# James G. DuBose

Ph.D. Student
Population Biology, Ecology, and Evolution
Emory University

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## Education

Georgia Institute of Technology — December 2022
M.S. in Bioinformatics

University of Central Arkansas — May 2021
B.S. in Biology
Minors: Chemistry and Anthropology

## Appointments

**NSF Graduate Research Fellow** — 2023 – Present
National Science Foundation/Emory University

**Graduate Teaching Assistant** — 2023 – Present
Emory University

**Graduate Research Assistant** — 2021 - 2022
Georgia Institute of Technology

**Graduate Teaching Assistant** — 2022
Georgia Institute of Technology

**ADS Student Undergraduate Research Fellow** — 2019 – 2020
Arkansas Department of Higher Education

## Research Synopsis

My primary research interest is in understanding the generation of biodiversity and biological complexity, and I approach this through studying what facilitates and constrains evolutionary change. I have explored this interest in several topics, but I mostly study life cycle evolution and the evolution of endosymbiotic interactions. I like to approach my work from both genetic and ecological perspectives. While my primary focus is on understanding the generation of biodiversity, I am also interested in the conservation of said biodiversity. Here, I combine my interests in life cycle evolution and conservation to study the consequences of anthropogenic environmental and ecological change on (seasonal) phenological dynamics.

## Publications

**DuBose, J.G.**, de Roode, J.C., The link between gene duplication and divergent patterns of gene expression across a complex life cycle, *Evolution Letters*, 2024. https://doi.org/10.1093/evlett/qrae028

**DuBose, J.G.**, Crook, T.B., Matzkin, L.M., Haselkorn, T.S., The relative importance of host phylogeny and dietary convergence in shaping the bacterial communities hosted by several Sonoran Desert Drosophila species, *Journal of Evolutionary Biology*, 2024. https://doi.org/10.1093/jeb/voae143

**DuBose, J.G.**, Robeson, M.S., Hoogshagen, M., Olsen, H., Haselkorn, T.S., Complexities of Inferring Symbiont Function: Paraburkholderia Symbiont Dynamics in Social Amoeba Populations and Their Impacts on the Amoeba Microbiota, *Applied and Environmental Microbiology*, 2022. https://doi.org/10.1128/aem.01285-22

Pentz, J.T., MacGillivray, K., **DuBose, J.G.**, Conlin, P.L., Reinhardt, E., Libby, E., Ratcliff, W.C., Evolutionary consequences of nascent multicellular life cycles, *eLife*, 2023. https://doi.org/10.7554/eLife.84336

**DuBose, J.G.**, de Roode, J.C., Extensive transcriptional differentiation and specialization of a parasite across its host's metamorphosis, *bioRxiv*, 2024. https://doi.org/10.1101/2024.07.16.603694 - In review at the *International Journal for Parasitology*

**DuBose, J.G.**, Morran, L.T., Reduced signatures of gene duplication and non-random gene organization in shaping stage-specific patterns of gene expression across a relatively simple life cycle. *bioRxiv*, 2024. https://doi.org/10.1101/2024.12.21.629888

**DuBose, J.G.**, Hoogshagen, M., de Roode, J.C., The role of a non-native host plant in altering the seasonal dynamics of monarch development, *bioRxiv*, 2024. https://doi.org/10.1101/2024.08.23.609406 - Submitted to *Ecological Entomology*

## Teaching

**Graduate Teaching Assistant, Foundations of Modern Biology** Fall 2024
Emory University: BIOL 141
Responsibilities: Lecturing, office hours, grading

**Instructor, Microbial Ecology** Spring 2024
Emory University: BIOL 470W/IBS 539
Responsibilities: Course design, primary instruction, lecturing, discussion leading

**Graduate Teaching Assistant, Foundations of Modern Biology** Fall 2023
Emory University: BIOL 141
Responsibilities: Lecturing, office hours, grading

**Graduate Teaching Assistant, Biological Principles** Fall 2022
Georgia Institute of Technology: BIOS 1107
Responsibilities: Office hours, supplemental instruction, grading

## Talks and Presentations

**The 3rd Joint Congress on Evolutionary Biology**, Talk July 29, 2024
**James G. DuBose**. *The role of gene duplication in facilitating divergent patterns of gene expression across the monarch butterfly metamorphosis*

**Front Range Microbiome Symposium 2023**, Poster April 28, 2023
**James G. DuBose**, Thomas B. Crook, Luciano Matzkin, Tamara S. Haselkorn. *Exploring the contributions of host evolutionary history and diet in shaping the gut microbiota of cactophilic flies*

**ASM South Central Branch 2022**, Poster October 27, 2022
Thomas B. Crook, **James G. DuBose**, Luciano Matzkin, Tamara S. Haselkorn. *Comparative Microbiome Analysis of Cactophilic Drosophila Species*

**Arkansas INBRE 2022**, Poster October 21, 2022
Thomas B. Crook, **James G. DuBose**, Luciano Matzkin, Tamara S. Haselkorn. *The Microbiota of Naturally Acquired Cactophilic Drosophila Species*

**Evolution 2021**, Talk June 23, 2021
**James G. DuBose**, Tamara S. Haselkorn. *The transmission and diversity of Paraburkholderia in natural D. discoideum populations and its impact on the D. discoideum microbiome*

**Asilomar 2021**, Talk January 08, 2021
**James G. DuBose**, Tamara S. Haselkorn. *The Domination of Paraburkholderia in the Social Amoeba D. discoideum microbiome and its Impact on the Ecological Relevance of the Farming Symbiosis*

**Arkansas INBRE 2020**, Talk November 06, 2020
**James G. DuBose**, Tamara S. Haselkorn. *The Genetic Diversity of Bacterial Symbionts in Dictyostelium discoideum Social Amoeba and Their Effect on the Amoeba Microbiome*

**ASM Microbe**, Poster July 2020
**James G. DuBose**, Hunter Olsen, Tamara S. Haselkorn. *Prevalence and Genetic Diversity of the Burkholderia Bacterial Farming Symbionts in Dictyostelium Discoideum Social Amoeba Populations and their Effect on the Amoeba Microbiome*

**ASM South Central Branch**, Poster November 01, 2019
**James G. DuBose**, Hunter Olsen, Tamara S. Haselkorn. *Long-term Prevalence Patterns of the Burkholderia Farming Symbiont in Dictyostelium discoideum Social Amoeba Populations*

## Grants and Funding Awards

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**NSF Graduate Research Fellowship** 2023-2028
Award: $159,000
Proposal: *Investigating heritable symbiont-mediated adaptation to climate change*

**Computational Biology Graduate Research Assistantship** 2022
Award: $4,200
Proposal: *A multi-omics approach for comparing the physiological differences between slow and fast-growing bacteria*

**UCA College of Natural Sciences and Mathematics Student Research Funding** 2021
Award: $1,000
Proposal: *The horizontal transmission of the Paraburkholderia bacterial farming symbiont and its effects on the microbiome of the social amoeba D. discoideum*

**Advancement of Undergraduate Research in the Sciences (AURS)** 2019
Award: $5,000
Proposal: *Ecological relevance of the amoeba farming symbiosis: the prevalence of the Burkholderia bacterial symbiont in natural populations, and its effect on the amoeba microbiome*

## Outreach and Volunteering

**US Fish and Wildlife Service Monarch Butterfly Festival**
Each year, the US Fish and Wildlife Service hosts an education-oriented festival in St. Marks, Florida, where monarchs are captured and tagged for research purposes. Each year, the de Roode lab participates with our own educational booth where we discuss and screen for monarch parasites with the general public.

**Rosalynn Carter Butterfly Trail**
The Rosalynn Cater Butterfly Trail is a program that aims to increase habitat for native pollinators. I am frequently invovled in various programs and events organized by the Rosalynn Cater Butterfly Trail, including their annual Spring symposium that is focused on communicating best practices in pollinator habitat construction, as well as various projects that involve planting said habitats.

**Programming Education Resources for Historically Minoritized Groups in Computing**
In collaboration with DataWorks, a data service provider that employs people from communities that have historically had less access to computational resources and education, I developed and taught an introductory Python course that was specifically designed for people with no prior computational experience.

## Employment

**Emory University** January 2023 – Present
Department of Biological Sciences

**Georgia Institute of Technology** January 2022 – December 2022
School of Biological Sciences

**Arkansas Department of Health** March 2021 – July 2021
Public Health Laboratories: Molecular Biology Unit, COVID-19 Unit

**University of Central Arkansas** August 2019 – May 2021
Tutoring Center

**University of Central Arkansas** June 2020 – August 2020
Biology Department

## References

Dr. Levi Morran
Associate Professor, Department of Biology
Emory University
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Dr. Tammy Haselkorn
Associate Professor, Department of Biology
University of Central Arkansas

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Dr. William Ratcliff
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Georgia Institute of Technology
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