



Megan Barkdull

PH.D CANDIDATE, NSF GRADUATE RESEARCH FELLOW

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Education

Ph.D Candidate, Department of Ecology and Evolutionary Biology

ADVISOR: DR. CORRIE MOREAU

Bachelor of Arts in Biology

ADVISOR: DR. EMILY HEFFERNAN

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

Cornell University

August 2019–expected May 2025

New College of Florida

August 2014–May 2018

Publications

Double dagger (‡) indicates co-first authors.

Published:

- 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>
- 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>
- 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>
- 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>

In press:

- Barkdull, M.†**, C. R. Miller‡, M. A. Pipkin, & C. S. Moreau. 2023. Natural history collections: What are they and why do we need them?. In press at *Frontiers for Young Minds*.

Scientific outreach:

- 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/3ph21sm>

Talks

Dagger (†) indicates presenter.

Oral presentations:

- Barkdull, M.†** and Moreau, C. (2023). Social traits modulate genome evolution in ants. *Evolution*, Albuquerque, NM.
- Barkdull, M.†** and Moreau, C. (2022). Social traits shape genome evolution in ants. Cornell Department of Ecology and Evolutionary Biology Winter Symposium, Ithaca, NY.
- 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.
- 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.

Lightning talks:

- Barkdull, M.†** and Moreau, C. (2020). Formicidae caste determination: single cell and functional genomic techniques. Social Insects in the Northeast Region meeting, Brooklyn, NY. **Postponed due to COVID19.

Posters:

- Barkdull, M.†** and Moreau, C. (2022). Social traits modulate genome evolution in ants. *Biology of Genomes meeting*, Cold Spring Harbor Laboratory, NY.
- 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.

- Markee, A.N†., Saarinen, E. V., **Barkdull, M.** (2019). Conservation genetics of the Florida duskywing skipper (*Ephyrades brunnea*): a multi-population assessment of a rare South Florida butterfly. Entomological Society of America meeting, St. Louis, MO.
- 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)

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

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

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

Post-baccalaureate Intern

ZAMUDIO LAB

Cornell University

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 (DNA extractions, microsatellite sequencing, Sanger sequencing, MiSeq).
- Collaborated with Dr. Fábio de Sá to describe the genetic mating system of the Brazilian frog *Cycloramphus boraceiensis* (data in prep for publication).

Hawkmoth Sensory Behavior Volunteer

RAGUSO LAB

Cornell University

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

DRS. ARAYA-SALAS AND ODOM

Cornell Lab of Ornithology

May 2018–May 2019

- Assisted in coding birdsong spectrograms for downstream data analysis.
- Created analysis protocol and generate graphics for future researchers on the project.

Florida Duskywing Genetics Project, Research Assistant

HEFFERNAN LAB

New College of Florida

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
- Results in prep for publication.

NSF Research Experiences for Undergraduates Intern

DEPARTMENT OF INVERTEBRATE ZOOLOGY

American Museum of Natural History

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

HEFFERNAN LAB

New College of Florida

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 the Imperiled Butterfly Working Group.

Curatorial Skills & Experiences

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

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.
- Oversaw 237% Instagram follower increase since the beginning of 2022.

Collection Databasing, Graduate Worker

CORNELL UNIVERSITY INSECT COLLECTION

August 2020–Present

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

Teaching

Conservation Biology guest lecturer

BISC 4575

Forham University

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

BIOEE 1781

Cornell University

August 2022–May 2023

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

Introduction to Evolution and Diversity Teaching Assistant

BIOEE1780

Cornell University

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

BIOG1440

Cornell University

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

BIOL2100

New College of Florida

August 2017–December 2017

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

Cellular Biology Teaching Assistant

BIOL3500

New College of Florida

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

PAID RESEARCH INTERN

Cornell University

August 2022–Present

- Conducted a research project to the evolution of genes related to aggression in ants spanning a range of aggression phenotypes.
- Learning scientific programming skills including Bash and R scripting, Git and Github version control

Seyde Delgado

PAID RESEARCH INTERN; BIOLOGY 2990 INDEPENDENT RESEARCH EXPERIENCE STUDENT

Cornell University

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

DEPT. OF ECOLOGY & EVOLUTIONARY BIOLOGY

Cornell University

August 2022–August 2023

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

Graduate Student Association Co-President

DEPT. OF ECOLOGY & EVOLUTIONARY BIOLOGY

- 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 University
July 2020–August 2022

Cornell Diversity Preview Weekend volunteer

DEPT. OF ECOLOGY & EVOLUTIONARY BIOLOGY

- 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.
- Answered participant questions as a panelist for the workshop “Crafting a CV” for the 2021 DPW event.

Cornell University
September 2020 and summer 2021–NA

EvoDay Planning Committee

* POSTPONED TO SPRING 2022 DUE TO COVID19

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

Cornell University
Spring 2020–NA

Department Seminar Series Committee

DEPT. OF ECOLOGY & EVOLUTIONARY BIOLOGY

- 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).

Cornell University
August 2019–August 2020

Journal referee:

- Evolution
- Insectes Sociaux

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

EVENT VOLUNTEER

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

Ithaca Children’s Garden
July 2023–NA

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

PUBLIC TALK

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

WSKG/PBS
October 2022–NA

“Meet an Entomologist” volunteer

EVENT VOLUNTEER

- Answered questions from visitors to the Museum of the Earth’s Six-legged Science exhibit.

Six-legged Science Exhibit, Museum
of the Earth
July 2022–NA

Panelist for “Exploring Insect Evolution: A Panel on New Research”

PUBLIC TALK

- 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>

Darwin Days Week, Museum of the
Earth
February 2022–NA

Cornell Insectapalooza volunteer

EVENT VOLUNTEER

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

Dept. of Entomology, Cornell
University
October 2019, 2022–NA

