

HUSAIN I. AGHA

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EDUCATION AND TRAINING

- 2024 – Present **Michigan State University**, East Lansing, MI
Postdoctoral Researcher
Emily B. Josephs, Advisor
- 2024 **University of Minnesota Twin Cities**, St. Paul, MN
Ph.D., Plant and Microbial Biology
Laura M. Shannon, Advisor
- 2018 **University of Missouri**, Columbia, MO
B.A., Classical Humanities, Graduated *magna cum laude*
Minor in Biology

PUBLICATIONS

- In Prep. Emily B. Josephs, **Husain I. Agha**, Robert J. Williamson, Jeremy J. Berg.
Multivariate adaptive divergence contributes to G×E in *Arabidopsis thaliana*.
- 2025 Sapphire Coronejo, ..., **Husain I. Agha**, ... Laura M. Shannon. (2025). Potato dihaploids uncover diverse alleles to facilitate diploid potato breeding. *bioRxiv*, 2025-08.
- 2025 Nathan S. Catlin, **Husain I. Agha**, Adrian E. Platts, Manisha Munasinghe, Candice N. Hirsch, Emily B. Josephs. (2025). Structural Variants Contribute to Phenotypic Variation in Maize. *Molecular Ecology*, e17662.
- 2024 **Husain I. Agha**, Jeffrey B. Endelman, Jessica Chitwood-Brown, et al. (2024). Genotype-by-environment interactions and local adaptation shape selection in the US National Chip Processing Trial. *Theor Appl Genet*, 137(5).
- 2023 **Husain I. Agha**, Laura M. Shannon, Peter L. Morrel (2023). Unloading potatoes: Potato breeding moves forward with only half the genome. *Cell Genomics*, 3(6).
- 2023 **Husain I. Agha**, Lucy Schroeder, David Eikholt, Cari A. Schmitz Carley, Jeannine Cavender-Bares, Laura M. Shannon. Assessing the Effectiveness of Hyperspectral Analysis to Determine Ploidy in Potato. *American Journal of Potato Research*, 100(2).
- 2021 James S. Busse, Shelley H. Jansky, **Husain I. Agha**, Cari A. Schmitz Carley, Laura M. Shannon, Paul C. Bethke. 2021. A High Throughput Method for Generating Dihaploids from Tetraploid Potato. *American Journal of Potato Research*, 98(4).

PRESENTATIONS

- 2025 Talk. **Husain I. Agha**, Jeremy J. Berg, Emily B. Josephs. Dissecting the contribution of phenotypic plasticity to adaptive divergence. Midwest Population Genetics Conference. August 23, St. Paul, MN.
- 2025 Poster. Effectively using herbarium specimens to study trait evolution and response to environment over time and space. Gordon Research Conference. February 17, Barga, Italy.
- 2024 Talk. **Husain I. Agha**, Laura M. Shannon. Polyploidy mediates loss of plasticity during domestication in tuber-bearing *Solanum* section *Petota*. EEB Symposium, March 7, East Lansing, MI.

- 2023 Talk. **Husain I. Agha**, Laura M. Shannon. Evidence of Local Adaptation in the National Chip Processing Trial. Midwest Population Genetics Conference. August 5, Ann Arbor, MI.
- 2023 Talk and Poster. **Husain I. Agha**, Laura M. Shannon. Using National Trial Data to Look for Local Adaptation in Breeding Programs. Gordon Research Conference. February 11, Ventura, CA.
- 2022 Talk. **Husain I. Agha**, Laura M. Shannon. Assessing Genotype-by-Environment interactions and alleles mediating environment in the National Chip Processing Trial. Potato Association of America Annual Meeting. July 25, Missoula, MT.
- 2020 Talk. **Husain I. Agha**, Laura M. Shannon. Effects of Induced Diploidization in *Solanum Tuberosum*. Plant and Microbial Biology Seminar. October 15, Saint Paul, MN.
- 2020 Poster. **Husain I. Agha**, Laura M. Shannon. Determining the Role of Allelic Dosage in Novel Trait Development. Microbial and Plant Genomics Institute, Science on the Spot; February 27, Saint Paul, MN.
- 2019 Lecture. **Husain I. Agha**, A Primer in Polyploidy. Plant and Microbial Biology Seminar. November 22, Saint Paul, MN.
- 2019 Talk. **Husain I. Agha**, Cari Schmitz Carley, Rachel Figueroa, David Eickholt, Laura M. Shannon. Using Near-Infrared Spectroscopy to Determine Ploidy. NCCC215 Potato Breeding and Genetics Technical Committee Meeting; December 10-11, Rosemount, IL.
- 2019 Talk. **Husain I. Agha**, Laura M. Shannon. Whatcha Going to do With All Them Genes? Science in Seconds. October 23, Saint Paul, MN.
- 2019 Talk. **Husain I. Agha**, Rachel Figueroa, Cari Schmitz Carley, Laura M. Shannon. Ploidy Determination using Near-Infrared Spectroscopy. Potato Association of America Annual Meeting. July 29, Winnipeg, Manitoba, Canada.
- 2019 Talk. **Husain I. Agha**, Laura M. Shannon. The Effects of Allelic Dosage on Quantitative Traits. Plant and Microbial Biology Annual Retreat. May 3, Saint Paul, MN.
- 2019 Poster. **Husain I. Agha**, Laura M. Shannon. Determining the Role of Allelic Dosage in Novel Trait Development. Gordon Research Conference – Quantitative Genetics and Genomics. February 9-14, Barga, Italy.
- 2018 Talk. **Husain I. Agha**, Dihaploid Seed Production. NCCC215 Potato Breeding and Genetics Technical Committee Meeting. December 10-11, Rosemount, IL.
- 2018 Poster. **Husain I. Agha**, Sarah D. Turner, Katherine E. Guill, and Tim Beissinger. A Novel Mating Design Provides High Power to Detect Epistasis in Maize. Maize Genetics Conference. March 22-25, Saint Malo, France.

RESEARCH EXPERIENCE

- 2024 – Present **Postdoctoral Researcher**, Michigan State University, East Lansing
 Advisor: Dr. Emily Josephs
- Studying the effects of transposable elements on phenotypic plasticity and genotype-by-environment interactions in maize
 - Developing methods to identify adaptive trait divergence in natural populations
- 2018 – 2024 **Graduate Research Assistant**, University of Minnesota, Saint Paul
 Advisor: Dr. Laura M. Shannon

- Quantitative/population genetics in domesticated potato and its wild relatives
- Potato breeding and variety development
- Using potato as a model organism for autopolyploid evolution and the evolution of genotype-by-environment interactions and phenotypic plasticity

2016 – 2018

Undergraduate Researcher, University of Missouri, Columbia

Advisor: Dr. Timothy M. Beissinger

- Developed methods for detecting statistical epistasis. Duties included: data collection, field work, and coding in the R environment.

TEACHING EXPERIENCE

2023

SOAR-REEU Graduate Mentor, University of Minnesota

- Mentored an underrepresented minority student in their first research project, duties included: teaching the student to understand best research practices, demonstrating how to present their research findings through both abstract writing and poster presentation, and connecting them with potential mentors in their chosen field of study for future research opportunities.

2022 - 2023

Dean's Research Program Graduate Mentor, University of Minnesota

- Directed an undergraduate student in an independent project, duties including: developing the project, assigning duties, and teaching new techniques and the underlying biology motivating the project.

2022

Teaching Assistant, BIOL3272: Applied Biostatistics, University of Minnesota

Supervisor: Dr. Yaniv Brandvain

- Coordinated with professor on lecture material and delivered supplementary lectures
- Provided timely feedback on student assignments and exams to improve learning outcomes
- Organized supplementary teaching sessions to improve student understanding and retention

2020

Teaching Assistant, PLSC3401: Plant Genetics and Breeding, University of Minnesota

Supervisor: Dr. Aaron Lorenz

- Developed and led laboratory exercises designed to demonstrate principles and practices in plant breeding and genetics
- Provided timely feedback on student assignments and exams to improve learning outcomes
- Lectured on topics related to plant genetics and breeding as needed

2018 - 2020

Undergraduate Research Opportunities Program Graduate Mentor, University of Minnesota

- Guided an undergraduate student in a semester long research program, fostering a deeper understanding and appreciation of scientific research.

2018 - 2019

Collaborative Opportunities in Horticulture Program Graduate Mentor, University of Minnesota

- Mentored an undergraduate student from an underrepresented group in a summer research project. I helped this student to collect and analyze data and to create a poster presentation of their research which they went on to present at a national conference.

2018

Teaching Assistant, CHEM1320: College Chemistry I, University of Missouri

Supervisor: Dr. Steven W. Keller

- Led an hour-long lecture every week geared toward chemistry majors needing a broad chemistry base to start their college careers.

- 2016 – 2017

- Assisted students in completing laboratory work to apply their knowledge.

Teaching Assistant, CHEM1100: Atoms and Molecules, University of Missouri
Supervisor: Dr. Brian C. Ganley

 - Led an hour-long lecture every week focused on chemistry for non-science majors, followed by a guided laboratory section where students were able to apply their knowledge.
 - Responsible for grading students' reports and proctoring exams.

AWARDS & HONORS

- 2023

Alderman Graduate Scholarship, University of Minnesota

 - Awarded to outstanding graduate students performing work in research, outreach, or extension that exceeds expectations. Used by the department to recognize a “graduate student of the year,” for students who go above and beyond to help their fellow graduate students, the department, and the community while also maintaining high levels of work. (\$1800).
- 2023

Gordon & Margaret Bailey Scholarship, University of Minnesota

 - Awarded to graduate students who show academic merit and financial need while conducting high quality research in horticulture. (\$600).
- 2023, 2022, 2021,
2020, 2019

Eldon A. And June E. Tessman Fellowship, University of Minnesota

 - Awarded to graduate students who show academic merit while studying potato breeding and genetics. (Total \$12600).
- 2023, 2022, 2020,
2019

Christian Thill Memorial Fellowship, University of Minnesota

 - Awarded to graduate students who show academic merit and financial need while conducting research in potato breeding and genetics. (Total \$3580).
- 2022

Frank L. Haynes Graduate Research Award Winner, Potato Association of America Annual Meeting

 - Awarded 1st place in the Frank L. Haynes Graduate Research Award Competition for talk entitled: “Assessing Genotype-by-Environment interactions and alleles mediating environment in the National Chip Processing Trial.” (\$1000).
- 2022, 2020, 2019

Honeycrisp Professional Travel Fellowship, University of Minnesota

 - Funded travel to the Potato Association of America Annual Meeting to present “Ploidy Determination using Near-Infrared Spectroscopy,” the Gordan Research Conference to present “Determining the Role of Allelic Dosage in Novel Trait Development”, and the Potato Association of America Annual Meeting to present “Assessing Genotype-by-Environment interactions and alleles mediating environment in the National Chip Processing Trial.” (Total \$2150).
- 2019

MPGI Travel Award

 - Funded travel to Gordan Research Conference to present “Determining the Role of Allelic Dosage in Novel Trait Development.” (\$400) and The Allied Genetics Conference where I was to present “Linked beneficial and long-term balancing selection.” This event was canceled due to COVID-19 (\$800).
- 2018

MPGI Graduate Student Recruitment Award, University of Minnesota

 - Awarded to top candidates in respective graduate programs interested in genomic research (\$2500).
- 2018

Induction into Phi Beta Kappa Society, Alpha Chapter of Missouri

- Prestigious honor society that recognizes students who demonstrate academic excellence while pursuing a wide breadth and depth of study in the Arts and Sciences.
- 2018 **MaNET Awardee** (Maize Genetics Network Enhancement via Travel)
 - Travel funding given to minoritized students to attend the annual Maize Genetics Conference (\$1200).
- 2017 **Harryette J. Campbell Scholarship**, University of Missouri
 - A student in the Classics department showing academic and intellectual merit is nominated by faculty to receive this award (\$1500).

OUTREACH AND SERVICE

- 2024 – Present **Danny Schnell Plant Biology Outstanding Postdoctoral Award Committee**, Michigan State University
 - Reviewing applications and selecting awardees to recognize their scientific, mentorship, and service contributions to the Department of Plant Biology and broader community.
- 2020 – 2023 **Graduate Labor Union Organizer**, University of Minnesota, Graduate Labor Union (GLU-UMN)
 - Worked to improve the working conditions of graduate workers at the University of Minnesota by establishing union representation to guarantee minimum standards of pay and transparency. Attended and led organizing meetings to discuss worker grievances and needs to perform with their greatest potential. Held one-on-one meetings with graduate workers to ensure they were able to make fully informed decisions.
- 2020 - 2022 **Diversity, Equity, and Inclusion Committee Chair**, University of Minnesota, Phyto grads
 - Advocated for DEI initiatives at the program, college, and university level. Organized meetings with other committee members and administration. Hosted events to better educate faculty and students on the effects of racism in academia and beyond to improve the experience for underrepresented minorities at the University of Minnesota.
- 2020 - 2021 **Phyto grads Vice-President**, University of Minnesota, Plant and Microbial Biology
 - Assisted the president in their duties, including attending faculty meetings and hosting Phyto grads meetings. Acted as the social chair for the Phyto grads graduate student group, organizing events for graduate students.
- 2020 **Collaborative Coding Organizer**, University of Minnesota, Community of Scholars Program
 - Developed, organized, and hosted a new outreach event for graduate students of color through the Community of Scholars Program. The event is designed to bring students together to work on data analysis and generation and to further involvement from STEM students of color in the program.
- 2018 - 2023 **Area II Potato Growers Association Field Day**, Becker, MN
 - Present research and breeding progress for the University of Minnesota Potato Breeding Program with Area II partners.
- 2018 - 2022 **Northern Plains Potato Growers Association Field Day**, Grand Forks, ND
 - Represent the University of Minnesota and discuss progress in the potato breeding program with NPPGA members. An important event to discuss results from research with growers and hear their requests and concerns.

2018 - 2019

Plant Science Symposium Organizing Committee Member, University of Minnesota

- Organize the annual Plant Science Symposium put on by the Applied Plant Sciences program. Duties include: Selecting keynote speakers, arranging travel for presenters, social media outreach, and selecting student speakers.

2016 - 2018

Volunteer Firefighter, Boone County Fire Protection District, Boone County, Missouri

- Responsible for responding to emergency calls from the community regarding structure fires, car accidents, and medical emergencies. Worked as a part of a team, taking responsibilities ranging from team member to incident commander.