. By identifying emission hotspots and linking observed fluxes to underlying biophysical drivers, this research provides new insights into how suburban landscapes regulate urban contributions to climate forcing. Together, these findings advance our understanding of the mechanisms governing carbon and nitrogen cycling in human-dominated ecosystems.

Alicia Costello advised by Armen Kemanian.
Soil carbon turnover and residue carbon stabilization during the incubation of crop residue fermentation byproducts.
The use of crop residues for bioenergy production risks reducing soil organic carbon, while the return of carbon-rich coproducts to soil can compensate for this removal. We investigate how digestate and high lignin fermentation byproduct alter native soil organic carbon turnover and stabilize new carbon compared to that of original crop residue using laboratory incubations, stable isotope tracing, and modeling.

Laura Kauer Schuck advised by Gui Becker. *Linking environmental microbial pool and pathogen exposure to host bacteriome recruitment across space and time.*
Despite all that has been learned about amphibian skin microbiome diversity, composition, and function in the context of disease, far less is known about the basic ecology of these communities. Understanding how amphibian skin microbiomes are assembled, structured, and regulated can offer insight into ecological processes associated with disease defense, advance community ecology theory, and help guide conservation strategies. In light of this knowledge gap, my central question is: are microbial communities on amphibian skin assembled and shaped primarily by deterministic or stochastic ecological and evolutionary processes? To address this question, we captured and VHF-tracked six *R. ornata* toads at each of five sampling sites for a period of 45 days, totaling 30 individuals. We collected a skin swab paired with an environmental sample at each recapture event, once every seven days. At the end of the tracking period, VHF tags were removed and animals were released at the same location where they were last captured. This 45-day timeframe allowed us to test temporal dynamics in host microbiome structure and function in relation to the environmental microbial pool and Bd infection loads across environments with distinct microbial communities. I will integrate individual movement and habitat-use data with host and environmental microbiome composition, Bd-inhibitory function, host body condition, and microclimatic variables (e.g., temperature and soil moisture) using a series of statistical approaches. Microbial community changes will be analyzed using trajectory analysis, mapping shifts in taxonomic composition and Bd-inhibitory function across sequential sampling points.