Rachel **Kruger**

PhD Student

Department of Biological Sciences, Binghamton University, Binghamton NY, USA

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Education

PhD in Biological Sciences — *Binghamton University*
Speciation in Monkeyflowers — *2021 - Present*

MS in Biological Sciences — *Binghamton University*
Adaptation of North American Bradyrhizobium to Invasive Legumes Involved Convergent Acquisition of a European Symbiosis Island Variant — *2019-2021*

BA in Biology — *Hartwick College*
Minor in Chemistry — *2012-2016*

Publications

Kruger RF, Rodríguez-Echeverría S, Quatrini P, Parker MA. 2022. Invasional meltdown via horizontal gene transfer of a European symbiosis island variant in North American nodule symbionts of Cytisus scoparius. Biol Invasions. 24:2113–2120. https://doi.org/10.1007/s10530-022-02776-9

Presentations and Lectures

Poster Presentation — *Evolution*
Closely related, highly isolated – insights from a niche model of Monkeyflowers — *July 2024*

Symposium Talk — *Departmental Symposium, Binghamton University*
Secondary woodiness in Mimulus" Binghamton University BGSO Symposium — *January 2023*

Invited Lecture — *Mechanisms of Evolution course, Binghamton University*
Mode of gene action and mutation-selection balance — *Fall 2022*

Symposium Poster — *Departmental Symposium, Binghamton University*
Dispersal syndrome evolution across a habitat connectivity gradient in Mimulus dudleyi — *January 2022*

MS Thesis Defense — *Binghamton University*
Adaptation of North American Bradyrhizobium to invasive legumes involved convergent acquisition of a European symbiosis island variant — *May 2021*

Honors, Awards, and Grants

Beagle Graduate Research Grant — *Deparment of Biological Sciences, Binghamton University*

$2000 for field research — 2023

Professional Development Fund
State University of New York (SUNY) Graduate Student Employee Union (GSEU)

$268 for field research — 2023

Professional Development Fund
SUNY GSEU

$560 for conference attendance — 2022

Best Poster Award
Departmental Symposium, Binghamton University

For the poster: 'Dispersal syndrome evolution across a habitat connectivity gradient in Mimulus dudleyi' — 2022

Research and Field Experience

Speciation in Mimulus
Binghamton University

Advisor: Dr. James Sobel — *2021-Present*

- Investigating ecological sources of floral trait divergence in a recently diverged species pair of Mimulus.

Pollinator Observation and Floral Morphology of Mimulus sect. Diplacus fieldwork
California

May 2023

- Conducted pollinator observations and took morphological measurements of floral traits of Mimulus calycinus and M. longiflorus in the Southern Sierra Nevada and the Transverse range of California.

Tissue and seed collection of Mimulus dudleyi fieldwork
California

April 2022

- Traveled along the southern Sierra Nevada to find populations of Mimulus dudleyi and collect plant tissue for DNA isolation and seeds for future growing experiments.

MS Thesis
Binghamton University

Advisor: Dr. Matthew Parker — *2019-2021*

- ‘Adaptation of North American Bradyrhizobium to Invasive Legumes Involved Convergent Acquisition of a European Symbiosis Island Variant’
- Evolution, invasion, mutualisms, horizontal gene transfer

Senior Thesis
Hartwick College

Advisor: Dr. AJ Russo — *2016*

- ‘Associations of GSK3B levels with occurrence of schizophrenia’

Island Biogeography
San Salvador, The Bahamas | Hartwick College

Advisors: Dr. Mark Kuhlman & Dr. Doug Hamilton — *2014*

- Three-week field course involving self-developed research project on population ecology of hermit crabs on San Salvador Island, The Bahamas.

Tropical Ecology
Costa Rica | Hartwick College

Advisors: Dr. Stanley Sessions & Dr. Peter Fauth — *2013*

- Three-week field course involving several small ecology research projects at various field stations in Costa Rica.
- Projects included comparing millipede abundance in old-growth vs. secondary growth forests at La Selva, population ecology of dragonflies at Palo Verde, and species interactions of ants and acacias.

Teaching Experience

Co-Instructor
Binghamton University

BIOL 114: Intro to Organisms & Populations Biology — *Summer 2024*

- Graded assignments for an intensive 5-week version of a semester-long intro biology course. Assisted students with course content questions.

Undergraduate Mentor
Binghamton University

Undergraduate students mentored: — *Spring 2022 - Present*

- Shuojie Teng, Woodiness in Diplacus project, Graduated December 2022
- Jovana Cvetanovic, Investigation of Gametic Isolation in Diplacus project, Ongoing
- Riley Peckman, Floral Morphology Divergence in Diplacus project, Ongoing

Teaching Assistant
Binghamton University

BIOL 377: Plant Systematics — *Spring 2024*

- Led and assisted with lab portion of course, which included plant dissection, identification, and field trips. Graded assignments for both lecture and lab. Attended lectures.

High School Student Mentor
Binghamton University - Long Island, NY

January 2022 - April 2023

- Mentored an advanced high school student enrolled in her high school's Authentic Science Research program. Helped develop and execute a research project involving reproductive success of Asclepias syriaca in Long Island, NY.

Teaching Assistant
Binghamton University

BIOL 355: Ecology — *Fall 2023*

- Led three discussions weekly, guided students through a semester-long species ecology project, helping them to connect core ecological concepts learned in lecture to researching an animal species and its ecology and presenting on it. Taught scientific media literacy skills. Graded assignments for both lecture and discussion. Attended lectures.

Teaching Assistant
Binghamton University

BIOL 351: Mechanisms of Evolution — *Fall 2022*

- Led three discussions weekly. Assisted students with understanding content, preparing for exams, and completing homework. Graded assignments and exams. Attended lectures.

Teaching Assistant
Binghamton University

BIOL 113: Intro to Cell & Molecular Biology — *Fall 2019 - Spring 2022; Spring 2023*

- Led three discussion sections weekly. Guided students through developing a scientific proposal using the scientific method; graded assignments

Community Engagement

Junior Biologists Outreach Program Founding Member
Johnson City, NY

Fall 2021 - Present

- Helping 8th grade students develop and execute a semester-long science project. Past projects include investigating legume-rhizobia mutualisms in varying nitrogen fertilizer environments, and investigating seasonal biodiversity on middle school campus.

Skills

Programming Languages

R — *3 years*

Markup Languages

Quarto *<1 year*

Professional Service

Peer Review
Ecology *February 2024*

Organizing Committee Member
Graduate Student Employee Union (GSEU) Binghamton University *Fall 2024 - Present*

Living Wage Committee Member
GSEU Binghamton University *Fall 2022 - Fall 2023*

Diversity, Equity, and Inclusion Graduate Student Committee Member
Department of Biological Sciences, Binghamton University *2021-2023*

Symposium Planning Committee
Department of Biological Sciences, Binghamton University *2021-2022*

Professional Memberships

Botanical Society of America
2021-Present

Society for the Study of Evolution
2021-Present

California Botanical Society
2023-Present