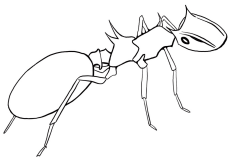

Megan Barkdull

Ph.D Candidate, NSF Graduate Research Fellow

Department of Ecology and Evolutionary Biology, Cornell University

+1 407 492 6225 | mb2337@cornell.edu

mbarkdull.github.io | mbarkdull | meganbarkdull_

Education

Ph.D Candidate, Department of Ecology and Evolutionary Biology — *Cornell University*

Advisor: Dr. Corrie Moreau — *August 2019–expected May 2024*

Bachelor of Arts in Biology — *New College of Florida*

Advisor: Dr. Emily Heffernan — *August 2014–May 2018*

- Honors Thesis: Population Genetics of the Threatened Florida Duskywing Skipper

Publications

Double dagger (‡) indicates co-first authors.

Published:

1. **Barkdull, M.**‡, C. R. Miller‡, M. A. Pipkin, & C. S. Moreau. 2023. Natural history collections: What are they and why do we need them?. Frontiers for Young Minds. https://kids.frontiersin.org/articles/10.3389/frym.2023.1048608
2. **Barkdull, M.**, & C. S. Moreau. 2023. Worker reproduction and caste polymorphism impact genome evolution and social genes across the ants. Genome Biology and Evolution. https://doi.org/10.1093/gbe/evad095
3. Heffernan, E., A. Markee., M. R. Truglio, **M. Barkdull**, S. Steele Cabrera, J. Daniels. 2023. Population Genetic Structure of a Rare Butterfly in a Fragmented South Florida Ecosystem. Insects https://doi.org/10.3390/insects14040321
4. Williams, K.M., **M. Barkdull**, M. Fahmy, E. Hekkala, M. E. Siddall, S. Kvist. 2020. Caught red handed: iDNA points to wild source for CITES-protected contraband leeches. Eur J Wildl Res. https://doi.org/10.1007/s10344-020-01419-5
5. Siddall, M. E., **M. Barkdull**, M. Tessler, M. R. Brugler, E. Borda„ & E. Hekkala. 2019. Ideating iDNA: Lessons and limitations from leeches in legacy collections. PloS one https://doi.org/10.1371/journal.pone.0212226

Submitted:

Manucripts available upon request.

1. Heffernan, E. V.‡, **Barkdull, M.‡**, N. K. Brady. 2023. Microsatellites for Lepidopteran conservation: utility, considerations, and outlook. *Submitted at Frontiers in Ecology and Evolution.*

Submitted for presubmission inquiry:

Manucripts available upon request.

1. **Barkdull, M.**, & C. S. Moreau. 2023. Comparative genomics reveals protein-coding and regulatory loci underlie the evolution of caste polymorphism in turtle ants. Submitted for presubmission inquiry to Nature Ecology & Evolution.

Talks

Dagger (†) indicates presenter.

Invited seminars:

1. **Barkdull, M†**. and Moreau, C. (2023). Genomic causes and consequences of worker caste polymorphism in the ants. Essig Brunch Seminar Series, University of Berkeley, Berkeley, CA.

Oral presentations:

1. **Barkdull, M†**. and Moreau, C. (2023). Social traits modulate genome evolution in ants. Evolution, Albuqerque, NM.
2. **Barkdull, M†**. and Moreau, C. (2022). Social traits shape genome evolution in ants. Cornell Department of Ecology and Evolutionary Biology Winter Symposium, Ithaca, NY.
3. **Barkdull, M.†** and Moreau, C. (2020). Formicidae caste determination: single cell and functional genomic techniques. Social Insects in the Northeast Region meeting, Brooklyn, NY. **Cancelled due to COVID19.
4. **Barkdull, M.†**, Williams, K.M., Tessler, M., Siddall, M.E. (2019). What's in a leech? A diversity of potential for leech-derived iDNA. Cornell Department of Ecology and Evolutionary Biology Winter Symposium, Ithaca, NY.

5. **Barkdull, M†.**, Tessler, M., and Siddall, M.E. (2017). What's in a leech? A haemadispid by any other name would reveal as much. AMNH REU Summer Symposium, Manhattan, NY.

Posters:

1. **Barkdull, M†**. and Moreau, C. (2022). Social traits modulate genome evolution in ants. Biology of Genomes meeting, Cold Spring Harbor Laboratory, NY.
2. E.V Heffernan†, **M. Barkdull**, and A. Markee (2019). The role of gene flow in connecting populations of endangered skipper butterflies in the United States: using genetic data to inform management strategies. International Symposium on Molecular Insect Science, Barcelona, Spain.
3. Markee, A.N†., Saarinen, E. V., **Barkdull, M.** (2019). Conservation genetics of the Florida duskywing skipper (Ephyriades brunnea): a multi-population assessment of a rare South Florida butterfly. Entomological Society of America meeting, St. Louis, MO.
4. Ash, M†., **Barkdull, M†.**, Elmir, G.† (2017). Are endangered Dakota Skipper populations infected with Wolbachia? Imperiled Butterflies Working Group meeting, Miami, FL.

Grants, Fellowships & Awards

Research grants (Total amount: $14,000)

- Cornell University, Andrew W. Mellon Student Research Grant ($1,000)
- Sigma Xi, Cornell Chapter, Research Grant ($1,000)
- American Society of Naturalists, Student Research Award ($2,000)
- Society for Integrative and Comparative Biology, Grant-in-aid of research ($1,000)
- Cornell University Graduate School, Research Travel Grant ($2,000)
- Cornell University, Graduate Student Research Fund ($4,000)
- Cornell University, Richard G. Harrison Fund ($3,000)

Conference travel grants (Total amount: $1,250)

- Cornell University, Graduate School Conference Travel Grant ($500)
- Cornell University , Orenstein Fund ($750)

Fellowships (Total amount: $233,655)

- National Science Foundation Graduate Research Fellowship ($138,000)
- Cornell Fellowship ($33,241)
- National Merit Scholar ($62,414)

Awards

- Book Award for Best First-Year Symposium Presentation ($50)

Research Positions

Ph.D. researcher
Cornell University

Moreau Lab
August 2018–ongoing

- Investigated the genetic basis and consequences of worker caste polymorphisms using genome sequencing, comparative genomic methods, and transcriptomics.
- Conducted multiple field excursions to collect ant specimens to support research program.

Post-baccalaureate intern
Cornell University

Zamudio Lab
September 2018–August 2019

- Conducted conservation genetics research on a number of reptile and amphibian species.
- Responsible for assisting all lab members with wet lab work, including DNA extractions, microsatellite sequencing, Sanger sequencing, and library prep for MiSeq.
- Collaborated with Dr. Fábio de Sá to describe the genetic mating system of the saxicolous Brazilian frog *Cycloramphus boraceiensis*.

Hawkmoth Sensory Behavior volunteer
Cornell University

Raguso Lab
September 2018–December 2018

- Participated in weekly hawkmoth colony care tasks (feeding, plant care, pupae counts etc.).
- Ran experiments testing the role of floral humidity in hawkmoth feeding choice.

Birdsong Evolution, research assistant
Cornell Lab of Ornithology

Drs. Araya-Salas and Odom
May 2018–May 2019

- Coded individual song elements in birdsong spectrograms for downstream data analysis.
- Created analysis protocol and generate graphics for future researchers on the project.

Florida Duskywing Genetics Project, research assistant
New College of Florida

Heffernan Lab
August 2017–May 2018

- Carried out a population genetics analysis of the threatened Florida Duskywing skipper butterfly to inform conservation policy.
- Performed next-generation sequencing in order to develop novel microsatellite markers
- Project published in *Insects*.

NSF Research Experiences for Undergraduates Intern

American Museum of Natural History

Department of Invertebrate Zoology — *May 2017–August 2017*

- Used genetic techniques (Sanger sequencing etc.) to identify the hosts of terrestrial bloodfeeding leeches.
- Presented results at 2017 AMNH REU Symposium; manuscript published in *PLoS One*.
- Conducted fieldwork to collect invertebrate (leeches, crayfish) for related lab projects.

Dakota Skipper Wolbachia Status, research assistant

New College of Florida

Heffernan Lab — *January 2017–May 2017*

- Conducted DNA extractions and PCR amplifications of Wolbachia pathogen genes from the endangered Dakota Skipper butterfly to identify pathogen strains.
- Performed significant PCR troubleshooting of genes which repeatedly failed to amplify.
- Prepared a poster on the findings of the project; presented at a meeting of at the Imperiled Butterfly Working Group.

Curatorial Skills & Experiences

Nabokov's Butterflies exhibit contributor

Cornell University Insect Collection and Mann Library — *Septermber 2023–March 2024*

- Collaborated with CUIC and Mann library staff to design an exhibit featuring the butterfly specimens collected by Vladimir Nabokov during his time at Cornell.
- Designed visuals and wrote content for exhibit component focused on butterfly conservation and the role of natural history collections in conservation research.

Six-Legged Science: Unlocking the Secrets of the Insect World exhibit contributor

Cornell University Insect Collection and Museum of the Earth — *January 2022–March 2022*

- Helped design components of public-facing museum exhibit, including pulling specimens, databasing, and design work
- This exhibit reached 18,592 in-person visitors.

Social Media co-manager

Cornell University Insect Collection — *January 2022–Present*

- Co-managed the CUIC's Instagram and Twitter pages, designing and posting content to engage the broader community with the work of the CUIC.

Collections Management Workshop, participant

Cornell University Insect Collection — *January 2021–May 2021*

- Participant in a semester-long workshop series, led by Drs. Jason Dombroskie and Corrie Moreau, which focused on practical discussion of topics related to the care and managment of natural history collections.
- Topics included museum mission statements, managing loans, collecting and export permits, managing volunteers and students, databasing, extension, and outreach.

Collection Databasing, graduate supervisor

Cornell University Insect Collection — *August 2020–Present*

- Responsible for databasing specimens in the CUIC's Formicidae collection, from data entry to interfacing with Specify.
- Supervised and trained undergraduate and graduate students on how to conduct databasing in the the collection.
- Designed training materials for other databasing workers.

Entomological Collections Network annual meeting, attendee

November 2020–NA

- Virtually attended conferences sessions on a wide range of entomological collections management topics.

Teaching

Introduction to Evolution and Diversity Writing in the Major guest lecturer

Cornell University

BIOEE 1780 — *October 2023–NA*

- Invited to give a guest lecture on my dissertation research and path to graduate school in Jasmine Peters' Writing in the Majors course.

Conservation Biology guest lecturer

Forham University

BISC 4575 — *April 2023–NA*

- Invited to give a guest lecture on conservation genetics and my research to Dr. Evon Hekkala's conservation biology seminar course.

Introduction to Evolution and Diversity grader

Cornell University

BIOEE 1781 — *August 2022–December 2023*

- Responsible for grading weekly assignments for online evolution and diversity course.

Introduction to Evolution and Diversity teaching assistant

Cornell University

BIOEE1780 — *January 2020–May 2020*

- Taught three weekly discussion/lab sections.
- Assisted with course transition to an online format due to COVID-19.

Comparative Physiology teaching assistant

Cornell University

BIOG1440

August 2019–December 2020

- Taught three weekly discussion/lab sections, leading hands-on investigations of physiological concepts covered in lectures.
- Created extensive, novel course review materials; available on my GitHub.

Foundations of Biology teaching assistant

New College of Florida

BIOL2100

August 2017–December 2017

- Led review sessions prior to tests and quizzes.
- Met individually with students to address performance questions.

Cellular Biology teaching assistant

New College of Florida

BIOL3500

August 2016–December 2016

- Led content-delivery and problem-solving review sessions once per week.
- Assisted in exam grading and clerical tasks.

Mentoring Experiences

Mahalia Donaldson

Cornell University

Paid research intern

August 2022–Present

- Conducted a research project to the evolution of genes related to agression in ants spanning a range of agression phenotypes.
- Learning scientific programming skills including Bash and R scripting, Git and Github version control
- Results of this project are in prep for an invited submission to Annals of the Entomological Society of America.

Seyde Delgado

Cornell University

Paid research intern; Biology 2990 Independent Research Experience Student

May 2022–Present

- Conducted a research project to understand the relationship between herbivory and molecular evolution in ants.
- Learning scientific programming skills including Bash and R scripting, Git and Github version control

Service

Graduate Student Association treasurer

Cornell University

Dept. of Ecology & Evolutionary Biology

August 2022–August 2023

- Manage funding from the university for graduate student and some department events.

Graduate Student Association co-president

Cornell University

Dept. of Ecology & Evolutionary Biology

July 2020–August 2022

- Liase between graduate student body and faculty leadership to communicate and address graduate student concerns
- Participated in the formation of working groups focused on assessing and improving diversity, equity and inclusion in the department.

Cornell Diversity Preview Weekend volunteer

Cornell University

Dept. of Ecology & Evolutionary Biology

September 2020 and summer 2021–NA

- Volunteered for the workshops “Crafting a CV” and “Fellowships and Personal Statements” providing peer review to participants for the 2020 DPW event.
- Served as a peer mentor to a DPW participant during the Fall 2020 semester.
- Amswered participant questions as a panelist for the workshop “Crafting a CV” for the 2021 DPW event.

EvoDay Planning Committee

Cornell University

* Postponed to Spring 2022 due to COVID19

Spring 2020–NA

- Identify and invite speakers for a day-long symposium on the theme of “Evolution in Deep Time”.

Department Seminar Series Committee

Cornell University

Dept. of Ecology & Evolutionary Biology

August 2019–August 2020

- This committee plans and coordinates the department’s weekly seminar series
- Responsible for soliciting speaker nominations, constructing schedule of speakers, and assisting host labs with managing their speaker visits.
- While on this committee, I initiated a push to increase the diversity of our invited speakers, based on the best practices identified by Hagan et al. (2020).

Journal referee:

- Integrative and Comparative Biology, editorial reviewer
- Evolution, ad hoc reviewer
- Insectes Sociaux, ad hoc reviewer

Society membership:

- Society for the Study of Evolution (SSE)
- Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (SORTEE)
- Society for Integrative and Comparative Biology (SICB)
- Society for Molecular Biology and Evolution (SMBE)

Outreach

Volunteer instructor for Ithaca Children's Garden summer camp

Ithaca Children's Garden

Event volunteer

July 2023–NA

- Led 6-10 year old campers through hands-on activity focused on the ant life cycle and on insect collecting.

Panelist for "Women in Entomology: Meet the Superheroes of Insect Science"

WSKG/PBS

Public talk

October 2022–NA

- Discussed research and insect conservation.
- Panel can be viewed at https://www.youtube.com/watch?v=HZ0WdZk84wM

Guest blogger for the Paleontological Research Institute/Museum of the Earth

Paleontological Research Institute/Museum of the Earth

Guest blogger

July 2022–NA

- Guest blogged for the Paleontological Research Institute and Museum of the Earth. **Barkdull, M.** (2022). Insects under threat: the role of natural history collections in biodiversity conservation. https://bit.ly/3ph2lsm

"Meet an Entomologist" volunteer

Six-legged Science Exhibit, Museum of the Earth

Event volunteer

July 2022–NA

- Answered questions from visitors to the Musuem of the Earth's Six-legged Science exhibit.

Panelist for "Exploring Insect Evolution: A Panel on New Research"

Darwin Days Week, Museum of the Earth

Public talk

February 2022–NA

- Gave a research talk for the event *Exploring Insect Evolution: A Panel on New Research* as part of the Museum of the Earth's Darwin Days events.
- Talk can be viewed at https://bit.ly/3s4jOGB

Cornell Insectapalooza volunteer

Dept. of Entomology, Cornell University

Event volunteer

October 2019, 2022, 2023–NA

- Manned a table on ant diversity and discussed all things ant with members of the public, including young children, teens and adults.