Aaron M. Kusmec
Curriculum Vitae

CURRENT POSITION

Assistant Professor
Department of Agronomy
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EDUCATION

2014-2021	Ph.D., Interdepartmental Genetics and Genomics	Iowa State University *Advisor: Dr. Patrick S. Schnable*
2010-2014	B.S., Biology *summa cum laude*	Truman State University

PROFESSIONAL APPOINTMENTS

2024-present	Assistant Professor	Department of Agronomy Kansas State University
2023-2024	Research Scientist III	Iowa State University *Supervisor: Dr. Jianming Yu*
2021-2023	Post-Doctoral Research Associate	Iowa State University *Advisor: Dr. Patrick S. Schnable*
2014-2021	Graduate Research Assistant	Iowa State University *Advisor: Dr. Patrick S. Schnable*

RESEARCH EXPERIENCE

2013	NSF Research Experience for Undergraduates	Iowa State University *Advisor: Dr. Patrick S. Schnable*
2012-2014	Student Research Assistant	Truman State University *Advisor: Dr. Brent Buckner*
2012	Student Research Assistant	University of Missouri-Columbia *Advisor: Dr. Charlotte Phillips*
2012	NSF Research Experience for Undergraduates	University of Missouri-Columbia *Advisor: Dr. Charlotte Phillips*

HONORS, AWARDS, AND FELLOWSHIPS

2021	C.R. Weber Excellence in Plant Breeding Award
2019	Genetics Society of America Peer Review Training Program

2017	Peter J. Loesch, Jr. Memorial Fund Travel Award, Department of Agronomy, Iowa State University
2016	USDA-NIFA Graduate Student Travel Fellowship, Fifth International Conference on Quantitative Genetics
2014-2017	Miller Graduate Fellowship, Iowa State University
2014-2015	Brown Graduate Fellowship, Iowa State University
2014-2015	Biotechnology Fellowship, Office of Biotechnology, Iowa State University
2012	Phi Beta Kappa
2011	The Honor Society of Phi Kappa Phi
2010-2014	Pershing Scholar, Truman State University
2008	Eagle Scout

TEACHING AND MENTORING

2024 Guest lectures for "Advanced Plant Breeding" (Iowa State University)
- "Parental Selection"
- "Phenotypic and Genetic Variances"

2022 Guest lecture, "Mendelian genetics and plant breeding" for "Robotics and AI for Agriculture" (Carnegie Mellon University)

2015-2022 Mentored three students in the Department of Industrial and Manufacturing Systems Engineering (Iowa State University) in Mendelian and quantitative genetics, genomic prediction, selection theory, and plant breeding, resulting in three co-authored publications:
- Zheng Ni (Ph.D. candidate)
- Saba Moeinizade (Ph.D., 2021)
- Matthew Goiffon (M.S., 2017)

PUBLICATIONS

* indicates that authors contributed equally.

1. **Kusmec A.** and Schnable P.S. (2024) Phenological adaptation is insufficient to offset climate change-induced yield losses in US hybrid maize. *Global Change Biology*, **30**(10): e17539. doi: 10.1111/gcb.17539.
2. **Kusmec A.**, Yeh C.-T. "Eddy", The Genomes to Fields Initiative, and Schnable P.S. (2024) Data-driven identification of environmental variables influencing phenotypic plasticity to facilitate breeding for future climates. *New Phytologist*, **244**(2): n.p. doi: 10.1111/nph.19937.
3. Zhou Y., **Kusmec A.**, and Schnable P.S. (2024) Genetic regulation of self-organizing azimuthal canopy orientations and their impacts on light interception in maize. *The Plant Cell*, **36**(5): 1600-1621. doi: 10.1093/plcell/koae007.

4. **Kusmec A.**, Attigala L., Dai X., Srinivasan S., Yeh C.-T. “Eddy”, and Schnable P.S. (2023) A genetic tradeoff for tolerance to moderate and severe heat stress in US hybrid maize. *PLOS Genetics*, **19**(7): e1010799. doi: 10.1371/journal.pgen.1010799.
5. Ni Z., Moeinizade S., **Kusmec A.**, Hu G., Wang L., and Schnable P.S. (2023) New insights into trait introgression with the look-ahead intercrossing strategy. *G3: Genes, Genomes, Genetics*, **13**(4): jkad042. doi: 10.1093/g3journal/jkad042.
6. Yu S., **Kusmec A.**, Wang L., and Nettleton D. (2023) Fusion learning of functional linear regression with application to genotype-by-environment interaction studies. *Journal of Agricultural, Biological, and Environmental Statistics*, **28**: 401-422. doi: 10.1007/s13253-023-00529-2.
7. Zhou Y.*, **Kusmec A.***, Mirnezami S.V.*, Attigala L., Srinivasan S., Jubery T.Z., Schnable J.C., Salas-Fernandez M.G., Ganapthysubramanian B., and Schnable P.S. (2021) Identification and exploitation of genetic determinants of trait measurement errors in image-based, high-throughput phenotyping. *The Plant Cell*, **33**(8): 2562-2582. doi: 10.1093/plcell/koab134
8. **Kusmec A.**, Zheng Z., Archontoulis S., Ganapathysubramanian B., Hu G., Wang L., Yu J., and Schnable P.S. (2021) Interdisciplinary strategies to enable data-driven plant breeding in a changing climate. *One Earth*, **4**(3): 372-383. doi: 10.1016/j.oneear.2021.02.005
9. Moeinizade S., **Kusmec A.**, Hu G., Wang L., and Schnable P.S. (2020) Multi-trait genomic selection methods for crop improvement. *Genetics*, **215**(4): 931-945. doi: 10.1534/genetics.120.303305
10. Zhou Y., Srinivasan S., Mirnezami S.V., **Kusmec A.**, Qi F., Attigala L., Salas-Fernandez M.G., Ganapathysubramanian B., and Schnable P.S. (2018) Semi-automated feature extraction from RGB images for sorghum panicle architecture GWAS. *Plant Physiology*, **179**(1): 24-37. doi: 10.1104/pp.18.00974
11. **Kusmec A.**, de Leon N., and Schnable P.S. (2018) Harnessing phenotypic plasticity to improve maize yields. *Frontiers in Plant Science*, **9**: 1377. doi: 10.3389/fpls.2018.01377
12. **Kusmec A.** and Schnable P.S. (2018) FarmCPUpp: Efficient large-scale genomewide association studies. *Plant Direct*, **2**(4): e00053. doi: 10.1002/pld3.53
13. **Kusmec A.**, Srinivasan S., Nettleton D., and Schnable P.S. (2017) Distinct genetic architectures for phenotype means and plasticities in *Zea mays*. *Nature Plants*, **3**: 715-723. doi: 10.1038/s41477-017-0007-7
    - Selected by the journal editors for a commentary written by Bruce Walsh (doi: 10.1038/s41477-017-0012-x)
    - Selected as an “Editors’ Choice” paper by MaizeGDB (Oct. 2017)
14. Goiffon M., **Kusmec A.**, Wang L., Hu G., and Schnable P.S. (2017) Improving response in genomic selection with a population-based selection strategy: Optimal population value selection. *Genetics*, **206**(3): 1675-1682. doi: 10.1534/genetics.116.197103 (Selected by journal editors as an Issue Highlight)
    - Selected by the journal editors as an “Issue Highlight”

MANUSCRIPTS IN PREPARATION

1. **Kusmec A.**, Liu Q., Fetty S., Attigala L., Conlon B., Coffey L., Yeh C.-T. "Eddy", Mirnezami S.V., Ganapathysubramanian B., Scanlon M.J., and Schnable P.S. (*in preparation*) Divergent selection in maize demonstrates genetic constraints on shoot apical meristem allometry.
2. Liu Q., **Kusmec A.**, and Schnable P.S. (*in preparation*) Co-regulation of vegetative and reproductive phase transitions in *Zea mays*.
3. **Kusmec A.**, Coffey L., Yeh C.-T. "Eddy", and Schnable P.S. (*in preparation*) Reduced contributions of heterosis to hybrid maize architectural and phenological traits over 50 years of maize breeding.
4. Escamilla D.M., Li D., Negus K.L., Kappelmann K., **Kusmec A.**, and Yu J. (*in preparation*) Genomic selection: Essence, applications, and prospects.

INVITED SPEAKER

1. "What is the margin of improvement for AI in genomic prediction?" Presented at the ASA, CSSA, SSSA Annual Meeting, San Antonio, TX, 11 November 2024.
2. "A genetic tradeoff for tolerance to moderate and severe heat stress in US hybrid maize." Presented in the "Hybridization, Heterosis, and Balancing Selection" workshop at the Plant and Animal Genome Conference 31, San Diego, CA, 15 January 2024.
3. "A genetic tradeoff for tolerance to moderate and severe heat stress in US hybrid maize." Presented at the 65th Maize Genetics Conference, St. Louis, MO, 17 March 2023.
4. "Distinct genetic architectures for phenotype means and plasticities in *Zea mays*." Presented at the 60th Maize Genetics Conference, Saint-Malo, France, 24 March 2018.
5. "Distinct genetic architectures for phenotype means and plasticities in *Zea mays*." Presented at the Nebraska Plant Breeding Symposium (DuPont Pioneer Seminar Series), Lincoln, NE, 13 March 2018.

ORAL PRESENTATIONS

1. "Genes in their contexts: Constancy, change, and complexity." Presented in the KSU Plant Pathology Seminar, Manhattan, KS, 3 October 2024.
2. "A genetic tradeoff for tolerance to moderate and severe heat stress in US hybrid maize." Presented at the ISU Plant Breeding Seminar, Ames, IA, 7 February 2024.
3. "A genetic tradeoff for tolerance to moderate and severe heat stress in US hybrid maize." Presented at the Zeavolution Seminar Series, Virtual, 21 February 2024.
4. "Eighty years of genetic adaptation to heat stress in US hybrid maize and prospects for further adaptation to a changing climate." Presented at the Collective Research Organization of Plant Scientists Summer Seminar Series, Virtual, 13 July 2021.
5. "Data-driven identification of environmental variables influencing phenotypic plasticity for grain yield in hybrid maize." Presented at the Collective Research

Organization of Plant Scientists Summer Seminar Series, Virtual, 9 June 2020. (Awarded second place for Best Presentation)

6. "Distinct genetic architectures for phenotype means and plasticities in *Zea mays*." Presented at the ISU Plant Breeding Seminar, Ames, IA, 11 April 2018.
7. "Dominant gene action accounts for much of the unexplained phenotypic variance in a maize GWAS and provides insight into heterosis." Presented at the American Society of Plant Biologists Annual Meeting, Austin, TX, 11 July 2016.
8. "Distinct genetic architectures for linear and non-linear measures of plasticity." Presented at the 2016 Corn Breeding Research Meeting, Jacksonville, FL, 17 March 2016.

POSTER PRESENTATIONS

2024	Maize Genetics Conference
2020	The Allied Genetics Conference
2019	Maize Genetics Conference
	Plant and Animal Genome Conference XXVII
2018	Iowa State Plant Breeding Symposium, DuPont Pioneer Seminar Series
	Plant and Animal Genome Conference XXVI
2017	Maize Genetics Conference
	Plant and Animal Genome Conference XXV
2016	Fifth International Conference on Quantitative Genetics
	Maize Genetics Conference
2013	Truman State University Student Research Conference

SERVICE

2024-	Associate editor for *Genomics Communications*
2019-	Reviewer for *Bioinformatics, Genetics, Heredity, Journal of Experimental Botany, Molecular Plant, Nature Communications, Plant Communications, Theoretical and Applied Genetics*

PROFESSIONAL AFFILIATIONS

2020-	Crop Science Society of America
2020-	Genetics Society of America