

Sophia F. Buysse

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Education

Michigan State University (MSU)

East Lansing, MI

Plant Biology (PLB) PhD student

Ecology, Evolution, and Behavior (EEB) Dual Degree Program

Kellogg Biological Station (KBS)

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 Ibáñez, Fall 2018 (study abroad)

Viña del Mar, Chile

Graduate Research Experience

Population Differentiation for Plasticity between *A. thaliana* populations in Sweden and Italy

PLB and EEB, MSU, East Lansing, MI

Authors: Sophia Buysse, Jeff Conner, and Emily Josephs

- Growth chamber study with three treatments (150 plants total) to determine differentiation between *A. thaliana* populations from Sweden and Italy for drought related traits and for plasticity of drought related traits
- I plan to present preliminary results as a poster at the EEB Symposium in May 2022

Population Structure and Short Stamen Loss in *Arabidopsis thaliana* Along An Elevational Gradient in the Spanish Pyrenees

PLB, KBS, and EEB, MSU, East Lansing, MI

KBS, Hickory Corners, MI

Authors: Sophia Buysse, Ava Garrison, Sam Pérez, Joshua Puzey, Steve Tonsor, Emily Josephs and Jeff Conner

- Computation project combining phenotypic and genetic data to investigate trait loss in multiple populations of *A. thaliana* along an elevational gradient
- Gained familiarity with bioinformatics tools to create a pipeline from raw sequencing reads to analysis with PCA, GWAS, and population structure statistics
- Additional Collaborators: Xavier Picó, Gideon Bradburd

Teaching Experience

Graduate Teaching Assistant

Aug 2021-Current

Biological Sciences Program, Michigan State University, East Lansing, MI

- 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.
- 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.

Presentations

Population Structure and Trait 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

- Virtual oral presentation (10 min): May 2021, EEB Symposium, East Lansing, MI
- Virtual oral presentation (10 min): June 2021, Virtual Evolution Conference

Population Differentiation for Plasticity: Summer 2021 Plans

PLB and EEB program, MSU, East Lansing, MI

KBS, Hickory Corners, MI

Coauthors: Dr. Emily Josephs, PLB, and Dr. Jeffrey Conner, PLB and KBS

- Virtual oral presentation (45 min): April 2021, KBS Brown Bag, Hickory Corners, 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

Skills

Laboratory Techniques

- *Field work:* sample collection, morphology phenotyping, tree plot mortality surveys, water potential measurements
- *Sample preparation:* genomic isolation through spin column protocols–purification and quantification assessments, gel electrophoresis, PCR, contamination isolation
- *Physiology:* specific leaf area measurements, leaf rehydration, Pressure-Volume curve measurements with PMS Pressure Chamber, stem hydraulic conductance measurements (K_{sat} and K_{max})
- *Population Genetics:* analysis from genomic data, see computational skills
- *Instrumentation:* UV Spectrophotometry (Nanodrop), CEQ 8000 (fragment and sequencing analysis), Garmin handheld GPS, PMS Instrument Pressure Chamber, LiCor 64000XT

Computational Skills:

- *Languages:* R, Bash, Python (beginner)
- *Basic Software:* Microsoft Office Suite; Adobe Photoshop, InDesign, and Illustrator
- *Statistics:* R including base, tidyverse, lme4, and emmeans
- *Genomics:* Samtools, BWA, Trim Galore, VCFtools, GATK, Gemma, Plink, PCAdapt
- *Other:* ImageJ, PeakScanner; ArcMap 10.2; use of High Performance Computing Cluster

Training and Certifications

- CPR Certification, Bystander First-aid

- Project Learning Tree Outdoor Education Training

Soft Skills

- *Interpersonal*: teamwork, large and small group collaboration, excellent communication, flexibility, mentored two international research assistants
- *Individual*: independent, punctual, strong work ethic, motivated
- *Critical Thinking*: problem-solving, scientific literature research

Honors, Scholarships, and Fellowships

- Michigan State University College of Natural Science Recruitment Fellowship, *Jul 2020- Aug 2021*
- National Science Foundation Graduate Research Fellowships Program Applicant, *Fall 2019 and 2021*
- Phi Beta Kappa Honor Society, *inducted 2019*
- Delta Epsilon Sigma Honor Society, *inducted 2019*
- Delta Epsilon Sigma Scholarship, *2019-2020*
- CSB/SJU Dean's List, *2016-2020*

Relevant Coursework

Biology

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

Math/Physics

- Foundations in Computational Plant Sciences*
- Statistical Methods in Ecology and Evolution I and II*
- Statistics

Other

- Science Ethics
- Global Climate Policy

*indicates graduate level coursework; EEB core courses are underlined

Society Membership

- Society for the Study of Evolution (SSE), 2021-current

Service

- Secretary/Webmaster for the Plant Biology Graduate Student Organization, *Aug 2021-present*
- Attended EEB Recruiting Social Events and Seminars 2020-2022
- Attended EEB Colloquium, 2020-2021
- Assisted in review for PNAS with Dr. Jeffrey Conner, *December 2020*
- Assisted in review for Evolution with Dr. Jeffrey Conner, *July 2021*

Community Engagement and outreach

- Mid-Michigan Symposium for Undergraduate Research Experiences, August 2021
 - ▶ Judge undergraduate research virtual 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>
- Within Lab Roles:
 - ▶ Led discussions and writing for the Conner Lab Anti-discrimination Action Plan, summer 2021
 - ▶ Started and organize weekly Josephs lab writing club, summer 2021
- Collaboration with the Minnesota Master Naturalist Program for data collection, summer 2018
- Tech Savvy Day at Saint Cloud State University, 2017, 2019
 - ▶ Role model for girls in STEM

- Mentor Roles:
 - Mentored 2 international exchange researchers, summer 2018

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

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