Chloee McLaughlin

PLANT BIOLOGIST · GENOMICS · SCIENCE COMMUNICATION

State College, PA

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Summary

Current plant biology PhD student with a passion for integrating data types to answer biological questions. I am a data-driven problem-solver with broad expertise in cereal crop genomics, transcriptomics, physiology, and environmental datasets. I value interdisciplinary collaborations and have a demonstrated ability to communicate to broad audiences.

Education

Ph.D. in Plant Biology

State College, PA

PENNSYLVANIA STATE UNIVERSITY

Expected March 2024

- Thesis: Local adaptation of crop landraces

B.S. in Botany

Gainesville, FL

THE UNIVERSITY OF FLORIDA

Aug. 2015 - May 2019

- Minor in Wildlife Ecology and Conservation

Related Experience

Ph.D. Candidate and Graduate Researcher

State College, PA

PENNSYLVANIA STATE UNIVERSITY

Aug. 2019 - March 2024

GENOMICS AND BIOINFORMATICS

- Integrated genomic, transcriptomic, phenotypic, and physiological data to investigate local adaptation in cereal crop landraces (native varieties).
- Developed a novel machine learning approach to predict phenotypic variation across environmental space. Identified locally adapted quantitative trait loci (QTL) using phenotype-environment associations of complex traits (root anatomy, microbiome).
- Utilized population genomics and species forecasting techniques (gradient forest, genomic offset) to predict maladaptation in cereal crops landraces following an extreme climate event.
- Characterized trade-offs in physiological traits and biotic interactions coupled with loss-of-function at strigolactone genes in Sorghum bicolor.

COLLABORATION, WRITING, AND COMMUNICATION

- Maintained an open-collaborative working environment with mentors and mentees on interdisciplinary projects.
- Authored three publications with two additional manuscripts in review.
- Presented research at seven conferences, three symposiums, and three departmental seminars.

Undergraduate Student and Research Assistant

Gainesville, FL

UNIVERSITY OF FLORIDA

Aug. 2016 - May 2019

PLANT CULTIVATION AND INDUSTRY KNOWLEDGE

- Co-invented the commercial downy mildew-resistant basil variety, 'Besto Pesto', released through the horticultural company Proven Winners.
- Led screening trials, data collection, plant performance assessments, and managed four students.

Living Collections and Conservation Intern

Washington, DC

SMITHSONIAN GARDENS

Jan. - June 2018

CONSERVATION AND ENGAGEMENT

- Managed the living orchid collection of *ex situ* collected specimens.
- Collaborated with members of the US Botanic Gardens for strategic planning of orchid exhibits.
- Developed outreach materials for public engagement of conservation-based strategies.

Skill Sets

Data Science R, Linux, Git, bash scripting, high performance computing (HPC), statistical analyses, data visualization

Bioinformatics PLINK, cereal crop genomic data, genome wide association (GWA), transcriptomic analysis, crop modeling

Experimental RNA and DNA extraction, tissue culture, PCR, qPCR, arbuscular mycorrhizal fungi (AMF) quantification and staining assays, root anatomical phenotyping, horticultural skills, collection of plant physiological data (LI-6400, LI-600)

Professional Development & Workshops

2021 **Genomics-Enabled Restoration Workshop**, Population genomics research group
2021 **World Campus Teaching Certificate**, Penn State World Campus course
2020 **Summer Institute in Statistical Genetics**, University of Washington
2020 **Bioinformatics Data and Reproducibility**, (BDR) Bootcamp
2020 **International Conference of Quantitative Genetics**, Quantitative genetics workshop

Awards & Acknowledgements

2024 **Early Career Award**, International Phytobiomes Alliance
2024 **Plant and Animal Genome Travel Award**, PSU One Health Microbiome Center
2023 **Walter Thomas Memorial Scholarship**, PSU College of Ag. Science
2023 **Domestic Travel Award**, PSU Huck Institute of the Life Sciences
2023 **International Travel Award**, PSU Huck Institute of the Life Sciences
2022 **J. Ben and Helen D. Hill Memorial Fund Award**, PSU College of Biology
2021 **Walter Thomas Memorial Scholarship**, PSU College of Ag. Science
2021 **Braddock/Roberts Endowment Scholarship**, PSU Plant Biology Department

DEI & Involvement

Graduate Student Representative — *State College, PA*
Plant Science Department — *July 2021 - Dec. 2023*
- Elected by peers to participate in and provide a graduate student perspective at Plant Science faculty meetings.

Diversity, Equity, and Inclusion Committee — *State College, PA*
Plant Science Department — *July 2020 - Dec. 2022*
- Committee member and head of a sub-committee that promotes belonging within the plant science department.

Letters to a Pre-Scientist — *Remote*
STEM Professional — *July 2020 - Dec. 2022*
- Acted as pen-pal to a middle schooler to demystify STEM and encourage students from low-income areas.

Smithsonian Habitat Camps — *Washington, DC*
Group leader — *2018*
- Developed and taught curriculum for middle school STEM camps focusing on preserving plant biodiversity.

Select Presentations

Plant Animal Genome Conference. Invited Talk. — *San Diego, CA*
Count the cost: Trade-offs associated with low germination stimulant 1. — *2024, Jan. 17*
- Sponsored by the Penn State One Health Microbiome Center.

Center for Root and Rhizophere Biology Retreat. Invited Talk. — *State College, PA*
Evidence that variation in root anatomy contributes to local adaptation in native maize — *2023, May 23*
- Invited by the Center for Root and Rhizosphere Biology.

Botany. Poster. — *Boise, ID*
Predicting maladaptation in crop landraces following a global climate catastrophe — *2023, July 24*
- Travel supported by the Huck Institute.

Select Publications

Google Scholar

Chloee M. McLaughlin, M. Li, M. Perryman, A. Heymans, H. Schneider, J. Lasky, R. Sawers. (2024). Evidence that variation in root anatomy contributes to local adaptation in Mexican native maize. ***Evolutionary Applications***.

X. He*, D. Wang*, Y. Jiang*, M. Li*, M. Delgado-Baquerizo*, **Chloee M. McLaughlin**, et al. (2024). Heritable maize microbiomes contribute to local adaptation and host stress resilience. ***Nature Plants***.

E. Bellis*, **Chloee M. McLaughlin***, C. dePamphilis, J. Lasky. (2021). The geography of parasite local adaptation to host communities. ***Ecography***.

* denotes co-first author