HUSAIN I. AGHA

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EDUCATION AND TRAINING

2024 – Present	**Michigan State University,** East Lansing, MI Postdoctoral Scholar Emily B. Josephs, Advisor
2024	**University of Minnesota Twin Cities,** St. Paul, MN Ph.D., Plant and Microbial Biology | GPA: 3.82/4.00 Laura M. Shannon, Advisor
2018	**University of Missouri**, Columbia, MO B.A., Classical Humanities | GPA: 3.90/4.00 Minor: Biology

PUBLICATIONS

In Prep.	E.B. Josephs, **H.I. Agha**, R.J. Williamson, J.J. Berg. Multivariate adaptive divergence contributes to G×E in Arabidopsis thaliana.
2025	S. Coronejo, B. Vaillancourt, J.P. Hamilton [and 24 additional authors, including **H.I. Agha**]. (2025). Potato dihaploids uncover diverse alleles to facilitate diploid potato breeding. bioRxiv. Accepted for publication in *The Plant Genome*. doi.org/10.1101/2025.08.06.668948.
2025	N.S. Catlin, **H.I. Agha**, A.E. Platts, M. Munasinghe, C.N. Hirsch, E.B. Josephs. (2025). Structural Variants Contribute to Phenotypic Variation in Maize. *Molecular Ecology*, e17662. doi.org/10.1111/mec.17662
2024	**H.I. Agha**, J.B. Endelman, J. 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). doi.org/10.1007/s00122-024-04610-3
2023	**H.I. Agha**, L.M. Shannon, P.L. Morrel (2023). Unloading potatoes: Potato breeding moves forward with only half the genome. *Cell Genomics*, *3*(6). doi.org/10.1016/j.xgen.2023.100343
2023	**H.I. Agha**, L. Schroeder, D. Eikholt, C.A. Schmitz Carley, J. Cavender-Bares, L.M. Shannon. Assessing the Effectiveness of Hyperspectral Analysis to Determine Ploidy in Potato. *American Journal of Potato Research*, 100(2). doi.org/10.1007/s12230-022-09899-8
2021	J.S. Busse, S.H. Jansky, **H.I. Agha**, C.A. Schmitz Carley, L.M. Shannon, P.C. Bethke. 2021. A High Throughput Method for Generating Dihaploids from Tetraploid Potato. *American Journal of Potato Research*, 98(4). doi.org/10.1007/s12230-021-09844-1

RESEARCH EXPERIENCE

2024 – Present **Postdoctoral Scholar,** Michigan State University, East Lansing
Advisor: Dr. Emily Josephs
- Mapping and investigating effects of transposable elements on G×E in maize
- Developing statistical model to identify adaptive trait divergence

2018 – 2024 **Graduate Research Assistant,** University of Minnesota, Saint Paul
Advisor: Dr. Laura M. Shannon
- Conducted quantitative/population genetics in potato and wild relatives
- Contributed to potato breeding and variety development
- Studied autopolyploid evolution and the genetic basis of G×E and plasticity

2016 – 2018 **Undergraduate Researcher,** University of Missouri, Columbia
Advisor: Dr. Timothy M. Beissinger
- Developed methods for detecting statistical epistasis
- Carried out data collection, field work, and computational analyses

TEACHING EXPERIENCE

2023 **SOAR-REEU Graduate Mentor,** University of Minnesota
- Mentored undergraduate student on their first research project
- Guided abstract writing, poster development, and presentation skills

2022 - 2023 **Dean's Research Program Graduate Mentor,** University of Minnesota
- Directed an undergraduate student in an independent project
- Taught field and lab-based techniques

2022 **Teaching Assistant,** BIOL3272: Applied Biostatistics, University of Minnesota
Supervisor: Dr. Yaniv Brandvain
- Delivered supplementary lectures and provided detailed feedback
- Contributed to the open-source textbook
- Led review sessions to reinforce course concepts

2020 **Teaching Assistant,** PLSC3401: Plant Genetics and Breeding, University of Minnesota
Supervisor: Dr. Aaron Lorenz
- Developed and led laboratory modules on plant breeding and genetics
- Provided timely feedback on student assignments and exams
- Lectured on topics relating to plant genetics and breeding

2018 - 2020 **Undergraduate Research Opportunities Program Graduate Mentor,** University of Minnesota
- Guided undergraduate in a semester long research program, fostering a deeper understanding and appreciation for plant biological research

2018 - 2019 **Collaborative Opportunities in Horticulture Graduate Mentor,** University of Minnesota
- Mentored an undergraduate in a summer research project
- Assisted in poster preparation for a national conference

2018 **Teaching Assistant**, CHEM1320: College Chemistry I, University of Missouri
Supervisor: Dr. Steven W. Keller
- Led a weekly, hour-long lecture geared toward science majors
- Assisted students in completing laboratory work to apply their knowledge

2016 – 2017 **Teaching Assistant**, CHEM1100: Atoms and Molecules, University of Missouri
Supervisor: Dr. Brian C. Ganley
- Led a weekly, hour-long lecture on chemistry for non-science majors
- Responsible for grading students' reports and proctoring exams

GRANTS

2025 USDA NIFA, "2025 Quantitative Genetics and Genomics Gordon Research Conference and Gordon Research Seminar." **$49,000**

2025 NIH NHGRI, "2025 Quantitative Genetics and Genomics Gordon Research Conference and Gordon Research Seminar." **$10,000**

PRESENTATIONS

2025 Talk. **H.I. Agha**, J.J. Berg, E.B. Josephs. Dissecting the contribution of phenotypic plasticity to adaptive divergence. Midwest Population Genetics Conference. August 23, St. Paul, MN.

2025 Poster. **H.I. Agha,** E.B. Josephs. 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. **H.I. Agha**, L.M. Shannon. Polyploidy mediates loss of plasticity during domestication in tuber-bearing Solanum section Petota. EEB Symposium, March 7, East Lansing, MI.
2023	Talk. **H.I. Agha**, L.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. **H.I. Agha**, L.M. Shannon. Using National Trial Data to Look for Local Adaptation in Breeding Programs. Gordon Research Conference. February 11, Ventura, CA.
2022	Talk. **H.I. Agha**, L.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. **H.I. Agha**, L.M. Shannon. Effects of Induced Diploidization in Solanum Tuberosum. Plant and Microbial Biology Seminar. October 15, Saint Paul, MN.
2020	Poster. **H.I. Agha**, L.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. **H.I. Agha**, A Primer in Polyploidy. Plant and Microbial Biology Seminar. November 22, Saint Paul, MN.
2019	Talk. **H.I. Agha**, C.A. Schmitz Carley, R. Figueroa, D. Eickholt, L.M. Shannon. Using Near-Infrared Spectroscopy to Determine Ploidy. NCCC215 Potato Breeding and Genetics Technical Committee Meeting; December 10-11, Rosemount, IL.
2019	Talk. **H.I. Agha**, L.M. Shannon. Whatcha Going to do With All Them Genes? Science in Seconds. October 23, Saint Paul, MN.
2019	Talk. **H.I. Agha**, R. Figueroa, C.A. Schmitz Carley, L.M. Shannon. Ploidy Determination using Near-Infrared Spectroscopy. Potato Association of America Annual Meeting. July 29, Winnipeg, Manitoba, Canada.
2019	Talk. **H.I. Agha**, L.M. Shannon. The Effects of Allelic Dosage on Quantitative Traits. Plant and Microbial Biology Annual Retreat. May 3, Saint Paul, MN.
2019	Poster. **H.I. Agha**, L.M. Shannon. Determining the Role of Allelic Dosage in Novel Trait Development. Gordan Research Conference – Quantitative Genetics and Genomics. February 9-14, Barga, Italy.
2018	Talk. **H.I. Agha**. Dihaploid Seed Production. NCCC215 Potato Breeding and Genetics Technical Committee Meeting. December 10-11, Rosemount, IL.
2018	Poster. **H.I. Agha**, S.D. Turner-Hissong, K.E. Guill, and T.M. Beissinger. A Novel Mating Design Provides High Power to Detect Epistasis in Maize. Maize Genetics Conference. March 22-25, Saint Malo, France.

AWARDS & HONORS

2023	**Alderman Graduate Scholarship,** University of Minnesota ▪ Used by department to recognize a "graduate student of the year," for students who go above and beyond to help fellow graduate students, the department, and community while conducting high-quality research
2023	**Gordon & Margaret Bailey Scholarship,** University of Minnesota ▪ Awarded to graduate students who show academic merit while conducting high quality research in horticulture
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

2023, 2022, 2020, 2019 — **Christian Thill Memorial Fellowship,** University of Minnesota
- Awarded to graduate students who show academic and intellectual merit while conducting research in potato breeding and genetics

2022 — **Frank L. Haynes Graduate Research Award Winner**, Potato Association of America Annual Meeting
- Awarded 1st place for talk: "Assessing Genotype-by-Environment interactions and alleles mediating environment in the National Chip Processing Trial"

2018 — **MPGI Graduate Student Recruitment Award,** University of Minnesota
- Awarded to top candidates in respective graduate programs who plan to conduct genomic research

2018 — **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 — **MaGNET Awardee** (Maize Genetics Network Enhancement via Travel)
- Travel funding given to students to attend the annual Maize Genetics Conference

2017 — **Harryette J. Campbell Scholarship,** University of Missouri
- Awarded to a student in the Classics department showing academic and intellectual merit, nominated by the faculty

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

2023 – 2025 — **Gordon Research Seminar on Quantitative Genetics and Genomics Chair,** Barga, Italy
- Organized and hosted the 2025 Quantitative Genetics and Genomics GRS
- Invited plenary and guest speakers from submitted abstracts
- Obtained grant funding from the USDA and NIH

2020 - 2022 — **Diversity, Equity, and Inclusion Committee Chair,** University of Minnesota, Phytograds
- Advocated for DEI initiatives at the program, college, and university level
- Organized and hosted events for PMB community and meetings with program and university administration

2020 - 2021 — **Phytograds Vice-President,** University of Minnesota, Plant and Microbial Biology
- Attended faculty meetings and hosted meetings
- Served as social chair by organizing events and encouraging attendance

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
- Designed event to bring students together to work on data analysis and to increase involvement of STEM students 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

2018 - 2019 **Plant Science Symposium Organizing Committee Member,** University of Minnesota

- Organized the annual Plant Science Symposium through the Applied Plant Sciences program
- Selected keynote speakers, arranged travel reimbursement for presenters, and conducted social media outreach

2016 - 2018 **Volunteer Firefighter,** Boone County Fire Protection District, Missouri

- Responded to emergency calls for structure fires, car accidents, and medical emergencies
- Carried out roles as both team member and incident commander