ELEANORE JEANNE RITTER

EDUCATION

Michigan State University Anticipated Spring 2024
PhD in Plant Biology

Skidmore College May 2018
BA in Biology, Minors in Asian Studies and Honors Forum
Magna Cum Laude and Phi Beta Kappa

Study Abroad, School for Field Studies Spring 2017
Bumthang, Bhutan

RESEARCH EXPERIENCE

PhD Candidate, Department of Plant Biology, Michigan State University Fall 2018-Present
Advisor: Dr. Chad Niederhuth

Project 1: I researched the genetic basis and developmental trajectory of Witch's Broom bud sports in *Vitis vinifera* (grapevine) using whole genome sequencing and phenotypic data analysis. The manuscript from this work is currently in review at the American Journal of Botany and is published on bioRxiv.

Project 2: I investigated the molecular genetic basis of domatia, leaf structures that house mutualistic mites, in *Vitis riparia* using RNA-sequencing. I identified key genetic pathways involved in both domatia development and intraspecific variation in domatia size within *V. riparia*. A manuscript from this work is currently in preparation.

Project 3: I assembled and annotated the genome of the Dakapo variety of grapevine, a teinturier grape variety that produces pigmented berry flesh.

Project 4: I am investigating unique DNA methylation patterns in clonal angiosperms using public data and bioinformatic/phylogenetic tools for data analysis. I am performing whole genome bisulfite sequencing (WGBS) on wild plants with mixed reproductive modes to expand the dataset. This project is supported by funds from the Rodman Endowment from the Department of Plant Biology at Michigan State University.

Additional projects: (1) I am generating and analyzing methylomes across the genus *Vitis* to better understand both fine-scale patterns of methylome evolution and the impact of reproductive mode on methylome evolution. This work is supported by funds from the Rodman Endowment from the Department of Plant Biology at Michigan State University. **(2)** I assembled and am currently annotating three Newfoundland genomes (*Canis familiaris*), which will be used for genetic studies currently in progress.

Undergraduate Researcher, Department of Biology, Skidmore College Spring 2015-Spring 2018
Faculty Advisor: Dr. David Domozych

Project 1: I researched the impact of environmental stresses on the organelles of *Penium margaritaceum* using organelle dyes and confocal microscopy.

Project 2: I isolated nuclei from protoplasts of *P. margaritaceum* using cell gradient separation. I also helped develop a protocol for optimal protoplast formation and regeneration which resulted in two publications.

Intern, Boyce Thompson Institute REU Program, Cornell University Summer 2017
Principal Investigator: Dr. Jocelyn Rose

I investigated the function of SlCDEF1, a putative cutinase in tomato fruits, by using purified SlCDEF1 in enzymatic assays. I also analyzed the morphology and viability of tomato plants lacking SlCDEF1.

Undergraduate Researcher, School for Field Studies, Bumthang, Bhutan Spring 2017
Principal Investigator: Dr. Peter Hosner

I surveyed transects along topographical gradients to identify the impact of topography on plant species' growth, abundance, and diversity.

Undergraduate Researcher, Department of Biology, Skidmore College Spring 2016
Faculty Advisor: Dr. Jason Breves

I helped develop a protocol for custom antibody staining while researching ionocytes in the fish *Fungulis heteroclitus*. I also imaged stained ionocytes using confocal microscopy.

Intern, National Cancer Institute Summer 2015
Principal Investigator: Dr. Sue Wickner

I performed mutagenesis on *E. coli* and grew bacterial cell cultures. I purified chaperone proteins (including DnaK) and used ATPase and luciferase assays to test function of proteins.

PUBLICATIONS

Published

6. Ritter EJ, Cousins PS, Quigley MY, ^Kile A, Kenchanmane Raju SK, Chitwood DH, Niederhuth CE. 2024. From buds to shoots: insights into grapevine development from the Witch's Broom bud sport. *BMC Plant Biology* 24(283).
^*Undergraduate mentee*

5. Ritter EJ and Niederhuth CE. 2021. Intertwined evolution of plant epigenomes and genomes. *Current Opinion in Plant Biology* 61: 101990.

4. Bryson AE, Wilson Brown M, Mullins J, Dong W… **Ritter EJ**, et al. 2020. Composite modeling of leaf shape along shoots discriminates *Vitis* species better than individual leaves. *Applications in Plant Sciences* 8(12): 11404.

3. Domozych D, **Ritter E**, Lietz A, Tinaz B, Raimundo S. 2020. Protoplast Isolation and Manipulation in the Unicellular Model Plant *Penium margaritaceum*. *The Plant Cell Wall*: 111-124.

2. Kenchanmane Raju SK, **Ritter EJ**, Niederhuth CE. 2019. Establishment, maintenance, and biological roles of non-CG methylation in plants. *Essays in Biochemistry* 63(6): 743-755.

1. Raimundo S, Sørensen I, Tinaz B, **Ritter E**, Rose J, Domozych D. 2018. Isolation and manipulation of protoplasts from the unicellular green alga *Penium margaritaceum*. *Plant Methods* 14(1): 1-18.

Pre-print/submitted

1. Ritter EJ, Graham CDK, Niederhuth CE, Weber MG. 2023. Investigating domatia development in *Vitis riparia* using transcriptome sequencing. *bioRxiv* 2024.03.04.583436.*
*Submitted to *New Phytologist*

GRANTS AND FELLOWSHIPS

Paul Taylor Travel Fund, Dept of Plant Biology, MSU	2019, 2020, 2022, 2023, 2024
University Distinguished Fellowship, MSU	2018, 2022
Rodman Endowment, Dept of Plant Biology, MSU	2021, 2022
Outstanding Scholar Fellowship, College of Natural Science, MSU	Summer 2021
FAST Fellowship, MSU	2020
Porter Presidential Scholarship in Math and Science, Skidmore College	2014-2018

HONORS AND AWARDS

NSF-GRFP Honorable Mention	2018, 2020
Donald W. Pyle Memorial Award, Department of Biology, Skidmore College	2018
Goldwater Scholarship Honorable Mention	2017
Goldwater Scholarship Nominee, Skidmore College	2016, 2017
Dean's List Honors, Skidmore College	Fall 2014, Spring 2015, Spring 2016-Spring 2018

ORAL PRESENTATIONS

Invited

Nanopore Sequencing Seminar, Michigan State University	October 2023
Department of Plant Biology Seminar, Michigan State University	April 2023

Contributed

Evolution 2023, Albuquerque, NM	June 2023
Evolution 2022, Cleveland, OH	June 2022
FAST (Future Academic Scholars in Teaching) Fellowship Program Annual Symposium, Virtual	April 2021

POSTER PRESENTATIONS

CROPS meeting 2022, Huntsville, AL	June 2022
CROPS meeting 2019, Huntsville, AL	June 2019
Plant Biology 2017, Honolulu, HI	June 2017

TEACHING EXPERIENCES

Invited Lecturer, Michigan State University — Fall 2022
Course: PLB 812 - Plant Genomics

- Designed and taught a module with hands-on activities on structural variant calling, filtering, and analysis for a graduate-level course on methods and practices in plant genomics research. The full lesson is available on GitHub for public use.

Graduate Teaching Assistant, Michigan State University — Spring 2021
Course: IBIO 341 - Fundamentals of Genetics

- Led two weekly recitation hours with 60-100 students each over Zoom.
- Helped students in office hours over Zoom and online in personal discussion boards.

FAST (Future Academic Scholars in Teaching) Fellow, Michigan State University — Fall 2020-Spring 2021
Course: IBIO 341 - Fundamentals of Genetics

- Developed a teaching-as-research project surrounding student motivation in an introductory genetics course. Tested the influence of the community of inquiry (CoI) framework on student motivation in an asynchronous genetics course. Developed and utilized a survey to measure student motivation. Analyzed survey findings and presented at annual FAST symposium.

Invited Lecturer, Michigan State University — Spring 2020
Course: HRT 892 - Plant Breeding and Genetics Seminar

- Designed and taught a virtual module on structural variant analysis in R with hands-on coding activities for a graduate-level course on using R in biological research.

Teaching-Lab Assistant, Skidmore College — Fall 2015- Spring 2018
Courses: Introduction to Biology 1 & 2 (BI 105/107 and BI 106/108)

- Helped students gain comprehension of biology principles and learn lab techniques.
- Cultivated discussion in lab.

PEDAGOGICAL AND PROFESSIONAL TRAINING

Teaching College Science course, Michigan State University — Spring 2020

Cultural Competency for Personal, Organizational, and Community Change workshop, — Spring 2019
College of Natural Science, Michigan State University

SERVICE

President — Fall 2021-Summer 2023
Plant Biology Graduate Student Organization, Michigan State University

Mentor, Peer Mentoring Committee — Spring 2022-Spring 2023
Plant Biology Graduate Student Organization, Michigan State University

Cofounder and Committee Member, Peer Mentoring Committee — Spring 2020-Spring 2022
Plant Biology Graduate Student Organization, Michigan State University

Graduate Student Representative, Diversity, Equity, and Inclusion Committee Spring 2020-Spring 2021
Department of Plant Biology, Michigan State University

Graduate Student Representative, Student Advisory Council Fall 2019-Spring 2021
College of Natural Science, Michigan State University

Co-Coordinator, Student Post-doc Lecture Series Fall 2018-Spring 2020
Plant Biology Graduate Student Organization, Michigan State University

Graduate Student Representative, Long Range Planning Committee Fall 2018-Spring 2019
Department of Plant Biology, Michigan State University

Student Representative Fall 2016-Spring 2018
Department of Biology, Skidmore College

OUTREACH

MSU Recruitment Specialist and Scientist Ambassador Fall 2021-Spring 2023
MI DNA Day

Scientist Mentor Fall 2018-Spring 2022
Planting Science

Scientist Ambassador Fall 2021
Seeds of Science

Liaison Fall 2018-Spring 2019
Master Planting Science Team, Planting Science

SOCIETIES

Botanical Society of America Since 2023
Society for the Study of Evolution Since 2022
American Society of Plant Biologists 2017-2019