Sophia F. Buysse

BUYSSESO@MSU.EDU | SFBUYSSE@GMAIL.COM | SFBUYSSE.GITHUB.IO

Education

Michigan State University (MSU), *expected May 2026*
East Lansing, MI
PhD Candidate, Plant Biology (PLB)
Ecology, Evolution, and Behavior (EEB) Dual Degree Program
Kellog Biological Station (KBS), Hickory Corners, MI
Advisors: Drs. Emily Josephs and Jeff Conner

College of Saint Benedict (CSB), *May 2020*
St. Joseph, MN
BA in Biology, *egregia cum laude*
Hispanic Studies Minor

Universidad Adolfo Ibañez, *Fall 2018* study abroad
Viña del Mar, Chile

Teaching Experience

Graduate Teaching Assistant **Aug 2021-Dec 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
  - Contributed to 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

- Developed and executed an independent research project to analyze the connections students in an introductory biology lab make between science experiments and their lives, and if modelling these connections improves student's writing about the relevance of their experiments and student's understanding of the connection between science and society
- Participated in weekly professional development training

FASTer Fellow **August 2023-May 2024**
Michigan State University, East Lansing, MI

- Peer Mentor for students completing teaching-as-research projects
- Develop and lead weekly journal clubs for FAST Fellows
- Coordinate 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

- Certificate in College Teaching, awarded *December 2024*
  - Find my certificate 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*

Honors

- Fields Award for Outstanding Teaching, *May 2024*

Professional Experience

Community Engagement Assistant **Aug 2017-May 2020**
Office of Sustainability, College of St. Benedict (CSB), St. Joseph, MN

- Develop programs and initiatives to share CSB's sustainable efforts with the community
- Student Director of the Full Circle Greenhouse
- Organize planting schedule, volunteers, and education programs

Americorps Conservation Intern **May 2017-Aug 2017**
CCMI partnership with Chippewa National Forest (CNF), Walker, MN

- Conservation Corps of MN and IA (CCMI)
- Monthly professional development training
- Chippewa National Forest Naturalist
- Plan and facilitate weekly programming at the Norway Beach Visitor Center, Cass Lake, MN
- Weekly training with all CNF Naturalists

Bonner Leader **Aug 2016-May 2020**
Experience and Professional Development Office, CSB, St.Joseph, MN

- Engage with the community through service and conversation
- Contribute to discussions surrounding social justice
- Volunteer on campus and with local organizations
- Leadership training

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*
  - Virtual visit to an elementary school classroom in London, England to talk about plant science
- MI DNA Day, *April 2023*
  - Visit to DeWitt high school classroom to present lesson on DNA and scientific careers
- Envision EEB Graduate Student Panelist, *Fall 2022*
- Graduate Women in Science Girls and Science Volunteer, *May 2022*
  - Assisted in running 4 session 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 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
- Community Kitchen, 2016-2019
  - Fight hunger injustice while reducing food waste
- Youth Coordinator at Promise Neighborhood of Central MN, 2016-2017
  - Plan STEAM activities for weekly youth night, ages 5 – 12

Skills

Computational Skills

- *Languages*: R (base and tidyverse); Bash; Python (beginner)
- *Basic Software:* Microsoft Office Suite; Adobe Photoshop, InDesign, and Illustrator
- *Population Genomics:* Analysis starting from raw sequencing reads (fastq file); BWA, Samtools, VCFtools, FastQC, TrimGalore, GATK, Gemma, Plink, Pixy, PCAdapt
- *Other:* ImageJ; use of High Performance Computing Cluster; PeakScanner; ArcMap 10.2 (beginner); GIS data in R (beginner)

Laboratory Techniques

- *Sample preparation*: genomic isolation through spin column protocols–purification and quantification assessments, gel electrophoresis, PCR, contamination isolation
- *Field work*: sample collection from deciduous and coniferous trees, water potential measurements, tree mortality surveys, navigating inclement weather, use of snowshoes or skis to access field sites, adjusting research plan to respond to field circumstances, led community volunteers to assist in the field
- *Plant physiology*: specific leaf area measurements, leaf physiology measurements, root extraction from soil, Pressure-Volume curve measurements with PMS Pressure Chamber, stem hydraulic conductance measurements
- *Instrumentation*: UV Spectrophotometry (Nanodrop), CEQ 8000 (fragment and sequencing analysis), Garmin handheld GPS, PMS Instrument Pressure Chamber, LiCor 64000XT, HOBO data loggers

Team Skills

- *Planning:* planning, organizing, and implementing large scale experiments including daily plant care, time sensitive data collection, data entry, and analysis over 2.5 years with many research assistants
- *Interpersonal*: large and small group collaboration, excellent communication, flexibility
- *Individual:* independent, punctual, strong work ethic, motivated, problem-solving

Publications

Peer-reviewed Journal Articles

1. Sourabh Palande, Jeremy Arsenault, Patricia Basurto-Lozada, Andrew Bleich, Brianna N. I. Brown, **Sophia F Buysse**, Noelle A Connors, 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.

Pre-prints (not peer-reviewed)

1. **Buysse, Sophia F.**, Samuel G. Pérez, Joshua R. Puzey, Ava Garrison, Gideon S. Bradburd, Christopher G. Oakley, Stephen J. Tonsor, F. Xavier Picó, Emily B. Josephs, and Jeffrey K. Conner. 2024. "Evaluating The Roles of Drift and Selection on Trait Loss along an Elevational Gradient" bioRxiv. https://doi.org/10.1101/2024.06.12.598645.

Presentations

Recombinant inbred lines expand variation in plasticity in *A. thaliana*
PLB and EEB program, MSU, East Lansing, MI
KBS, Hickory Corners, MI
Coauthors: Dr. Emily Josephs, PLB, and Dr. Jeffrey Conner, PLB and KBS

- Poster presentation: June 2023, Evolution, Albuquerque, NM
- Poster presentation: August 2023, Midwest Population Genetics, Ann Arbor, MI

Making Connections: The impact of modelling connections between reasoning and results on scientific literacy in an introductory biology lab
PLB, EEB, Biological Sciences Program, FAST, MSU, East Lansing, MI
KBS, Hickory Corners, MI
Coauthor: Mike Wiser, EEB and Biological Sciences Program

- 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

Population Differentiation for Plasticity in *Arabidopsis thaliana*
PLB and EEB, MSU, East Lansing, MI
KBS, Hickory Corners, MI
Coauthors: Tori Nicholes, former KBS REU student, Dr. Jeffrey Conner, PLB and KBS, and Dr. Emily Josephs, PLB

- Oral presentation: October 2024, EEB Colloquium, East Lansing, MI
- Poster presentation: May 2022, EEB Symposium, East Lansing, MI **awarded 2nd place poster**
- Poster presentation: June 2022, Evolution, Cleveland, OH
- Hybrid oral presentation (45 minutes): July 2022, East Lansing, MI

Population Structure and Trail Loss along an Elevational Gradient
PLB and EEB program, MSU, East Lansing, MI
KBS, Hickory Corners, MI
Coauthors: Dr. Emily Josephs, PLB, and Dr. Jeffrey Conner, PLB and KBS
Additional Collaborators: Ava Garrison, Sam Peréz, Joshua Puzey, Steve Tonsor, Xavier Picó, Gideon Bradburd

- Virtual oral presentation (10 min): May 2021, EEB Symposium, East Lansing, MI
- Virtual oral presentation (10 min): June 2021, Virtual Evolution Conference
- Oral presentation (20 minutes): December 2022, EEB Colloquium, East Lansing, MI

The Impact of Climate Change on Corn (*Zea mays L.)* Production in the Midwest
Biology Department, SJU, Collegeville, MN
Advisor: Dr. Gordon Brown, Biology Department
- Virtual poster presentation: April 2020, Scholarship and Creativity Day, Collegeville, MN

Analysis of REDD+ policy in Chile
Environmental Studies Department, SJU, Collegeville, MN
Advisor: Dr. Corrie Grosse, Environmental Studies Department
- Panelist: January 2020, Climate Justice for Revolution in Values, St. Joseph, MN
- Oral presentation (90min): March 2020, Bonner Leader Program, St. Joseph, MN

Genetic Influence on Drought-tolerance Traits in Quaking Aspen (*Populus tremuloides*)
Office of Undergraduate Research, University of Utah, Salt Lake City, UT
Advisor: Dr. William Anderegg, School of Biological Sciences
Mentor: Kelly Kerr, PhD Candidate, School of Biological Sciences
- Poster presentation: August 2019, Summer Symposium, Salt Lake City, UT
- Oral presentation (15min): November 2020, Central Minnesota Audubon Society, St. Cloud, MN
- Oral presentation (15min): February 2020, Michigan State University, East Lansing, MI

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

Impact of Wind and Salt Exposure on Seven Year Apple Tree (*Casasia clusiifolia*) Growth
Biology Department, SJU, Collegeville, MN
Advisors: Ms. Kristina Timmerman and Dr. Gordon Brown, Biology Department
- Poster presentation: April 2018, Scholarship and Creativity Day, Collegeville, MN

Mentorship

- Undergraduate Research Assistants (* indicates joint mentorship with other lab members)
  - Jas Chalmers, *fall 2024 - present*
  - Basia Love, *summer 2024 – present*
    - Mentored on an individual research project "Population Differentiation for Growth Curves in *Arabidopsis thaliana*"
  - Sophia Lanning*, *summer 2024 - present*
  - Evan Adamski*, *spring 2023 – spring 2024*
    - Mentored on an individual course project "Mapping Changing Quantitative Trait Loci in *Arabidopsis thaliana* using Various Climate Change Conditions"
  - Claudia Colligan*, *summer 2023- present*
  - Kennedy Barnes*, *summer 2023- fall 2024*
  - Claire Henley*, *summer 2023- fall 2024*
  - Tianyi Xia*, *summer 2023*
  - Trevor Markwood, *fall 2022- spring 2023*
- Plant Genomics Research Experience for Undergraduates, *summer 2023*
  - Athena Dila: Genomic Signatures of Urban Adaptation in *Arabidopsis thaliana*
  - Provided introduction to R and introduction to bioinformatics mentoring through an independent research project using publicly available data
  - Outcomes: poster presentation and 15 minute oral presentation in August 2022

- KBS Research Experience for Undergraduates, *summer 2022-spring 2023*
  - Tori Nicholes: 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
- SJU summer research fellowship, *summer 2018*
  - Mentored 2 undergraduate international researchers from China, in the lab and field to collect population genetics data (Eastern White Pine project, SJU)

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*
  - Multi-part self paced training

Lab Leadership Roles

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

Service

- Peer Mentorship Committee, Plant Biology Graduate Student Organization
  - Chair, *May 2023 – present*
  - Understanding Comprehensive Exams, panelist: *February 2023*, moderator: *November 2024*
  - Mentor, *2021-2023*
  - Mentee, *2020-2021*
- EEB Symposium Planning Committee Member, *Aug 2023 – May 2024*
- Secretary/Webmaster for the Plant Biology Graduate Student Organization, *Aug 2021-present*
- Seminar Committee for EEB Program seminar series, *Jan 2023 - Aug 2023*
- Assisted in review for PNAS with Dr. Jeffrey Conner, *December 2020*
- Assisted in review for Evolution with Dr. Jeffrey Conner, *July 2021*
- Assisted in review for eLife with Dr. Emily Josephs, *March 2022 and May 2022*
- Assisted in review for Journal of Ecology with Dr. Jeffrey Conner, *September 2022*

Honors, Scholarships, and Fellowships

- Plant Resilience Institute Travel Award ($500), Michigan State University, *Spring 2024*
- Triemer Graduate Student Summer Fellowship ($7,500), PLB, Michigan State University, *Summer 2023*
- KBS Summer Research Fellowship ($1,350), Michigan State University, *Summer 2023*
- EEB Travel Funds ($500), Michigan State University, *Summer 2022, 2023*
- Paul Taylor Travel Award ($650; $1,700; $1,100), PLB, Michigan State University, *Summer 2022, 2023, 2024*
- EEB Summer Research Fellowship ($7,500), Michigan State University, *Summer 2022, 2024*
  - Co-sponsored by BEACON, an NSF Center for the Study of Evolution in Action in 2022
- Summer Tuition Award, Michigan State University Graduate School ($1,500), *Summer 2022*
- George H Lauff Scholarship - KBS Summer Funding Award for Research and Mentorship ($1,600), Michigan State University, *Summer 2022*

- Recruitment Fellowship ($32,000), Michigan State University College of Natural Science, *Aug 2020- Aug 2021*
- Early Start Fellowship ($6,000), Michigan State University College of Natural Science, *Jul 2020- Aug 2020*
- CSB/SJU Dean's List, *Fall 2016 – Spring 2020*
- CSB/SJU Trustees' Scholarship, *2016-20*
- CSB/SJU Percussion Music Scholarship, *2016-20*

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*

Relevant Coursework

Biology

- Evolutionary Biology*
- Population and Community Ecology*
- General Genetics
- Evolution
- Plant Physiology
- Molecular Genetics
- Behavioral Ecology

Chemistry

- Introductory and Organic Chemistry (4 semesters)

Math/Physics

- Foundations in Computational Plant Sciences*
- Statistics in R I and II*
- Statistics
- Physics for Life Sciences I and II
- AP Calculus I and II

Other

- Teaching College Science *
- Science Ethics
- Global Climate Policy

*indicates graduate level coursework