

Emily Leggat

📍 New York, NY ✉ el3258@columbia.edu 🌐 eleggat.github.io in emilyleggat 📷 eleggat

Education

PhD in Ecology and Evolution <i>Columbia University</i> , New York, NY	Sept 2023 – Present
MA in Ecology and Evolution <i>Columbia University</i> , New York, NY	May 2025
BA in Biology <i>Wesleyan University</i> , Middletown, CT	May 2021

Research

Ag Biologicals Engineer 1 - Microbiology <i>Ginkgo Bioworks</i>	Oct 2022 – Jul 2023 <i>Boston, MA</i>
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- 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 <i>Joyn Bio</i>	Oct 2021 - Oct 2022 <i>Boston, MA</i>
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- 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 <i>Singer Lab, Wesleyan University</i>	Apr 2019 - May 2021 <i>Middletown, CT</i>
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- 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.

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