Mary-Francis **LaPorte**

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Education

University of California, Davis *Davis, CA, USA*

PhD Plant Biology *August 2024 (Expected)*

Dissertation: Using genomic prediction, genetic association, and crop modeling to study nutritional traits in maize and rice
Advisor: Christine Diepenbrock, PhD

University of Oklahoma (OU) *Norman, OK, USA*

BS: Plant Biology, *summa cum laude* *May 2019*

Concentration: Molecular techniques analyzing *OsAT5* gene regulation on the cell walls of *A. thaliana*
Advisor: Laura Bartley, PhD

Research Experience

Department of Plant Sciences, University of California, Davis *Davis, CA*

PhD Candidate; Advisor: Christine Diepenbrock, PhD *Sept. 2019 - Present*

- Analyzed maize genomic data for Joint Linkage and Genome Wide Association Study analysis
- Compared Genomic Prediction methods to predict carotenoid traits in a maize association mapping panel, including parallelizing and adapting scripts for High-Performance Computing

National Renewable Energy Lab *Golden, CO*

PhD Practicum; Advisor: Ambarish Nag, PhD *July 2022 - Present*

- Compared the genomes of halophilic, halotolerant, and halophobic algal varieties to explore genetic mechanisms for salt tolerance, with application for outdoor algae cultivation
- Utilized high performance computing techniques for increasing the scale of comparative genomics applications

Department of Plant Biology and Microbiology, University of Oklahoma *Norman, OK*

Undergraduate Research Assistant; Advisor: Laura Bartley, PhD *2016 - 2019*

- Applied molecular and genetic techniques to analyze *OsAT5* gene expression on the cell walls of *A. thaliana*
- Analyzed Switchgrass transcriptomic data focusing on cell-wall related genes

Department of Molecular Plant Physiology, Utrecht University *Utrecht, The Netherlands*

Undergraduate Research Intern; Advisor: Henriette Schluepmann, PhD *Sept. 2017 - Dec. 2017*

- Purified and quantified RNA from Azolla filiculoides differential gene expression analysis for application in domestication

Publications

MF LaPorte, M Vachev, M Fenn, C Diepenbrock. 2022. Simultaneous dissection of grain carotenoid levels and kernel color in biparental maize populations with yellow-to-orange grain. *G3: Genes, Genomes, Genetics*.

R Dale, S Oswald, A Jalihal, **MF LaPorte**, DM Fletcher, AH Hubbard, SH Shiu, A Nelson, A Bucksch. 2021. Overcoming the challenges to enhancing experimental plant biology with computational modeling. *Frontiers in Plant Sciences*.

Presentations

Conference Talks

Summer 2022. *Mathematical Modeling In Crop Sciences*. Invited talk: Multi-scale modeling in plant biology. American Society of Plant Biologists, Portland, OR (Virtual).

Winter 2021. *Towards orange, biofortified maize: identifying genes associated with carotenoid traits and kernel color*. Talk: Plant Breeding Retreat, Davis, CA (Virtual)

Fall 2021. *Towards orange, biofortified maize: identifying genes associated with carotenoid traits and kernel color*. Seminar: Zeavolution Maize Seminar Series. Virtual

Spring 2021. *Towards orange, biofortified maize: identifying genes associated with carotenoid traits and kernel color*. Corn Breeding Research Meeting. Virtual.

Fall 2020. *Towards orange, biofortified maize: identifying genes associated with carotenoid traits and kernel color*. Colloquium Talk, Plant Biology Graduate Group Colloquium. Davis, CA (Virtual)

Poster Presentations

Summer 2022. **MF LaPorte**, A Koide, W Suwarno, J Crossa, N Palacios-Rojas, C Diepenbrock. Predicting Carotenoid Breeding Values and Kernel Color in Maize Grain. Computational Science Graduate Fellowship Program Review, Washington D.C., USA.

Summer 2018. **MF LaPorte**, C Zhang, L Bartley. Expression of a rice ferulate monolignol transferase in Arabidopsis improves cell wall suitability for biorefining. American Society of Plant Biologists, Montreal, Canada.

Spring 2018. **MF LaPorte**, C Zhang, LE Bartley. Expression of a rice ferulate monolignol transferase in Arabidopsis improves cell wall suitability for biorefining. Undergraduate Research Symposium, Norman, OK, USA.

Summer 2017. **MF LaPorte**, C Zhang, LE Bartley. Expression of a rice ferulate monolignol transferase in Arabidopsis improves cell wall suitability for biorefining. Curiosity-to-Creativity Symposium, Norman, OK, USA.

Awards, Fellowships, & Grants

2020 - 2024	**Computer Science Graduate Fellowship**, U.S. Department of Energy
2022	**Borlaug Scholar**, National Association of Plant Breeders
2019	**Dean's Distinguished Graduate Fellowship**, UC Davis College of Biological Science
2018	**Ronald Lehr Award for Undergraduate Research (Grand Prize)**, OU Phi Beta Kappa
2018	**Microbiology and Plant Biology Endowed Scholarship for Undergraduates**, OU Microbiology and Plant Biology Department
2017	**Effective Communication of Research Award**, Curiosity-to-Creativity Symposium, University of Oklahoma
2016	**Best essay by an undergraduate related to the Anthropocene Biosphere**, Anthropocene Biosphere Project
2015 - 2019	**National Merit Scholarship**, University of Oklahoma

Teaching and Mentoring

2021-Present	**Software Carpentries**, Instruct workshops for undergraduates, graduate students, faculty, and researchers in topics including: python, R, version control with Git, data management and organization, SQL database management
2022-Present	**Undergraduate Mentoring**, Mentored an undergraduate student (Computer Science major) to apply the mathematically-complex Reproducing Kernel Hilbert Space Model to predict carotenoid traits in maize. Covered topics including plant breeding, genetics and genomics, linear algebra, and code implementation and optimization

University Service and Outreach

2022	**Plant Sciences Symposium Organizational Committee**, Organized and spearheaded accessibility, diversity, and inclusion efforts for speaker talks, attendee participation, and student networking at this industry-backed, student-organized conference
2021-2022	**Mentorship Committee: Plant Biology Graduate Group** , Developed and implemented resources for Graduate Students related to wellbeing and mental health during the pandemic and support for incoming graduate students
2022-2023	**Seminar committee: Plant Biology Graduate Group**, Facilitate student involvement in the department seminar series, especially as speakers return for in-person talks
2020-2021	**Advocacy committee: Plant Biology Graduate Group**, Represent Plant Biology interests in the UC Davis Graduate Student Association

Relevant Coursework

2020-2021	**Statistical Methods for Research I-II**, Individual data analysis projects in R, including the study of causal inference	*Statistics*
2021	**Machine Learning**, Mathematical theory and application of Python tools including sklearn and TensorFlow	*Statistics*
2021	**Machine Learning**, Understanding and developing applications of machine learning models in python	*Computer Science*
2021	**Quantitative Genetics**, Applied quantitative genetics R packages (MASS, synbreed, etc) to animal and plant data	*Plant Science*
2021	**Advanced Plant Breeding**, Proposed a full hypothetical breeding program, from yearly optimization to IP	*Plant Science*
2022	**Programming Languages**, Studied the concepts behind lambda calculus, imperative programming, and language design	*Computer Science*
2022	**Large-Scale Scientific Computing**, Numerical algorithms and techniques for large-scale scientific computation, especially applications of fast-solvers in MATLAB	*Computer Science*

Programming Skills

R, Python, Shell Scripting, MATLAB, Version Control with Git, utilizing High Performance Computing