Melissa A. Draves

madcfr@umsystem.edu | OrcID: 0000-0002-1668-2822

Education

University of Missouri: Columbia, MO August 2022-present
Ph.D. in Plant, Insect, and Microbial Sciences
Advisors: Sherry Flint-Garcia and David Braun

Iowa State University: Ames, IA May 2022
Bachelor of Science in Genetics- Minors in Agronomy and Biology Magna Cum Laude

Research Experience

University of Missouri Division of Plant Science and Technology Columbia, MO
Graduate Research Assistant- Flint-Garcia Lab August 2022-present

- Characterizing 990 heirloom maize populations from the United States and Canada in order to create comprehensive phenotypic and genotypic data sets describing heirloom morphology and population relationships.
- Responsible for coordinating and training five undergraduate students each summer in controlled pollinations and manual phenotyping techniques for 1,280 experiment rows.
- Collaborating with a team of principal investigators, students, and researchers at multiple institutions across the country to expand understanding of heirloom maize populations in various environments.

Iowa State Department of Genetics, Development, and Cell Biology Ames, IA
Undergraduate Research Assistant-Kelley Lab January 2020-May 2022
Laboratory Technician-Kelley Lab May 2022-August 2022

- Executed research and published work related to investigating the role of auxin response factors in maize seedling root development with Dr. Dior Kelley.
- Efficient in performing laboratory projects including molecular biology bench skills, hormone growth assays, large scale phenotyping assays, and statistical tests based on data collection.
- Collaborated with a diverse team to develop essential interpersonal skills through data presentations and weekly meetings.

Publications and Preprints

Draves, M.A., Traylor, Z.B., Salazar-Vidal, M.N., Oliver, S.L., Flint-Garcia, S. (2025, accepted). Field Preparation and Planting Corn (*Zea mays*). Cold Spring Harbor Protocols.

Salazar-Vidal, M.N., **Draves, M.A.,** Fitzsimmons, S.L., Traylor, Z.B., Flint-Garcia, S. (2025, accepted). How to Harvest and Store Corn (*Zea mays*). Cold Spring Harbor Protocols.

Traylor, Z.B., Fitzsimmons, S.L., **Draves, M.A.,** Salazar-Vidal, M.N., Tracy, W.F., Flint-Garcia, S. (2025, accepted). Planting, Pollinating, Monitoring Growth, and Harvesting Maize (*Zea mays*) for Research. Cold Spring Harbor Protocols.

Salazar-Vidal, M.N., Traylor, Z.B., **Draves, M.A.,** Fitzsimmons, S.L., Tracy, W.F., Flint-Garcia, S. (2025, accepted). How to Monitor Growth and Identify Developmental Stages of Maize (*Zea mays*). Cold Spring Harbor Protocols.

Fitzsimmons, S.L., Salazar-Vidal, M.N., Traylor, Z.B., **Draves, M.A.,** Flint-Garcia, S. (2025, accepted). How to Pollinate Corn (*Zea mays*). Cold Spring Harbor Protocols.

Callwood, J.B., Townsend, E.G., Malik, S., **Draves, M.A**., Khor, J., Marshall, J.P., Sweers, H., Cowling, C. L., Walley, J.W., Kelley, D.R. (2025). Identification of phenotypic and transcriptomic signatures underpinning maize crown root systems. Plant Phenomics. https://doi.org/10.1016/j.plaphe.2025.100008

Dash, L., McReynolds, M.R., **Draves, M.A.,** Khangura, R.S., Muench, R.L., Khor, J., Callwood, J.B., Cowling, C.L., Mejia, L., Lang, M.G., Dilkes, B.P., Walley, J.W., Kelley, D.R. (2023, submitted). The Auxin Response Factor ARF27 is required for maize root morphogenesis. https://doi.org/10.1101/2023.08.15.553439.

Cowling, C.L., Homayouni, A., Callwood, J.B., McReynolds, M.R., Khor, J., Ke, H., **Draves, M.A.**, Dehesh, K., Walley, J.W., Strader, L.C., Kelley, D.R. (2023). ZmPILS6 is an auxin efflux carrier required for maize root morphogenesis. Proceedings of the National Academy of Science. https://doi.org/10.1073/pnas.2313216121.

Draves, M.A. and Muench, R., Lang M.G., Kelley, D.R. (2022). Maize seedling growth and hormone response assays using the rolled towel method. Current Protocols. https://doi.org/10.1002/cpz1.562.

McReynolds, M.R., Dash, L., Montes, C., **Draves, M.A.,** Lang., M., Walley, J.W., Kelley, D.R. (2022). Temporal and spatial auxin responsive networks in maize primary roots. Quantitative Plant Biology. 3, E21. 10.1017/qpb.2022.17.

Relevant Work Experience

Research and Development Intern Geneseo, Illinois
Wyffels Hybrids May 2021-August 2021

- Directed a team of 15 students in hand pollination techniques and general nursery management for hybrid production.
- Evaluated hybrid plot locations throughout the Western corn belt to provide valuable data on potential products.

Precision Agronomy Intern Champaign, Illinois
Advanced Agrilytics and Ag Ingenuity Partners May 2020-August 2020

- Coordinated scouting and yield based improvement data for over 3,000 acres of corn and soybeans throughout East Central Illinois.
- Provided GPS coordinates, data, and plant collections in over 20 corn and soybean trials in support of the Research and Development department.
- Developed a streamlined reporting system for communicating field status with growers.

Field Corn Breeding Undergraduate Research Assistant Madison, Wisconsin
University of Wisconsin-Madison June 2019-August 2019

- Collaborated closely with Bridget McFarland, Ph.D. and the UW Field Corn Breeding Program, to assess physiological effects of planting density on plant performance using genotypic, phenotypic, and weather data.
- Gained proficiency in planting, pollinating, collecting phenotypic data, and conducting data analysis in R.

Campus Involvement and Service

Department of Plant Science and Technology Graduate Student Association January 2023-present

- Serving on the Graduate Student Association (GSA) committee to foster a welcoming and supportive community among DPST graduate students.

Maize Genetics Meeting Steering Committee February 2024-March 2025
Graduate Student Representative

- Served as the graduate student representative for the committee planning the 2025 Maize Meeting in St. Louis, MO.

MU Plant Research Symposium Committee October 2022- March 2023
Co-Chair

- Worked with a team of seven graduate students and post-docs to organize the MU Plant Research Symposium with 150 attendees and five speakers.

Teaching and Mentorship

B4U Mentoring Program February 2025-present
Graduate Mentee

- Participating in a yearlong mentorship program, sponsored by Bayer Agriscience, with a primary focus on professional development opportunities.

Maximizing Access to Research Careers (MARC) August 2024-present
Undergraduate Mentor

- Responsible for mentoring two senior undergraduate students during their graduate school application process including editing personal statements and providing general support.

University of Missouri Division of Plant Science and Technology August 2023-December 2023
Teaching Assistant for Plant Breeding and Genetics

- Responsible for grading assignments for 25 students in the undergraduate plant breeding and genetics course and delivering multiple lectures related to plant breeding objectives and plant polyploidy.

Presentations

- Research Presentation-Corn Breeding Meeting-St. Louis, MO March 2025
- Poster presentation-Interdisciplinary Plant Group Symposium-Columbia, MO May 2023, 2024
- Poster presentation-Bayer Agriscience-Chesterfield, MO March 2024
- Poster presentation- MU Plant Research Symposium-Columbia, MO March 2024, April 2025
- Poster presentation- Maize Genetics Meeting-Raleigh, NC February 2024
- Outreach presentation- Career Exploration Day-Columbia, MO August 2023, 2024
- Outreach presentation- Nursery Demonstration Plot-Columbia, MO August 2023, 2024
- Virtual Panel Discussion-American Society of Plant Biologists April 2023
- Poster presentation- Maize Genetics Meeting- St. Louis, MO March 2022, 2023, 2025

Honors and Awards

- Third Place Poster Presentation-MU Plant Research Symposium April 2025
- First Place Short Talk- Corn Breeding Meeting March 2025
- Graduate Research Fellowship Honorable Mention-National Science Foundation March 2024
- Life Sciences Fellowship August 2022-present
- Genetics, Development, and Cell Biology Departmental Award May 2022

Certifications

- Mentoring at Mizzou March 2024
- Remote Pilot Certification- Federal Aviation Administration June 2023