Sophia F. Buysse

BUYSSESO@MSU.EDU | personal website

Education

PhD Candidate, Michigan State University (MSU), East Lansing, MI ***expected May 2026***
Dual Degree: (1) Plant Biology and (2) Ecology, Evolution, and Behavior (EEB)
Advisors: Drs. Emily Josephs and Jeffrey Conner

Bachelor of Arts, College of Saint Benedict (CSB), St. Joseph, MN ***May 2020***
Biology (major), Hispanic Studies (minor)
Honors: *Egregia cum laude*

Relevant Skills

- *Experiment Management:* planning, organizing, and implementing large scale experiments including daily plant care, time sensitive data collection, data entry, and analysis on 3,500 plants blocked over 4 years
- *Field Experience:* leaf/needle collection for genomic DNA, population mapping with GPS, multi-day field collection trips, field safety
- *Phenotyping Techniques:* demographic surveys, biomass allocation including root extraction from soil, fitness, plant architecture, SLA, leaf physiology measurements, stem hydraulic conductance measurements
- *Computational skills:* R, Bash, Python; population genomics analysis from raw reads; experience with High Performance Computing Cluster and Github
- *Research Communication:* 2 peer-reviewed publications, 8 poster presentations, 6 oral presentations, outreach to elementary and middle school students in the past 5 years
- *Interpersonal:* collaboration through Microsoft Office, G Suite, Slack; excellent communication, teamwork, and problem-solving; mentorship of multiple undergraduates

Publications

1. **Buysse, S. F.**, Pérez, S. G., Puzey, J. R., Garrison, A., Bradburd, G. S., Oakley, C. G., Tonsor, S. J., Picó, F. X., Josephs, E. B., & Conner, J. K. (2025). Evaluating the Roles of Drift and Selection in Trait Loss along an Elevational Gradient. *Evolution*, https://doi.org/10.1093/evolut/qpaf078

2. Palande, S., Arsenault, J., Basurto-Lozada, P., Bleich, A., Brown, B. N. I., **Buysse, S. F.**, Connors, N. A., et al. (2024). Expression-Based machine learning models for predicting plant tissue Identity. *Applications in Plant Sciences*. https://bsapubs.onlinelibrary.wiley.com/doi/10.1002/aps3.11621.

Presentations

Adaptive and Maladaptive Plasticity in Leaf Number among Populations of *A. thaliana*
Coauthors: Jeffrey Conner and Emily Josephs
- Oral presentation (15 minutes): May 2025, EEB Symposium, East Lansing, MI
- Oral presentation (15 minutes): June 2025, Evolution, Athens, GA

Making Connections: The impact of modelling connections between reasoning and results on scientific literacy in an introductory biology lab
Coauthor: Mike Wiser

- Poster presentation: July 2024, Society for the Advancement of Biology Education Research Conference, Minneapolis, MN
- Poster presentation: June 2024, Botany Conference, Grand Rapids, MI
- Poster presentation: May 2023, Teaching Fellows Showcase, East Lansing, MI
- Poster presentation: May 2023, EEB Symposium, East Lansing, MI
- Oral presentation (15 minutes): May 2023, FAST Symposium, East Lansing, MI

Recombinant inbred lines expand variation in plasticity in *A. thaliana*
Coauthors: Emily Josephs and Jeffrey Conner
- Poster presentation: August 2023, Midwest Population Genetics, Ann Arbor, MI
- Poster presentation: June 2023, Evolution, Albuquerque, NM

Population Differentiation for Plasticity in *Arabidopsis thaliana*
Coauthors: Tori Nicholes (former KBS REU student), Jeffrey Conner, and Emily Josephs
- Oral presentation (25 minutes, hybrid): October 2024, EEB Colloquium, East Lansing, MI
- Oral presentation (45 minutes, hybrid): July 2022, PLB Department, East Lansing, MI
- Poster presentation: May 2022, EEB Symposium, East Lansing, MI **awarded 2nd place poster**
- Poster presentation: June 2022, Evolution, Cleveland, OH

Population Structure and Trail Loss along an Elevational Gradient
Coauthors: Sam Pérez, Josh Puzey, Ava Garrison, Gideon Bradburd, Chris Oakley, Stephen Tonsor, Xavier Picó, Emily Josephs and Jeffrey Conner
- Oral presentation (20 minutes): December 2022, EEB Colloquium, East Lansing, MI
- Virtual oral presentation (10 min): June 2021, Virtual Evolution Conference
- Virtual oral presentation (10 min): May 2021, EEB Symposium, East Lansing, MI

Genetic Influence on Drought-tolerance Traits in Quaking Aspen (*Populus tremuloides*)
Coauthors: Kelly Kerr and William Anderegg
- Oral presentation (15min): November 2020, Central Minnesota Audubon Society, St. Cloud, MN
- Oral presentation (15min): February 2020, Michigan State University, East Lansing, MI
- Poster presentation: August 2019, Summer Symposium, Salt Lake City, UT

Analyzing Genetic Diversity of Eastern White Pine (*Pinus strobus*) in the St. John's Abbey Arboretum
Coauthor: Katherine Furniss
- Poster presentation: April 2019, Scholarship and Creativity Day, Collegeville, MN

Impact of Wind and Salt Exposure on Seven Year Apple Tree (*Casasia clusiifolia*) Growth
Coauthors: Kristina Timmerman and David Gordon Brown
- Poster presentation: April 2018, Scholarship and Creativity Day, Collegeville, MN

Teaching Experience

Graduate Teaching Assistant **August 2021 - December 2024**
Michigan State University, East Lansing, MI
- IBIO 830: Statistical Methods in Ecology and Evolution *(Fall 2024)*
  - Assisted during lecture section twice a week
  - Led a guest lecture on "If statements and for loops in R"

- PLB341: Fundamental Genetics *(Fall 2022)*
  - Assisted during lecture section twice a week
  - Led 2 weekly recitation sections focused on teaching problem solving strategies

- Developed course materials to improve inclusivity in teaching language and example problems
- Presented a mini lecture on the application of recombination to study plant genetics

- BS161: Cells and Molecules Lecture *(Spring 2022)*
  - Team teaching of a 250 student 'flipped' lecture section consisting of pre-recorded lectures and in class activities

- BS171: Cells and Molecules Laboratory Online *(Fall 2021)*
  - Led 2 lab sections of 28 students each through online labs to simulate experiments, analyze data, and communicate results

Future Academic Scholars in Teaching (FAST) Fellow **August 2022 - May 2023**
Michigan State University, East Lansing, MI
- Selected as a fellow to participate in weekly professional development training and conduct discipline-based education research during a mentored teaching experience
- Developed and executed an independent research project analyzing the connections students in an introductory biology lab make between science and their lives, and if modelling these connections improves student's writing about the relevance of their experiments beyond the classroom.

FASTer Fellow **August 2023 - May 2024**
Michigan State University, East Lansing, MI
- Selected as the peer mentor for students completing teaching-as-research projects
- Developed and led weekly journal clubs for FAST Fellows
- Coordinated monthly meetings with the FAST Fellowship Steering Committee composed of faculty from across the University to provide assistance to FAST Fellows

FAST Fellowship Steering Committee **August 2023 - Present**
Michigan State University, East Lansing, MI
- Provide mentorship and feedback to graduate students completing teaching-as-research projects

Pedagogy Training
- Syllabus Development: Communicating Expectations with Care, *January 2025*
- Certificate in College Teaching, awarded *December 2024*
  - Find my portfolio here: https://sfbuysse.github.io/CollegeTeaching/index.html
- Culturally Responsive Teaching Workshop, *November 2024*
- Teaching College Science, *Spring 2024*
  - ISE 870; Graduate Level Coursework focused on STEM pedagogy
- Certificate in College Teaching Institute, *May 2023*
- Advanced Learning Through Evidence-Based STEM Teaching, *Spring 2023*
  - Massive Open Online Course provided through The Center for the Integration of Research Teaching and Learning
  - Completed with distinction
- An Introduction to Evidence-Based Undergraduate STEM Teaching, *Fall 2022*
  - Massive Open Online Course provided through The Center for the Integration of Research Teaching and Learning
  - Completed with distinction
- Exploring Differences in the Biology Classroom: "How to represent wide-ranging family structures and personal identities using the latest pedigree nomenclature", *November 2022*
- Participation in monthly STEM pedagogy journal club, *2021-present*
- Project Learning Tree Outdoor Education Training, *summer 2018*

Mentorship

* indicates joint mentorship with other lab members

- Jas Chalmers, *fall 2024 – spring 2025*
- Basia Love, *summer 2024 – spring 2025*
  - Independent research project: "Vegetative Growth Curves on Different *Arabidopsis thaliana* Populations Experiencing Drought Stress"
  - Mentored through experiment design, data collection, analysis in R, and scientific writing
  - Outcomes: research proposal, poster presentation in April 2025, and a scientific report
- Sophia Lanning*, *summer 2024 - present*
- Evan Adamski*, *spring 2023 – spring 2024*
  - Independent course project: "Mapping Changing Quantitative Trait Loci in *Arabidopsis thaliana* using Various Climate Change Conditions"
- Claudia Colligan*, *summer 2023- spring 2025*
- Kennedy Barnes*, *summer 2023- fall 2024*
- Claire Henley*, *summer 2023- fall 2024*
- Tianyi Xia*, *summer 2023*
- Trevor Markwood, *fall 2022- spring 2023*
- Athena Dila, Plant Genomics REU, *summer 2023*
  - Independent research project: "Genomic Signatures of Urban Adaptation in *Arabidopsis thaliana"*
  - Provided introduction to R and bioinformatics mentoring using publicly available data
  - Outcomes: poster presentation and 15 minute oral presentation in August 2023
- Tori Nicholes, KBS REU, *summer 2022-spring 2023*
  - Independent research project: "Differences in plasticity to increased temperature and drought in two populations of *Arabidopsis thaliana"*
  - Led Tori through plant care, root washing and other phenotyping of 100 plants; provided introduction to R mentoring for statistics and data visualization
  - Outcomes: poster presentation in August 2022, blog post, news article, manuscript draft *in prep*
- SJU summer research fellowship, *summer 2018*
  - Mentored 2 undergraduate international researchers from China, in the lab and field to collect population genetics data on Eastern White Pine project at St. John's University Arboretum, MN

Training

- Having Difficult Conversations with Students, *October 2024*
- Responsible Conduct of Research: Mentoring Case Studies, *September 2023*
- Building Effective Mentoring Relationships, *August 2022*
  - Engaged in a learning community centered around mentoring where mentoring challenges and methods were discussed
- Quest I: Foundations – Introduction to LGBTQA+ Identities and Inclusion, s*ummer 2022*

Lab Leadership Roles:

- Led annual discussions and writing for the Conner Lab Anti-discrimination Action Plan, s*ummer 2021-present*
- Led CV development workshop, *May 2021*, *May 2023, February 2024, December 2024*
- Led Undergraduate Journal Club, *Summer 2023*
- Led Personal Website Workshop, *November 2022*
- Started and organized weekly Josephs lab writing club, *May 2021 – May 2022*

Outreach

- Letters to a Pre-scientist, *matched 2023-2024* and *2024-2025*
  - Pen pal to middle school students in California

- Answered questions about being a scientist including what I do, how I got here, and the challenges I overcame
- Skype A Scientist, *May 2023 - present*
  - Virtual visits to 3 classrooms to talk about plant science
- Gear Up, *May 2025*
  - Visit to 5 classrooms at Eastern High School, Lansing, MI to teach genetics curriculum with examples from the Josephs Lab
- MI DNA Day, *April 2023*
  - Visit to DeWitt high school classroom to present lesson on DNA and scientific careers
- Graduate Women in Science Girls and Science Volunteer, *May 2022*
  - Assisted in running 4 sessions of an activity on fish evolution for middle school girls
- Mid-Michigan Symposium for Undergraduate Research Experiences, *August 2021, 2024*
  - Judge undergraduate research poster presentations
- Michigan Career Quest Southwest*, May 2021*
  - Staff booth with KBS to answer questions from middle schoolers throughout the region about a career as a biologist
- Project Biodiversify, *2020*
  - Contribute examples of scientists from underrepresented minorities to a growing database which is available to search and creates material for teachers.
  - Buysse, S. 2020. Jantina Tammes: Inheritance of continuous traits can be explained by Mendelian genetics. Project Biodiversify https://projectbiodiversify.org/jantina-tammes
- Tech Savvy Day at Saint Cloud State University, *2017, 2019*
  - Role model for girls in STEM
  - Help lead STEM activities
- Naturalist at Chippewa National Forest, *Summer 2017*
  - Planned and led interpretive programs 4x/week for the community at the Norway Beach Visitor Center and a local summer program

Honors, Scholarships, and Fellowships

- Don Hall Fellowship, EEB, MSU, *Summer 2025*
- Fields Award for Outstanding Teaching, PLB, MSU, *May 2024*
- FAST and FASTer Fellowships, Graduate School, MSU, *Fall 2022 – Spring 2024*
- Triemer Graduate Student Summer Fellowship, PLB, MSU, *Summer 2023*
- EEB Summer Research Fellowship, MSU, *Summer 2022, 2024*
  - Co-sponsored by BEACON, an NSF Center for the Study of Evolution in Action in 2022
- George H Lauff Scholarship - KBS Summer Funding Award for Research and Mentorship, MSU, *Summer 2022*
- Recruitment Fellowship, College of Natural Science, MSU, *Aug 2020- Aug 2021*
- Early Start Fellowship, College of Natural Science, MSU, *Jul 2020- Aug 2020*

Service

- Peer Mentorship Committee, Plant Biology Graduate Student Organization
  - Chair, *May 2023 – August 2025*
  - Understanding Comprehensive Exams, panelist: *February 2023*, moderator: *November 2024*
  - Mentor, *2021-2023*
  - Mentee, *2020-2021*
- Secretary for the Plant Biology Graduate Student Organization, *Aug 2021- May 2025*
- EEB Symposium Planning Committee Member, *Aug 2023 – May 2024*
- Seminar Committee for EEB Program seminar series, *Jan 2023 - Aug 2023*
- Envision EEB Graduate Student Panelist, *Fall 2022*

- Assisted in reviewing 5 journal articles with Dr. Jeffrey Conner or Dr. Emily Josephs

Professional Societies

- Botanical Society of America, *2024 – present*
- Society for the Advancement of Biology Education Research, *2024 - present*
- Society for the Study of Evolution (SSE), *2021- present*
- Phi Beta Kappa Honor Society, *inducted 2019*
- Delta Epsilon Sigma Honor Society, *inducted 2019*