Emily Leggat

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Education

PhD in Ecology and Evolution — Sept 2023 – Present
Columbia University, New York, NY

MA in Ecology and Evolution — May 2025
Columbia University, New York, NY

BA in Biology — May 2021
Wesleyan University, Middletown, CT

Research

Ag Biologicals Engineer 1 - Microbiology — Oct 2022 – Jul 2023
Ginkgo Bioworks — *Boston, MA*

- Optimized corn biomarker assay for gene expression analysis in response to soil and microbial nitrogen presence
  - Established best mRNA extraction and preservation methods for cDNA synthesis
  - Created and wrote protocols for high-throughput RNA → cDNA → qPCR sample processing
  - Ran qPCR and analyzed data in R to calculate fold gene expression
- Validated DNA extraction protocols for microbial strains in plant tissues
  - Tested various methods to optimize DNA yield and ran qPCR and gel electrophoresis on samples to confirm results
- Planned workflows for sequential sporulation and *in planta* assays
- Continued responsibilities from Joyn Bio following acquisition and the creation of the Agriculture Division

Plant-Microbe Interactions Research Associate — Oct 2021 - Oct 2022
Joyn Bio — *Boston, MA*

- Performed *in planta* assays to determine microbial colonization of shoots and roots in V1 corn and VC soybean
  - Planted seeds, watered, and harvested up to 200 plants per experiment, with two experiments per week
  - Separated, dried, ground, and resuspended plant tissues for long-term storage and downstream analysis
- Extracted microbial DNA from plant tissue samples to perform qPCR
  - Prepared qPCR plates both by hand and using a Hamilton robot for analysis in a LightCycler
- Grew, diluted, and plated experimental microbial strains for sporulation assays and later use in *in planta* assays
  - Prepared several types of media to determine each strain's preferred media for sporulating

Undergraduate Research Fellow — Apr 2019 - May 2021
Singer Lab, Wesleyan University — *Middletown, CT*

- Analyzed the effects of forest fragmentation on parasitism of caterpillars during the 2019 field

season

- Systematically sampled red maple and witch hazel branches for caterpillars in sixteen sites in midland Connecticut
- Reared collected caterpillars to monitor for emerged parasitoids, and preserved them for future identification

- Conducted a literature review examining the research on the enemy-free space hypothesis as it pertains to caterpillar diet breadth since the publication Bernays & Graham 1988
  - Wrote and edited a book chapter in collaboration with other lab members, published in *Caterpillars in the Middle: Trophic Interactions in a Changing World* (2022)
- Presented research findings at the Wesleyan Research in Sciences poster session in the 2019 and 2020 summers

Teaching and Mentorship

Graduate Teaching Assistant Sept 2024 – Present
Columbia University *New York, NY*

- *Conservation Biology*, Spring 2025 semester: Led twice-weekly discussions for 15 undergraduate students about primary literature from conservation biology
- *Introduction to Statistics*, Fall 2024 semester: Ran weekly lab sessions teaching 20 undergraduate and graduate students how to use R for statistical analyses of ecological questions

High School Research Mentor Mar – Jun 2025
Advanced Preparatory Research Academy *New York, NY*

- Mentored a high school student through weekly one-on-one meetings to develop a research paper about the ecological roles of predatory insects
- Crafted a syllabus, including weekly readings and assignments, as well as addressing skills needed to read and write scientific papers

Course Assistant Sept 2019 – May 2021
Wesleyan University *Middletown, CT*

- Guided 10-15 students in *Principles of Biology I* and *II* laboratories through wet lab exercises including, but not limited to, pipetting, making agarose gels, conducting PCR, performing Bradford assays, bacterial transformations, and dissections
- Coordinated directly with Professor and Lab Coordinator weekly to assess students' performances, improve lab activities for subsequent semesters, and troubleshoot conducting labs with COVID-19 safety measures

Publications

Singer, M.S., Anderson, R.M., Hennessy, A.B., **Leggat, E.**, Prasad, A., Rathe, S., Silverstone, B., and Wyatt, T. J. (2022). Predators and caterpillar diet breadth: appraising the enemy-free space hypothesis. In R.J. Marquis. & S. Koptur (Eds.), *Caterpillars in the middle: Trophic interactions in a changing world* (pp. 273-96). Springer.

Talks

Molecular methods of detecting community diversity in cities. *Entomological Society of America Annual Meeting: Insect Biodiversity in Urban Landscapes Symposium.* November 12, 2025.

Impacts of Land Use Legacies on Urban Insect Diversity and Ecosystem Services. *Columbia University Department of Ecology, Evolution, and Environmental Biology: Student Seminar.* April 3, 2025.

Leadership

Outreach Committee Chair May 2024 - Present
Outreach Committee Member Sept 2023 - May 2024

- Organizes and presents professional development workshops for undergraduates, with topics including CVs and getting involved with research
- Organized and moderated two career panels in 2024 and 2025 for current Ecology and Evolution students, with department alumni working outside of academia as panelists
- Partnered with Riverside Park Conservancy to collect native seeds and overwinter them in the department greenhouse for spring planting in the park

PhD Representative Jan 2024 - May 2025
Arts and Sciences Graduate Council *Columbia University*

- Represented Ecology and Evolution PhD student interests at Graduate Council meetings, and served on the Finance and Quality of Life committees

Honors and Awards

NSF Graduate Research Fellowship Program - Honorable Mention	2025
Phi Beta Kappa	2021
Wesleyan College of the Environment Summer Research Fellowship	2019, 2020

Technologies

Languages: R, Python, Bash