

James G. DuBose

Graduate Student, Bioinformatics
Department of Biology
Georgia Institute of Technology

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Education

Georgia Institute of Technology
M.S. in Bioinformatics

December 2022

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

May 2021

Research

Georgia Institute of Technology

January 2022 - Present

Principle Investigator: Dr. William Ratcliff

Synopsis: In the Ratcliff lab, I am focusing on developing new bioinformatic and statistical approaches to analyze genomic mutation data. Recent work has shown that many types of mutation types that were presumed neutral can have large effects. My focus has been developing statistical models that can account for the variability of mutational effects, and to develop accompanying bioinformatic tools that allow others to implement these approaches. I am also working in the wet lab on developing single-cell RNA sequencing approaches for studying yeast systems.

Georgia Institute of Technology

August 2021 - April 2022

Principle Investigator: Dr. Kostas Konstantinidis

Synopsis: In the Environmental Microbial Genomic Laboratory I combined transcriptomic and proteomic approaches to study the physiology of obligate halogen-respiring bacteria. These soil-dwelling bacteria grow significantly slower than other bacteria. My objective was to understand what physiological adaptations allow for this lifestyle. Additionally, such bacteria have been implied in bio-remediation efforts, as halogen pollutants pose large risks for the environment.

University of Central Arkansas

2019-2021

Principle Investigator: Dr. Tammy Haselkorn

Thesis: *The Ecological and Evolutionary Dynamics of Social Amoeba Microbiomes and Key Symbionts*

Synopsis: As an undergraduate student I studied the symbiotic interaction between soil dwelling amoebae and their bacterial symbionts. Specifically, I investigated the key ecological drivers of these symbiotic interactions, including how the symbionts are transmitted, their relevance to the host, and how abiotic soil factors influence the stability of the interactions. I have continued with Dr. Haselkorn to study how abiotic and biotic soil factors influence amoeba diversity.

Publications

J.G. DuBose., M. Robeson, M. Hoogshagen, H. Olsen, T.S. Haselkorn. 2021. The complexities of inferring symbiont function: Paraburkholderia symbiont dynamics in social amoeba populations and its impact on the amoeba microbiome: doi: 10.1101/2021.08.21.457203 - In revision at Applied and Environmental Microbiology

Jennifer T. Pentz, Kathryn MacGillivray, **J.G. DuBose**, Peter L. Conlin, Emma Reinhardt, Eric Libby, William C. Ratcliff. 2021. Clonal development, not aggregation, drives the transition to multicellularity in an isogenic model system: doi: 10.1101/2022.07.21.500805 - In review at PNAS

Talks and Presentations

Evolution 2021, Talk 06/23/2021
Virtual

James 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 01/08/2021
Virtual

James 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 11/06/2022
Virtual

James 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 07/2022
Virtual

James 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 11/01/2019
University of Mississippi, Oxford, MS

James 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

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

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

Student Undergraduate Research Fellowship (SURF) 2019-2021
Award amount: \$4,000 over two semesters
Proposal: *The effects of the Burkholderia bacterial symbiont on its social amoeba host's fitness and microbiome formation*

Advancement of Undergraduate Research in the Sciences (AURS) 2019
Award amount: \$5,000 over one semester

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

Development of Programming Education Resources for Historically Minoritized Groups in Computing

Project Advisor: Dr. Benjamin Rydal Shapiro

Synopsis: DataWorks is a data services provider that employs people from communities that have historically had little access to computational resources and education. By hiring and educating people from these groups, DataWorks hopes to broaden access to computing and foster equitable labor practices. One of the main tasks performed by DataWorks employees is retrieving and organizing information from online locations, a process known as webscraping. I have been working with DataWorks on building educational resources that will teach the employees to how to automate these tasks using Python, as opposed to manual copying and pasting. The primary resource is a comprehensive introductory Python course that is specifically designed for people with no computational experience. Since webscraping is the major task performed at DataWorks, this course teaches Python through the lens of parsing webpages into tabular data.

Employment

Georgia Institute of Technology, School of Biological Sciences Graduate Research Assistant	01/2022-Present
Arkansas Department of Health, Public Health Laboratories Laboratory Technician, Molecular Biology Unit, COVID-19 Unit	03/2021 – 07/2021
University of Central Arkansas Tutoring Center Biology, Chemistry, and Mathematics Tutor	08/2019 – 05/2021
University of Central Arkansas, Biology Department Research Assistant	06/2020-08/2020

References

Dr. Tammy Haselkorn
Assistant Professor, Department of Biology
University of Central Arkansas
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Phone: 520-400-4196

Dr. Benjamin Rydal Shapiro
Assistant Professor, Department of Learning Sciences
Georgia State University
Email: bshapiro@gsu.edu

Dr. Michael Robeson
Assistant Professor, Department of Biomedical Informatics
University of Arkansas for Medical Sciences
Email: MRobeson@uams.edu