Aimee J. Schulz

Plant Breeding and Genetics PhD Candidate · NSF Graduate Research Fellow
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Education

Cornell University
Ithaca, New York

Ph.D. in Plant Breeding and Genetics — *August 2019 - Present*

- **Minors:** Field Crop Science, Plant Physiology
- **Advisor:** Edward S. Buckler, Ph.D.

Iowa State University
Ames, Iowa

B.S. in Genetics & B.S. in Agronomy, GPA: 3.72/4.0 — *August 2015 - May 2019*

Magna Cum Laude & Honors Program

Experience

Cornell University / USDA-ARS - Bucker Lab
Ithaca, NY

Graduate Research Assistant — *August 2019 - Present*

- Developed deep learning pipeline to evaluate gene model annotations to release to broader maize community
- Assembled 450+ short read genomes in the *Andropogoneae*
- Evaluating annual/perennial transitions across the *Andropogoneae*
- Predicting genetic effects of neighboring plants and mixtures of unique maize lines
- Worked with Genomes to Fields initiative to incorporate competition experiment into five field locations over two years

Iowa State University - Hufford Lab
Ames, IA

Undergraduate Research Assistant — *Nov. 2015 - May 2019*

- Analyzed inbreeding depression in *Z. mays* ssp. *parviglumis* populations in R using microsatellites, Genomic Evolutionary Rate Profiling scores, and Structure
- Oversaw 500 rows of maize during the 2016 summer nursery, including 120 rows of Mexican and South American landraces
- Created weekly work schedules for 2 part-time undergraduate workers
- Developed protcols for germinating, growing, and pollinating inbred lines of *Z. mays* ssp. *parviglumis*

Donald Danforth Plant Science Center - Topp Lab
St Loius, MO

NSF REU Student — *May 2018 - August 2018*

- Designed and executed experiment evaluating sequences of three genes in 30 inbred maize lines, five diverse landraces, and seven teosinte species
- Imaged and analyzed root architecture variation of inbred maize lines, landraces, and teosintes
- Developed sequencing and qRT-PCR primers for three genes of interest
- Oversaw 500 rows of maize in summer nursery field including 39 rows of *Z. mays* ssp. *mexicana* and *Z. mays* ssp. *parviglumis*

Beck's Superior Hybrids
Kauai, Hawaii

Winter Nursery Corn Breeding Intern — *December 2017 - January 2018*

- Traveled to winter nursery in Hawaii for 18 days in December to assist with pollinations

Beck's Superior Hybrids
Marshalltown, IA

Corn Breeding Intern — *May 2017 - August 2017*

- Selected maize inbred lines for advancement
- Evaluated yield trials for environmental and genetic effects on phenotypic expression
- Supervised planting operations and ran a research planter
- Operated tractor and planter to plant solid male rows within research plots
- Recorded field notes on stand counts, plant growth stages, and pollination traits
- Supervised a summer pollinating crew of 30 individuals

Achievements & Awards

National Science Foundation Postdoctoral Research Fellowship in Biology, $249,000 in funding over three years awarded to study the Genomics of Grass-Legume Interactions at the University of Minnesota	*2025-2027*
ICQG7 Best Student Poster Presentation Award, Unanimously selected by conference organizers at the 7th International Conference of Quantitative Genetics	*2024*
Larry Darrah Student Presentation Award - 2nd prize, Voted by attendees at the Corn Breeding Research Meeting on best graduate student talk of the conference	*2024*
National Corn Growers Association Research Ambassador, Selected to represent NCGA at a series of events across the US, meeting with growers and policy makers to discuss the importance of corn research	*2022-2023*
National Science Foundation Graduate Research Fellow, Nationally competitive fellowship providing $138,000 in independent funding for three years	*2021-2024*
Iowa State CALS Senior Council Academic Achievement Award, awarded to one graduating senior who demonstrated excellence in academics, leadership, and service	*2019*
American Society of Plant Biologists Conviron Scholar, program designed to develop the next generation of plant science leaders	*2018-2019*
Cardinal Key Honor Society, Iowa State's highest and most selective honors society	*2017*
Gamma Sigma Delta Agriculture Honor Society, Iowa State Chapter membership offered to those in the top 15% of their class with a demonstrated commitment to agriculture	*2019*
CALS Deans Leadership Scholar, awarded to the top ten out-of-state students applying to Iowa State	*2015-2017*
President's Leadership Scholarship, awarded to thirty incoming freshman hand-picked by the president of the university	*2015-2016*
Intercollegiate Horse Show Association Joan Johnson Memorial Scholarship, awarded to an influential student leader in the Intercollegiate Horse Show Association	*2017*
Minnesota 4-H Dan Patch Youth Leadership Award, awarded to one exceptional student leader each year with demonstrated learning, leadership, and service	*2014*

Scholarships & Fellowships

Iowa State University CALS Dean's Leadership Scholarship	*2015-2017*
Iowa State University President's Leadership Scholarship	*2015-2016*
Intercollegiate Horse Show Association Joan Johnson Memorial Scholarship	*2017*
Iowa State University Award for Competitive Excellence	*2015-2019*
Intercollegiate Horse Show Association Joan Johnson Memorial Scholarship	*2017*
Iowa State Agricultural Endowment Kiley and Marie Powers Scholarship	*2018-2019*
Iowa State Ron and Ethel George Scholarship in Agronomy	*2018-2019*
Iowa State Women's Club Scholarship	*2018-2019*
Iowa State Genetics Sui Tong Chan Fung Fund Highest GPA Award	*2018*
Iowa State Elenor and Walter Fehr Endowed Scholarship for Genetics and Agronomy	*2017-2018*
American Miniature Horse Registry Scholarship	*2017-2018*
Andrew Ryback Photography and The Plaid Horse Higher Learning Scholarship	*2016-2017*
Iowa State Women in Science and Engineering Scholarship	*2016-2017*
Minnesota 4-H Pace Leadership Scholarship	*2015*
Benton - Sherburne Corn Growers Scholarship	*2015*

Publications

Peer-reviewed publications

- Hu H, Crow T, Nojoomi S, **Schulz AJ**, Rellan-Alvarez R, Sawers R, Hufford MB, Flint-Gercia S, Runcie D. (2022) Genes and pathways underlying highland adaptation in maize identified with a novel allele-specific expression analysis pipeline. *Molecular Biology and Evolution* 39:11. https://doi.org/10.1093/molbev/msac239

Preprints

- Hsu SK, Emmett BD, Haafke A, Costa-Neto G, **Schulz AJ**, Lepak N, La T, AuBuchon-Elder T, Hale CO, Raglin SS, Ojeda-Rivera JO, Kent AD, Kellogg EA, Romay MC, Buckler ES. (2024) Contrasting Rhizosphere Nitrogen Dynamics in Andropogoneae Grasses: Implications for Sustainable Agriculture. *BioRxiv*. https://doi.org/10.1101/2024.06.03.597142
- Long EM, Stitzer MC, Monier B, **Schulz AJ**, Romay MC, Robbins KR, Buckler ES. (2024) Muller's Ratchet in Action: The Erosion of Sexual Reproduction Genes in Domesticated Cassava *(Manihot esculenta)*. *BioRxiv*. https://doi.org/10.1101/2024.02.14.580345
- **Schulz AJ**, Hufnagel D, Gepts P, Hufford MB. (2023) Inbreeding depression leads to reduced fitness in declining populations of wild maize. *BioRxiv* https://doi.org/10.1101/2023.11.20.567972
- **Schulz AJ**, Zhai J, AuBuchon-Elder T, El-Walid MZ, Ferebee TH, Gilmore EH, Hufford MB, Johnson LC, Kellogg EA, La T, Long E, Miller ZR, Romay MC, Seetharam AS, Stitzer MC, Wrightsman T, Buckler ES, Monier B, Hsu SK. (2023) Inbreeding depression leads to reduced fitness in declining populations of wild maize. *BioRxiv* https://doi.org/10.1101/2023.11.20.567972

In prep

- **Schulz AJ**, Bohn M, Bradbury P, Cristina Lima D, De Leon N, Flint Garcia S, Holland J, Lepak N, Romay MC, Buckler ES, Robbins KR. *In prep 2024.* Intraspecific competition dynamics in US inbred and hybrid maize varieties
- **Schulz AJ**, AuBuchon-Elder T,Costa Neto G, Hale CO, Seetharam A, Stitzer MC, Romay MC, Kellogg EA, Hufford MB, Buckler ES, Hsu SK. *In prep 2024.* Across-species association mapping to identify the genetics of perenniality.

Presentations

Presentations

- **Schulz AJ**, Bohn M, Bradbury P, Cristina Lima D, De Leon N, Flint Garcia S, Holland J, Lepak N, Romay MC, Buckler ES, Robbins KR. Intraspecific competition dynamics in US inbred and hybrid maize varieties. Talk presented at the **Corn Breeding Research Meeting**; 2024 Feb 28; Raleigh, NC
- **Schulz AJ**, Zhai J, AuBuchon-Elder T, El-Walid MZ, Ferebee TH, Gilmore EH, Hufford MB, Johnson LC, Kellogg EA, La T, Long E, Miller ZR, Romay MC, Seetharam AS, Stitzer MC, Wrightsman T, Buckler ES, Monier B, Hsu SK. reelGene: fishing for good gene models with evolution and machine learning. Talk presented at the **Plant and Animal Genome Conference**; 2024 Jan 13; San Diego, CA
- **Schulz AJ**, Hsu SK, Wrightsman T, Romay MC, La T, Miller ZR, AuBuchon-Elder T, Kellogg E, Hufford MB, Seetharam A, Buckler ES, Monier, B. reelGene: fishing for good gene models with evolution and machine learning. Talk presented at the **Cornell Plant Breeding Departmental Seminar**; 2023 May 9; Ithaca, NY
- **Schulz AJ**, Hsu SK, Wrightsman T, Romay MC, La T, Miller ZR, AuBuchon-Elder T, Kellogg E, Hufford MB, Seetharam A, Buckler ES, Monier, B. reelGene: fishing for good gene models with evolution and machine learning. Talk presented at the **Maize Genetics Meeting**; 2023 March 19; St. Louis, MO
- **Schulz AJ**, Hsu SK, Wrightsman T, Romay MC, La T, Miller ZR, AuBuchon-Elder T, Kellogg E, Hufford MB, Seetharam A, Buckler ES, Monier, B. reelGene: a pipeline for robust evaluation through evolutionary leverage of gene models. Talk presented at the **Zeavolution Webinar**; 2022 December 7; virtual
- **Schulz AJ**, Wrightsman T, Long E, Miller ZR, AuBuchon-Elder T, Kellogg EA, Seetharam A, Hufford MB, La T, Romay MC, Buckler ES, and Monier B. 101 Evolutions: Evaluating maize gene annotations with genome sequences acrossthe Andropogoneae. Talk and poster presented at the **CROPS Conference**; 2022 June 13-16; Huntsville, AL
- **Schulz AJ**, Wrightsman T, Long E, Miller ZR, AuBuchon-Elder T, Kellogg EA, Seetharam A, Hufford MB, La T, Romay MC, Buckler ES, and Monier B. What makes a perennial? A roadmap to uncovering perenniality with the Andropogoneae . Talk presented at the **Cornell Plant Breeding Departmental Seminar**; 2022 March 16; Ithaca, NY
- **Schulz AJ**, Romay MC, Robbins K, Buckler ES. Exploring competitive interactions in maize. Talk presented at the **Cornell Plant Breeding Departmental Seminar**; 2021 April 20; Ithaca, NY
- **Schulz AJ**, Hufnagel D, Gepts P, Hufford MB. Declining fitness and high genetic load point to inbreeding depression in fragmented wild maize populations. Lightning talk presented at the **Corteva Plant Science Symposium**; 2020 April 24; Virtual
- **Schulz AJ**, Hufnagel D, Gepts P, Hufford MB . Inbreeding depression in wild maize (*Zea mays* ssp. *parviglumis*) populations subject to habitat degradation in southwest Mexico. Talk presented at the **National Conference on Undergraduate Research**; 2018 April 5-7; Edmond, OK
- **Schulz AJ**, Bray AL, Topp CN. Exploring the hidden half: sequence variation of *ZmDro* orthologs and root architecture differences in *Zea mays* and wild relatives. Talk presented at the **Donald Danforth Plant Science Center REU Symposium**; 2018 August 3; St Louis, MO

Conference posters

- **Schulz AJ**, AuBuchon-Elder T,Costa Neto G, Hale CO, Seetharam A, Stitzer MC, Romay MC, Kellogg EA, Hufford MB, Buckler ES, Hsu SK. Across-species association mapping to identify the genetics of perenniality. Presented at the **7th International Conference of Quantitative Genetics**; 2024 July 22 - 26; Vienna, Austria
- **Schulz AJ**, AuBuchon-Elder T, Costa Neto G, Hale CO, Seetharam AS, Stitzer MC, Romay MC, Kellogg EA, Hufford MB, Buckler ES, and Hsu SK. Uncovering the genetic basis of perenniality in the Andropogoneae. Presented at the **Maize Genetics Meeting**; 2024 Feb 29 - March 3; Raleigh, NC
- **Schulz AJ** and Khaipho-Burch, M. A Seed Dispersal Game: curriculum for teaching plant domestication and adaptation to students of all ages. Presented at the **Maize Genetics Meeting**; 2024 Feb 29 - March 3; Raleigh, NC
- **Schulz AJ**, Zhai J, AuBuchon-Elder T, El-Walid MZ, Ferebee TH, Gilmore EH, Hufford MB, Johnson LC, Kellogg EA, La T, Long E, Miller ZR, Romay MC, Seetharam AS, Stitzer MC, Wrightsman T, Buckler ES, Monier B, Hsu SK. reelGene: fishing for good gene models with evolution and machine learning. Poster presented at the **Ecological and Evolutionary Genomics Gordon Research Conference**; 2023 July 29-Aug 4; Smithfield, RI
- **Schulz AJ** and Khaipho-Burch, M. A Seed Dispersal Game: curriculum for teaching plant domestication and adaptation to students of all ages. Presented at the **Maize Genetics Meeting**; 2023 March 16-19; St Louis, MO
- **Schulz AJ**, Zhai J, AuBuchon-Elder T, El-Walid MZ, Ferebee TH, Gilmore EH, Hufford MB, Johnson LC, Kellogg EA, La T, Long E, Miller ZR, Romay MC, Seetharam AS, Stitzer MC, Wrightsman T, Buckler ES, Monier B, Hsu SK. reelGene: fishing for good gene models with evolution and machine learning. Poster presented at the **New York Area Population Genomics Conference**; 2023 Jan 27; New York, NY
- **Schulz AJ**, Wrightsman T, Long E, Miller ZR, AuBuchon-Elder T, Kellogg EA, Seetharam A, Hufford MB, La T, Romay MC, Buckler ES, and Monier B. 101 Evolutions: Evaluating maize gene annotations with genome sequences acrossthe Andropogoneae. Presented at the **CROPS Conference**; 2022 June 13-16; Huntsville, AL
- **Schulz AJ**, Wrightsman T, Long E, Miller ZR, AuBuchon-Elder T, Kellogg EA, Seetharam A, Hufford MB, La T, Romay MC, Buckler ES, and Monier B. 101 Evolutions: Evaluating maize gene annotations with genome sequences acrossthe Andropogoneae. Presented at the **Maize Genetics Meeting**; 2022 March 31 - April 3; St Louis, MO
- **Schulz AJ**, Romay MC, Robbins K, Buckler ES. Cooperate or Compete: modeling competitive traits in maize. Poster presented at the **Maize Genetics Conference**; 2021 March 8-12; Virtual
- **Schulz AJ**, Romay MC, Robbins K, Holland J, Buckler ES. Maize intraspecific competition dynamics: the genomic architecture behind competitive ability. Poster presented at the **International Conference on Quantitative Genetics**; 2020 November 2-12 ; Virtual
- **Schulz AJ**, Romay MC, Robbins K, Holland J, Buckler ES. Maize intraspecific competition dynamics: the genomic architecture behind competitive ability. Poster presented at the **Maize Genetics Conference**; 2020 June 25-26; Virtual
- **Schulz AJ**, Bray AL, Thiruppathi D, Hufford MB, Topp C. Exposing the hidden half: Deeper Rooting 1 *(DRO1)* orthologs alter root architecture in *Zea mays*. Poster presented at **ASPB Plant Biology**; 2019 August 3-7; San Jose, California
- **Schulz AJ**, Bray AL, Thiruppathi D, Hufford MB, Topp C. Exploring the hidden half: sequence variation in maize orthologs of *Deeper rooting 1 (Dro1)* and root architecture differences in the genus *Zea*. Poster presented at the **Maize Genetics Conference**; 2019 March 17-19; St Louis, Missouri
- **Schulz AJ**, Gepts P, Hufford MB. Inbreeding depression in wild maize populations (*Zea mays* ssp. *parviglumis*) subject to habitat degradation in southwest Mexico. Poster presented at the **Maize Genetics Conference**; 2018 March 22-25; Saint Malo, France
- **Schulz AJ**, Gepts P, Hufford MB. Inbreeding depression in wild maize populations (*Zea mays* ssp. *parviglumis*) subject to habitat degradation in southwest Mexico. Poster presented at the **RF Baker Plant Science Symposium**; 2018 March 2; Ames, Iowa

Lectures

- **Schulz AJ**, Burch M. Expanding Your Horizons Plant Domestication Game. Lecture given in **Cornell University course PLSCI 5940/3940**; 2019 February 19; Ithaca, NY

Teaching and Service

2023-2024	**Cornell Faculty Search Committee** Graduate Student representative in the SIPS Moonshot Faculty Search Committee
2022	**Cornell Plant Breeding Admissions Committee** Graduate Student representative in the Plant Breeding PhD Program admissions committee
2022 - 2023	**Maize Genetics Meeting Steering Committee** Graduate Student representative in planning the annual Maize Genetics Meeting
2021 - 2022	**Curriculum development** Worked with faculty member to revamp the introductory plant breeding course and develop new curriculum
2020 - Present	**Research mentor to undergraduate students** Developed weekly plans with undergraduate students for both field work and computational work in a variety of projects
Fall 2018	**ISU Genetics 320: Genetics, Agriculture, and Biotechnology - Teaching Assistant** Prepared and ran weekly review sessions on lecture material
2018-2019	**ISU Technology Advancement Committee - College of Agriculture and Life Sciences Undergraduate Representative** Reviewed proposals and distributed funds to departments for various projects

Student Organizations

Synapsis (Cornell Plant Breeding graduate student association)

Ithaca, NY

Member, Vice President (2019-2020), Symposium Committee Co-Leader (2020-2021), Invited Speaker Co-Leader (2021-2022), & Professional Development Committee Co-Leader (2022-2023)

2019 - Present

- Co-organized ran graduate student recruitment weekend
- Attended faculty meetings as graduate student representative
- Attended SIPS Graduate Student Council meetings as Plant Breeding student representative
- Member of 2020 Symposium organizing committee and assisted with transition to all-virtual platform
- Co-leader for 2021 Symposium
- Invited and organized visit for seminar speakers
- Organized professional development seminars

Cornell Diversity Preview Weekend

Ithaca, NY

Member, SIPS Co-Leader

2020

- Coordinate and organize diversity preview weekend to bring junior and senior undergraduate students to campus
- Facilitate discussions and mentoring of attendees on the graduate school application process in small groups through online meeting format
- Work with workshop leaders to ensure all 60 volunteers are prepared, workshop materials distributed ahead of time, and Zoom links were set up

Iowa State University Equestrian Club - Western Team

Ames, IA

Member, Secretary (2015-2016), Team Captain(2016-2017), & President (2017-2018)

2015 - 2018

- Led team restructuring efforts as the liaison between ISU, the Intercollegiate Horse Show Association, and team members
- Built the team from four members to over twenty in three years
- Arranged for a volunteer team coach and established a partnership with a local boarding stable for team practices
- Mentored new officers in their positions
- Acquired horses for the team and sought out team sponsorships
- Oversaw registration, travel, and competition at shows across the Midwest

Extension and Outreach

Plant Domestication and Adaptation: A Seed Dispersal Game

Curriculum Development and Workshops

- Developed a full curriculum that can be used by K-12 teachers on plant domestication and adaptation (see at maizegenetics.net/game)
- Taught workshops at 5 different events over 4 years to over 100 students and 30 middle and high school teachers

Musgrave Research Farm Field Day

Research Field Demonstration

- Presented on Genomes to Fields research using the phenotyping rover to local growers, undergraduate/graduate students, and industry representatives