

Jenna M. Hershberger

PLANT BREEDING AND GENETICS PH.D. CANDIDATE · USDA NIFA FELLOW

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Education

Cornell University

Ithaca, New York

PH.D. IN PLANT BREEDING AND GENETICS, GPA: 3.79/4.3

July 2016 - Present

- **Advisor:** Michael A. Gore, Ph.D.
- **Minors:** International Agriculture and Rural Development, Field Crop Physiology
- **Thesis:** Quality trait phenotyping and genomics in cassava and sweet corn

University of Wisconsin-Madison

Madison, Wisconsin

B.S. IN HORTICULTURE WITH DISTINCTION, GPA: 3.76/4.0

Sept. 2012 - May 2016

- **Minor:** African Studies
- **Minnesota Studies in International Development**, Nairobi, Kenya — *Semester Abroad Fall 2014*

Expertise

Statistical Genetics	Genome- and transcriptome-wide association studies, genomic and phenomic prediction
Phenotyping	Near-infrared spectroscopy, phenotyping smartphone app development
Laboratory	DNA & RNA extraction, gel electrophoresis, tissue culture
Programming	R, R package development, Python, reproducible analyses, pipeline development, LaTeX
Languages	English, Spanish (intermediate), Swahili (basic)

Research & Extension

Cornell University Field of Plant Breeding and Genetics (Gore Lab)

Ithaca, NY

GRADUATE RESEARCH ASSISTANT

July 2016 - Present

- Constructing prediction models for cassava quality traits using handheld NIR spectroscopy
- Developing and integrating spectral analysis tools into BreedBase databases
- Teaching international workshops on the use of smartphone plant phenotyping applications
- Conducting an RNA-seq experiment to study the genetic architecture of nutritional quality traits in fresh sweet corn kernels
- Evaluating genomic and transcriptomic predictive ability for nutritional quality in sweet corn

University of Wisconsin-Madison Department of Horticulture/USDA-ARS (Simon Lab)

Madison, WI

UNDERGRADUATE STUDENT RESEARCH ASSISTANT

Nov. 2012 - May 2016

- Planted, weeded, pollinated, and harvested carrot plants
- Assisted faculty, postdoctoral research associates and graduate students with carrot breeding projects
- Trained new student employees
- Extracted DNA, ran PCR and gel electrophoresis
- Performed High Performance Liquid Chromatography
- Initiated and maintained tissue culture, including media preparation

Community Rehabilitation and Environmental Protection Programme

Awasi, Kenya

FIELD INTERN

Oct. 2014 - Dec. 2014

- Tended demonstration farm (e.g. plant, compost, harvest, graft, form raised beds)
- Trained local primary school pupils and farmers on Ecological Organic Agriculture
- Wrote and presented reports on field work

Grants

2019 **\$121,000**, AFRI Education and Workforce Development Predoctoral Fellowship

USDA NIFA

Awards

- 2020 **Barbara McClintock Graduate Student Award**, Cornell University School of Integrative Plant Science
- 2020 **Borlaug Graduate Scholar**, National Association of Plant Breeders
- 2012-16 **University of Wisconsin-Madison Dean's List**, All semesters (Fall 2012 - Spring 2016)

Publications

Peer-reviewed journal articles

- **Hershberger J**, Morales N, Simoes CC, Ellerbrock B, Bauchet G, Mueller LA, Gore MA. (2021). Making WAVES in Breedbase: An Integrated Spectral Data Storage and Analysis Pipeline for Plant Breeding Programs. *The Plant Phenome Journal*. 4(1), e20012. <https://doi.org/10.1002/ppj2.20012>

Preprints

- Rife TW, Courtney C, **Hershberger J**, Shaver B, Gore MA, Neilsen M, Poland JA. (2021). Prospector: a high-throughput NIRS phenotyping application. *arXiv* 2104.07071. <https://arxiv.org/abs/2104.07071>

In prep

- **Hershberger JM**, Mbanjo EGN, Peteti P, Rabbi IY, Gore MA. *In prep*. Low-cost, handheld near-infrared spectroscopy for root dry matter prediction in cassava.
- **Hershberger JM**, Tanaka R, Wood J, Kaczmar N, Wu D, Hamilton JP, Buell CR, Gore MA. *In prep*. Transcriptome-wide association and prediction for carotenoids and tocopherols in fresh sweet corn kernels.
- **Hershberger JM**, Kaczmar N, Illut D, Baseggio M, Mueller LA, Gore MA. *In prep*. Sweet corn diversity panel morphological phenotypes from New York State 2014-2019

Software

- **Hershberger JM** and Gore MA. (2020). *waves*: Vis-NIR Spectral Analysis Wrapper. R package version 0.1.1. <https://cran.r-project.org/package=waves>

Presentations

Invited talks

- **Hershberger JM**, Morales N, Simoes CC, Ellerbrock B, Bauchet GJ, Mueller LA, Gore MA. Making WAVES in Breedbase: an integrated spectral data storage and analysis pipeline for plant breeding programs. Talk presented at the National Association of Plant Breeders Annual Meeting. 2020 August 19, Virtual
- **Hershberger JM**, Ellerbrock B, Mueller LA, Kawuki RS, Oliveira E, Rabbi IY, Gore MA. Development and validation of a low-cost, rapid NIRS-based phenotyping approach for approving cassava root quality traits. Talk presented at the International Plant and Animal Genome XXVIII Conference. 2020 January 11, San Diego, CA
- **Hershberger JM**. Development and integration of handheld NIRS-based phenotyping for cassava breeding. Talk presented at: Kansas State University 4th Biennial Plant Breeding and Genetics Symposium. 2019 April 4, Manhattan, KS

Conference posters

- **Hershberger JM**, Morales N, Simoes CC, Ellerbrock B, Bauchet GJ, Mueller LA, Gore MA. Making WAVES in Breedbase: an integrated spectral data storage and analysis pipeline for plant breeding programs. Poster presented at the National Association of Plant Breeders Annual Meeting. 2020 August 18, Virtual
- **Hershberger JM**, Baseggio M, Murray M, Magallanes-Lundback M, Kaczmar N, Wood J, Chamness J, Buckler ES, Smith ME, Buell CR, DellaPenna D, Tracy WF, Gore MA. Integrating transcriptomics for the improvement of genetic dissection and prediction of provitamin A and vitamin E in fresh sweet corn kernels. Poster presented at the 62nd Annual Maize Genetics Meeting. 2020 June 25-26, Virtual
- **Hershberger JM**, Ellerbrock B, Mueller LA, Kawuki RS, Oliveira E, Rabbi IY, Gore MA. Development and validation of a low-cost, rapid NIRS-based phenotyping approach for approving cassava root quality traits. Poster presented at the International Plant and Animal Genome XXVIII Conference. 2020 January 10-15, San Diego, CA
- **Hershberger JM**, Ikeogu UN, Esuma W, Kawuki RS, Rabbi IY, Gore MA. Prospector: An Android application for NIRS-based phenotyping of cassava quality traits. Poster presented at the National Association of Plant Breeders 2018 Annual Meeting. 2018 August 7-10, Guelph, ON

Lectures

- **Hershberger JM**. Breeding for root quality traits in cassava. Lecture given in Cornell University course PLBRG 4030. 2019 December 10, Ithaca, NY
- **Hershberger JM**. Phenotypic prediction with spectral data in R. Lecture and laboratory exercise given in Cornell University course PLBRG 4060; 2019 November 5; Ithaca, NY
- **Hershberger JM**. PhenoApps. Lecture given in Cornell University course PLSCI 4100. 2019 October 17, Ithaca, NY
- **Hershberger JM**. Near-infrared spectroscopy for trait prediction in plants: a cassava case study. Lecture given in Cornell University course PLBIO 4000/6000. 2019 March 28, Ithaca, NY

Workshops

2019	Participant , Cornell Vegetable Breeding Institute	<i>Ithaca, NY</i>
2019	Organizer and Participant , Operations Research in Plant Breeding Short Course	<i>Ithaca, NY</i>
2019	Organizer and Co-Instructor , NextGen Cassava PhenoApps Workshop	<i>Kampala, Uganda</i>
2018	Organizer and Co-Instructor , NextGen Cassava PhenoApps Workshop	<i>Dar es Salaam, Tanzania</i>
2017	Co-Organizer and Participant , Tucson Plant Breeding Institute at Cornell	<i>Ithaca, NY</i>
2017	Participant , Wageningen University Image Analysis for Plant Phenotyping	<i>Wageningen, Netherlands</i>
2017	Organizer and Co-Instructor , NextGen Cassava PhenoApps Workshop	<i>Ibadan, Nigeria</i>
2016	Participant , NSF Field-based High Throughput Phenotyping	<i>Maricopa, AZ</i>

Service and Membership

North American Plant Phenotyping Network

MEMBER

United States

2021 - Present

Crop Science Society of America

MEMBER

United States

2021 - Present

Maize Genetics Cooperation

MEMBER

- Attend annual meetings to network and present research

National Association of Plant Breeders

MEMBER

- Attend annual meetings to network and present research
- Attend professional development and research webinars

Synopsis, Cornell Plant Breeding Graduate Student Association

MEMBER, CO-PRESIDENT (2016-2017), & HISTORIAN (2017-2018)

- Co-organized graduate student recruitment weekend
- Reported on graduate student business at faculty meetings
- Planned and documented social activities and other events
- Organized overnight graduate student visit to Cornell's Long Island Research Center
- Conducted organization-wide meetings
- Arranged Synopsis departmental seminar and hosted invited speaker

Ithaca, NY

2016 - Present

Cornell Graduate Christian Fellowship

MEMBER & VICE PRESIDENT (2017-2018)

- Organized weekly Bible study and social activities
- Participated in group discussions on faith and academia
- Maintained organization website

Ithaca, NY

2016 - 2018

Blackhawk Church College Age Ministry

CORE LEADERSHIP TEAM MEMBER

- Planned organization-wide events
- Co-led small group discussions on faith and college life
- Led musical worship band including music selection, running practice sessions, and coordinating with other leaders
- Participated in two spring break service trips with Second Mile Ministries, a community development non-profit in Jacksonville, Florida

Madison, WI

2013 - 2016

Volunteer Experience

DOMESTIC

Esty Street Food Pantry Garden

VOLUNTEER

- Harvested vegetables twice per week
- Delivered produce to Loaves and Fishes, a local, free community meal program

Ithaca, New York

Fall 2017

Madison Area Food Pantry Gardens

BOARD MEMBER AND GARDEN LEADER (2015)

- Instructed and led 15+ volunteers on a biweekly basis
- Planned and organized garden layout
- Tended plants (e.g., watered, weeded, harvested)

Madison, Wisconsin

2012 - 2016

Slam Dump, charity basketball tournament to benefit AFE, a Honduran high school and college scholarship program

CO-ORGANIZER AND VOLUNTEER

- Organized annual basketball tournament with over 200 participants
- Supervised 30-50 volunteers including recruitment, scheduling, and training
- Managed logistical aspects of the event including sign-in, brackets, and score-keeping
- Requested donations from local businesses for tournament prizes

Madison, Wisconsin

2012 - 2016

INTERNATIONAL

Beacon of Hope

SHORT TERM VOLUNTEER

- Provided support to local doctors and pharmacists by sorting and dispensing medication
- Partnered with local organization to distribute school supplies

Ongata Rongai, Kenya

June 2008, 2013

Open Roads Orphan Ministry

VOLUNTEER CAMP COUNSELOR

- Partnered with Romanian non-profit to provide summer camp opportunities for local orphans
- Planned and led music and small group discussions for high school students
- Participated in strategic planning to assess organizational resources and community connections

Craiova, Romania

August 2010, 2011, 2012

Give Ye Them to Eat, an integrated development program of the Methodist Church

SHORT TERM VOLUNTEER

- Assisted with repair of local school classrooms and church building
- Taught elementary school students nutritional information through theater skits
- Learned about sustainable development, building practices, and agricultural techniques

Tlancualpican, Mexico

February 2010, 2012

Scholarships

2020	\$440 , Graduate School Travel Grant	Cornell University
2017	\$335 , Graduate School Travel Grant	Cornell University
2017	\$500 , Russell R. Billings Graduate Assistantship	Cornell University
2017	\$1250 , Hollingshead Travel Award	Cornell University
2017	\$1000 , Travel International Agriculture and Rural Development 602 International Programs Award	Cornell University
2015	\$1250 , CALS Wisconsin Agri-Business Association Scholarship	UW-Madison
2015	\$1500 , CALS Donald & Nancy Field Natural Resources Scholarship	UW-Madison
2014	\$1500 , CALS Donald & Nancy Field Natural Resources Scholarship	UW-Madison
2014	\$1000 , African Studies Departmental Scholarship	UW-Madison
2014	\$1000 , CALS Gavin & Mary Weis Research Scholarship	UW-Madison
2013	\$1076 , CALS Gavin & Mary Weis Research Scholarship	UW-Madison
2013	\$1000 , CALS Albert J. & Adelaide E. Riker Academic Merit Award	UW-Madison
2012	\$1500 , Ruth & Carl Miller Academic Merit Award	UW-Madison
2012	\$1000 , Scholarship for Middleton High School graduate with interest in the plant sciences	Monsanto