Organization of Biological Field Stations

108 Petticoat Hill Rd, Williamsburg, MA 01096
www.obfs.org

Supporting Environmental Research, Education, and Public Understanding

In 2025 the Organization of Biological Field Stations (OBFS) launched the **OBFS-Maxwell/Hanrahan Research Experience Grant**. OBFS received $15,000 from the Maxwell/Hanrahan Foundation to support graduate students from member organizations in field-based research. This was the first time OBFS funded research at field stations and the grant sub-committee identified three field stations with compelling projects and graduate students. We were able to allocate funds to the different stations according to graduate students' needs: The Baruch Marine Field Laboratory in South Carolina received $2500, Black Rock Forest in New York received $5000, and the Cedar Creek Ecosystem Science Reserve in Minnesota received $7500. The monies primarily went directly to the students, though in some cases we split the monies between the field station and the student to assure the most financially efficient way of covering costs associated with the field work.

At the end of their field season, each graduate student recipient was asked to summarize their experience and describe how the monies impacted their field work. Their reports follow. From oyster bed health to how heat stress impacts trees to acoustic monitoring of birds, the breadth of scientific research is impressive.

The 2025 OBFS-Maxwell/Hanrahan Research Experience Grant Sub-Committee Members:
Itchung Cheung, OBFS Chair of the Collaborations Committee
Conner Philson, OBFS Chair of the Outreach and Communications Committee
Sofía Rodríguez, OBFS Member-at-Large, early career
Rhonda Struminger, OBFS President
Paul Wetzel, OBFS Treasurer

Student 1: Briar Ownby-Connolly
Field station: Baruch Marine Field Lab, Georgetown, South Carolina

I am a Ph.D. student in Biological Sciences at the University of South Carolina, advised by William Strosnider. With support from the OBFS-Maxwell/Hanrahan Research Experience Grant, I conducted fieldwork during summer 2025 at Baruch Marine Field Lab in Georgetown, South Carolina. My research focuses on oyster reef restoration and community ecology, with particular interest in how habitat structure and spatial configuration influence early reef succession and associated nekton communities.

Project Description and Purpose
This project investigated how different materials and spatial densities of biodegradable alternative reef substrates influence oyster settlement, barnacle recruitment, and nekton community composition. Understanding these processes is important for designing effective oyster reef restoration and management strategies that promote both reef development and the recovery of estuarine biodiversity.

In summer 2025, we installed **36 experimental plots**, 18 wood stakes plots and 18 bamboo stake plots. Each material involves three different spatial densities: 6-in, 12-in, and 18in.To track ambient spatfall, we also deployed "oyster trees" (strings with clumps of six shells) as a control for natural settlement.

Fieldwork and Progress
So far, our team has conducted **five stake sampling events** (with two more planned for this year). These samples showed **minimal oyster spat recruitment** to date but **substantial barnacle settlement**, supporting a working theory of successional dynamics (barnacles colonizing first, followed by oysters). Additionally, we've conducted **eight nekton sampling events** using fyke nets (with one more planned for this year). Nekton, he actively swimming aquatic organisms such as fish and shrimp that can move independently of currents, were sampled primarily on the wood stake plots, with comparisons to a natural reference reef. Preliminary data show **overlap in species composition** across all treatments and the natural reef, though differences emerge in **abundance and size structure**.

Together, these results provide early insights into how substrate type and spatial arrangement influence both reef colonization and the communities that reefs support.

Impact of Grant Support
The Maxwell/Hanrahan funds were important for enabling this field work at Baruch Marine Field Lab. The salary support allowed other funding to shift towards essential supplies and boat use fees needed throughout the summer season. This flexibility made it possible to establish and monitor the experimental plots at the necessary scale and to adapt as field conditions and project needs evolved.

Professional Development
This funding allowed me to design and lead a field-intensive project, coordinate a team through plot installation and sampling, and begin to integrate ecological monitoring with restoration practice. It has strengthened my skills in experimental design, field logistics, and species identification, and provided valuable experience working across tides and conditions typical of estuarine systems. These skills will be foundational to my dissertation research and my long-term career in marine science and conservation.

Looking Ahead
Sampling will continue into late summer 2025 and will be repeated in 2026. I look forward to sharing more detailed results as the project progresses. Thank you again for the opportunity to pursue this work through the OBFS-Maxwell/Hanrahan Research Experience Grant. This support has been instrumental in both advancing my research and in my development as a field-based marine scientist.

Student 2: Corina Vernon
Field station: Black Rock Forest, Cornwall, New York

I am a PhD student studying plant biology and ecology at the City University of New York (CUNY) in the heart of New York City. My advisor, Andrew Reinmann (faculty at Hunter College and the Advanced Science Research Center), studies environmental change and terrestrial carbon cycling, particularly in human impacted landscapes such as forest edges, or along urban-to-rural gradients. My research took place at Black Rock Forest (BRF), in Cornwall New York. Situated in the Hudson Highlands region, this oak-dominated temperate broadleaf forest features extensive topographic diversity in the form of mesic valleys, dry ridgetops, and north and south facing slopes. I spent the summer (June through August) conducting leaf-level measurements in *Quercus rubra* (red oak) of isoprene production and photosynthesis as a response to temperature, and analyzing chlorophyll fluorescence as a measure of leaf stress to quantify how a tree's local growing conditions mediate its response to heat stress.

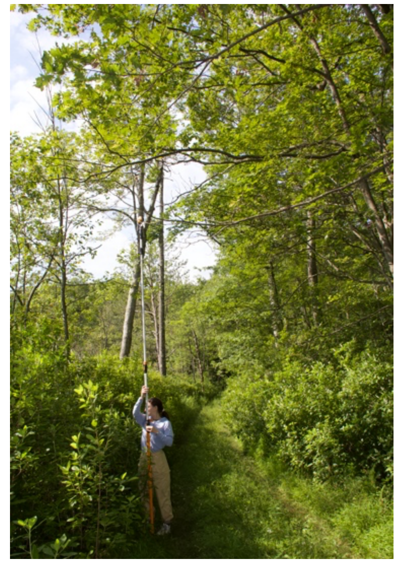


Fig 1. Using the 16-foot pole trimmer to cut sunlit leaves from *Quercus rubra*

As climate change intensifies, the frequency of heat waves and intensity of water stress are expected to increase with important implications for tree-mediated ecosystem functions. Trees are a foundational component of forest ecosystems and provide a range of critically important ecosystem functions, such as carbon sequestration, and regulating biogeochemical cycles and climate. Many of the ecophysiological processes that regulate these important functions, such as photosynthesis, transpiration, respiration, and volatile organic compound synthesis, are strongly influenced by a tree's growing environment, and are particularly impacted by climate conditions. Prevailing climate conditions impact physiological processes such as photosynthesis, but local growing conditions will further modulate how trees experience acute climate stress from excessive heat and extended periods without precipitation. Local growing conditions such as soil properties, topography (e.g., steep slopes, aspect, valleys), and microclimate likely exert particularly important controls on tree response to climate stress. One of the ways that red oak trees respond to heat stress is by producing isoprene, which is one of the most globally abundant biological volatile organic compounds (VOCs). Physiologically, isoprene is generally considered to provide protection against thermal stress and in shielding the photosynthetic apparatus from reactive oxygen species (ROS) under high light conditions that often accompany high heat. However, its chemical structure makes it highly reactive in the atmosphere and an important precursor to ozone pollution. As the air temperatures continue to warm from anthropogenic climate change isoprene emissions are likely increase, which could have important implications for a tree's carbon balance and air quality.

Fig 2. Putting leaf samples in water.

Isoprene production was measured repeatedly throughout the growing season (early June, late July, and late August) to study the seasonality of this phenomenon. These measurements were time consuming and required several weeks of staying at the BRF field station and traveling between BRF and my home institution (CUNY). The Maxwell/Hanrahan grant made this possible by covering the costs associated with travel and lodging, enabling an extended stay at Black Rock Forest and extended data collection. This has also been an unparalleled opportunity to meet and network with scientists outside of academia. Lodging covered by the Maxwell/Hanrahan grant, afforded me an immersive experience at BRF for the duration of the summer and I witnessed the wide variety of post graduate school roles available in the biological sciences.

Fig 3. Adjusting settings on the LiCor-6800 connected to the Fast Isoprene Sensor to collect isoprene data

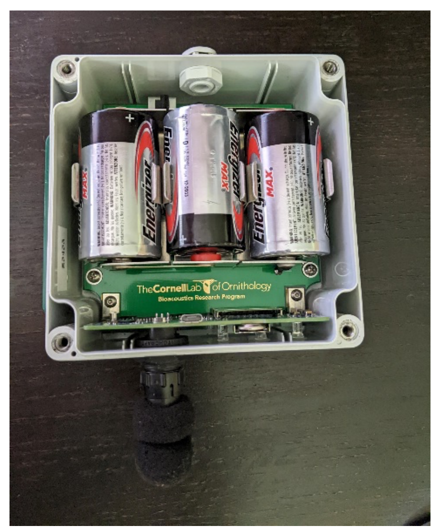
Student 3: April Strzelczyk Haverstock
Field station: Cedar Creek Ecosystem Science Reserve, East Bethel, Minnesota

Figure 1: Deploying an Acoustic Recording Unit (Swift)

I am a Master's student pursing a degree in Wildlife Ecology and Management at the University of Minnesota's in the Department of Fisheries, Wildlife, and Conservation Biology, where I conduct research under the guidance of Dr. Elena West. My research investigates the daily and seasonal vocalization patterns of red-headed woodpeckers and Eastern whip-poor- wills—two species experiencing population declines and listed as Species of Greatest Conservation Need in Minnesota.

The primary objective of this project is to understand how vocal activity for each species varies seasonally and across the 24-hour cycle during the breeding season. To capture these patterns, I use Passive Acoustic Monitoring (PAM), an emerging and powerful tool for studying biodiversity. This approach relies on Autonomous Recording Units (ARUs), which can be programmed to record at set intervals and for extended durations. To apply this method, I deployed ARUs at sites where target species had nested in the current or previous year, securing each device to a tree with a lock and leaving it to record throughout the breeding season. Periodic visits allow me to check on the units, swap batteries, and replace SD cards. This non-invasive method is especially useful for rare and cryptic species like red-headed woodpeckers (rare) and Eastern whip-poor-wills (rare and cryptic).

Figure 2: Inside an Acoustic Recording Unit (Swift)



Data from my research will help refine the timing and design of future acoustic surveys, enhance species detection rates, and ultimately inform management strategies to support these vulnerable species. Additionally, the data collected is being used to evaluate the performance of several audio analysis programs, including BirdNET, Kaleidoscope, and monitoR. By assessing these programs in terms of accuracy and usability, this work supports a broader goal of streamlining acoustic analysis workflows for wildlife managers and conservation researchers.

Figure 3: Acoustic Recording Unit (Swift)

In 2024, I conducted passive acoustic monitoring at multiple field locations across the state of Minnesota, including a National Wildlife Refuge, State and County parks, and the Cedar Creek Ecosystem Science Reserve (hereafter, Cedar Creek). While red-headed woodpeckers were detected at multiple sites, Eastern whip-poor-wills were detected only at Cedar Creek. These results guided the focus of my 2025 fieldwork, which is now centered exclusively at Cedar Creek, where Autonomous Recording Units (ARUs) are deployed to capture vocalizations of Eastern whip-poor-wills throughout the breeding season.

Funding from the Maxwell/Hanrahan Foundation made this work possible by directly supporting field data collection during the 2025 season. The grant supported extended deployments of acoustic equipment at Cedar Creek, without which this work would not be possible. The dataset I will be able to work with is now significantly more robust and will enable me to analyze and compare PAM methods for two species of conservation need, rather than just one.

Figure 4: April with an Acoustic Recording Unit (Swift)

Professionally, this funding supported my work to design and implement a field project, expand my expertise in acoustic ecology and analytical tools, and gain valuable experience in applied wildlife research—key skills that will support my future contributions to applied wildlife research and conservation. I am grateful to the Organization of Biological Field Studies for supporting my work through the Maxwell/Hanrahan Research Experience Grant!