James G. DuBose

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

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Education

Ph.D. in Population Biology, Ecology, and Evolution
Emory University — Currently enrolled

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

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

Appointments

NSF Graduate Research Fellow — 2023 – Present
U.S. 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 and model systems, but I mostly study life cycle evolution and the evolution of endosymbiotic interactions. I predominately approach my work on life cycle evolution from an evolutionary genetics and organismal perspective, while I predominately approach my work the evolution of endosymbioses from an ecological perspective. In addition to my core research, I am also interested in developing computational and statistical approaches for improving inferences regarding evolutionary patterns and processes.

Publications

DuBose, J.G., Morran, L.T. (2025) Reduced signatures of gene organization and duplication in shaping stage-specific patterns of expression across the *C. elegans* life cycle. *Journal of Evolutionary Biology.* (in press)
DOI: 10.1101/2024.12.21.629888

DuBose, J.G., de Roode, J.C. (2025) Extensive transcriptional differentiation and specialization of a parasite across its host's metamorphosis. *International Journal for Parasitology* 55 (6): 273-279
DOI: 10.1016/j.ijpara.2025.01.006

DuBose, J.G., Crook, T.B., Matzkin, L.M., Haselkorn, T.S. (2025) 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.* 38 (2): 180-189.
DOI: 10.1093/jeb/voae143

Junker A.D., Chen J.Z., **DuBose, J.G.**, Gerardo N.M. (2025) Dynamic reciprocal morphological changes in insect hosts and bacterial symbionts. *Journal of Experimental Biology.* 228 (14): jeb249474
DOI: 10.1242/jeb.249474

DuBose, J.G., Hoogshagen, M., de Roode, J.C. (2025) The role of a non-native host plant in altering the seasonal dynamics of *Danaus plexippus* (Lepidoptera: Nymphalidae) development. *Journal of Insect Science.* (in press)
DOI: 10.1101/2024.08.23.609406

DuBose, J.G., de Roode, J.C. (2024) The link between gene duplication and divergent patterns of gene expression across a complex life cycle. *Evolution Letters.* 8 (5): 726-734.
DOI: 10.1093/evlett/qrae028

Pentz, J.T., MacGillivray, K., **DuBose, J.G.**, Conlin, P.L., Reinhardt, E., Libby, E., Ratcliff, W.C. (2023) Evolutionary consequences of nascent multicellular life cycles. *eLife.* 12:e84336.
DOI: 10.7554/eLife.84336

DuBose, J.G., Robeson, M.S., Hoogshagen, M., Olsen, H., Haselkorn, T.S. (2022) Complexities of Inferring Symbiont Function: *Paraburkholderia* Symbiont Dynamics in Social Amoeba Populations and Their Impacts on the Amoeba Microbiota. *Applied and Environmental Microbiology.* 88 (18): e01285-22.
DOI: 10.1128/aem.01285-22

Submitted or in review

DuBose, J.G. (2025) Evaluating the use of Monte Carlo simulation for statistically assessing topological congruence of phylogenetic trees. *In review at the Journal of Evolutionary Biology*
DOI: 10.1101/2025.02.07.637028

Catano C.P., **DuBose, J.G.**, Fuller-Hall L., Chavez J., de Roode J.C., (2025) Experimental immigration mediates ecological selection and stochasticity in monarch microbiome assembly. *In review at Ecology Letters.*

Teaching

Regression Analysis, Graduate Teaching Assistant — Spring 2025
Emory University: QTM 220
Responsibilities: Weekly lab instruction, office hours, grading

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

Microbial Ecology, Co-instructor — Spring 2024
Emory University: BIOL 470W/IBS 539
Responsibilities: Course design, primary instruction, lecturing, discussion leading

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

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

Undergraduate Mentorship

Tristan Olpin (Emory University) — Fall 2024
Role: Mentor for undergraduate research credit (BIOL 499R)
Final paper: *The dynamics of Ophryocyctis elektroschirra life cycle asynchrony across its host's pupal development*

Emmanuel Arega (Emory University) — Fall 2023 - Spring 2024
Role: Mentor (computational methods) for undergraduate thesis
Thesis title: *Population Differences and Genetic Basis of Parasitic Resistance and Melanization in Monarch Butterflies*

Thomas B. Crook (University of Central Arkansas) — Fall 2022 - Spring 2023
Role: Mentor (computation methods) for undergraduate honors thesis
Thesis title: Comparative microbiome analysis of naturally acquired cactophilic *Drosophila* species

Ella Li (Georgia Institute of Technology) — Summer 2022 - Fall 2022
Role: Mentor for undergraduate research credit (BIOS 4699)
Final paper: *Varanus: A fast and scalable Python-based variant annotation program*

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

NSF Graduate Research Fellowship 2023-2028
Award: $159,000 (salary)
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*

Professional Society Involvement

Society for the Study of Evolution 2024 – Present
Member
American Society of Naturalists 2024 – Present
Member
Entomological Society of America 2025 – Present
Member
International Society for Computational Biology 2025 – Present
Member
American Society for Microbiology 2021 – Present
Member

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 History

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 T. Morran
Associate Professor, Department of Biology
Emory University
Email: levi.morran@emory.edu

Dr. Tamara S. Haselkorn
Associate Professor, Department of Biology
University of Central Arkansas
Email: thasekorn@uca.edu

Dr. Christopher P. Catano
Assistant Professor, Department of Botany & Plant Sciences
University of California, Riverside
Email: chcatano@gmail.com