Emily Leggat

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Education

PhD in Ecology and Evolution — Sept 2023 – Present
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

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

- *Conservation Biology*, Spring 2025 semester: Leads 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

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 Co-chair May 2024 - Present
Outreach Committee Member Sept 2023 - May 2024

- Organized and presented professional development workshops for undergraduates, with topics including CVs and getting involved with research
- Organized and moderated a career panel 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 - Dec 2024
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

Phi Beta Kappa 2021

Wesleyan College of the Environment Summer Research Fellowship 2019, 2020

Technologies

Languages: bash, R