

# Seren Villwock

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<https://serenvillwock.github.io>

## EDUCATION

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### Cornell University

PhD in Plant Breeding & Genetics (GPA: 4.145 / 4.3)  
Minors: Plant Genetics and Plant Molecular Biology

Ithaca, NY  
2020 - 2025

### Lewis & Clark College

Bachelor of Arts in Biology with honors (GPA: 4.0 / 4.0)  
Semester abroad: School for International Training Peace & Conflict Studies

Portland, OR  
2015 - 2018  
Rwanda & Uganda, 2016

## RESEARCH & TEACHING EXPERIENCE

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### Cornell Institute of Biotechnology, Bioinformatics Facility

Postdoctoral Research Associate (Advisor: Dr. Qi Sun)

Ithaca, NY (remote)  
AUG 2025 - present

- Bioinformatician for the *Vitis x Muscadinia* hybrid grape breeding project
- Developed a machine learning algorithm for *in vivo* chromosome painting to identify introgressions and quantify local ancestry from *Vitis* clades
- Assembled and annotated a new *Muscadinia rotundifolia* reference genome, 'Supreme'
- Analyzing population structure and evolutionary history of Muscadine grape diversity panel using whole-genome resequencing
- Investigating genomic barriers to recombination and fertility in interspecific hybrids
- Conducting genetic mapping in hybrid families to identify loci affecting disease resistance and other key agronomic and consumer quality traits

### Cornell University

Graduate Research Fellow (Advisor: Dr. Jean-Luc Jannink)

Ithaca, NY  
2020 - 2025

- Integrated multi-omic data to investigate molecular interactions between carotenoid and starch metabolism in biofortified cassava roots
- Developed new framework for using multivariate genome-wide associations to test hypotheses about the shared genetic architecture of correlated traits
- Leveraged historical multi-environment trial datasets from cassava database
- Designed and employed a panel of KASP markers for fine mapping wild introgression
- Collaborated with USDA, university, and CGIAR breeders, geneticists, and technicians to carry out research objectives with NextGen Cassava Project
- Led 2 field seasons of data collection at the International Institute of Tropical Agriculture
- Mentored and supervised 4 undergraduate research summer interns

Graduate Teaching Assistant (*Introduction to Evolutionary Biology and Diversity*)

JAN - MAY 2023

- Taught five one-hour discussion sections weekly, graded assignments, and assisted students with course material in office hours

### Donald Danforth Plant Science Center

NSF REU Undergraduate Research Intern (Advisor: Dr. Malia Gehan)

St. Louis, MO  
MAY - AUG 2018

- Developed pipelines for high-throughput phenotyping of *Setaria viridis* abiotic stress responses
- Quantified growth curves using data extracted from images with Python-based tool "PlantCV"

### Lewis & Clark College

Undergraduate Researcher (Advisor: Dr. Paulette Bierzychudek)

Portland, OR  
JAN - DEC 2018

- Completed honors thesis entitled: "Evaluating the Potential for the Evolution of Polygenic Glyphosate Resistance in Portland Populations of the Landscape Weed *Cardamine hirsuta*"
- Discovered genetic variance in glyphosate sensitivity among *C. hirsuta* populations using dose-response curve modeling and assessed response to selection with glyphosate exposure

## Lab and Teaching Assistant

SEP 2015 - 2017

- Prepared lab materials and co-taught Investigations in Genetics & Evolutionary Biology Lab
- Managed *Drosophila* cultures and crosses for genetic study

## WORK & SERVICE EXPERIENCE

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### Conception Nurseries

#### Plant Tissue Culture Technologist

Portland, OR

OCT 2019 - JUN 2020

- Cultured and propagated plantlets using sterile technique in production environment
- Optimized micropropagation methods to increase production efficiency

### Synopsis (Cornell Plant Breeding & Genetics Graduate Student Association)

#### Co-President [elected]

Ithaca, NY

2023 - 2024

- Facilitated communication and cooperation among graduate student committees
- Organized new student recruitment and orientation events
- Represented graduate students in monthly faculty meetings
- Hosted professional development discussions with visiting seminar speakers

#### Diversity & Inclusion Council representative [elected]

2021 - 2024

- Served on graduate student recruitment and retention working group
- Organized inclusive mentorship workshops and graduate student peer support sessions
- Proposed and managed working group budget

#### Cornell-Corteva Symposium Committee Chair [elected]

2022 - 2023

- Organized and hosted symposium entitled “Plant Resilience: Breeding Crops for a Changing World” with invited speakers from 8 institutions
- Led a team of 6 students to plan symposium

#### Leadership Council member [elected]

2020 - 2021

- Managed internal and external communications, coordinated virtual recruitment events, organized three social networking events per semester

### Children of Peace Uganda

Portland, OR & Lira, Uganda

#### Farming for Peace Project Manager

OCT 2015 - SEP 2017

- Developed and implemented a two-month agricultural training course for youth affected by war in Uganda in collaboration with local nonprofit
- Co-wrote project proposal awarded \$10,000 grant to undergraduate student team

## GRANTS

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2023	USDA NIFA Predoctoral Fellowship (\$180,000)
2022	Schmittau-Novak School of Integrative Plant Science Grant (\$9,000)
2017	Davis Projects for Peace Grant (\$10,000)

## AWARDS & SCHOLARSHIPS

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2025	Crop Science Society of America Gerald O. Mott Meritorious Graduate Student Award
2024	1st place PhD Poster Contest Winner, NAPB
2024	NAPB Borlaug Scholarship
2024	Munger/Murphy Award for Outstanding Graduate Students in Cornell Plant Breeding
2023	Russell R. Billings Graduate Assistantship Award
2022	Honorable Mention, NSF Graduate Research Fellowship Program
2020	Cornell University Graduate Recruitment Fellowship
2018	Phi Beta Kappa of Oregon STEM Scholarship
2016 - 2018	Kent Swanson Jr. Memorial Biology Scholarship
2015 - 2018	Lewis & Clark Trustee Endowed Scholarship
2015 - 2018	Lewis & Clark Leadership & Service Award Scholarship

## PUBLICATIONS

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Villwock, S.; Wilkerson, D.; Zou, C.; Cadle-Davidson, L.; Sun, Qi. *Local Ancestry Inference and Chromosome Painting Reveal the Genomic Composition of Interspecific Vitis Hybrids.* In prep (2025).

Villwock, S.; Rabbi, I.; Ikpan, A.; Kayode, O.; Kehinde, N.; Kayondo, S.; Wolfe, M.; Jannink, JL. *Introgression from the wild relative Manihot glaziovii on cassava (*M. esculenta*) chromosome 1 associated with segregation distortion and low plant vigor.* In review (2025); preprint available upon request.

Villwock, S.; Gomez, K.; Fish, T.; Thannhauser, T.; Gore, M.; Jannink, JL. *Gene-metabolite network analysis of carotenoid accumulation and interactions with carbohydrates across genetic, spatial, and developmental variation in cassava (*Manihot esculenta*) storage roots.* In review (2025); preprint available upon request.

Villwock, S.; Parkes, E.; Mbanjo, G.; Rabbi, I.; Jannink, JL. *Bivariate genome-wide association study reveals polygenic contributions to negative covariance between total carotenoid and dry matter contents in yellow-fleshed cassava.* (2025) *Genetics* 231(2): iyaf162. <https://doi.org/10.1093/genetics/iyaf162>.

Villwock, S.; Li, L.; Jannink, JL. *Carotenoid-carbohydrate crosstalk: Evidence for genetic and physiological interactions in storage tissues across crop species.* (2024) *New Phytologist* 244: 1709-1722. <https://doi.org/10.1111/nph.20196>

Brzozowski, L.; Hanson, S.; Jannink, J.; Meints, B.; Moore, V.; Tufan, H.; Villwock, S. *Towards Equitable Public Sector Plant Breeding In The US.* (2022) *Crop Science* 62: 2076-2090. <https://doi.org/10.1002/csc2.20800>.\*

\*Outstanding Paper in Crop Breeding and Genetics Award 2023

Chan, A.; Villwock, S.; Williams, A.; Jannink, JL. *Sexual dimorphism and the effect of wild introgressions on recombination in cassava (*Manihot esculenta* Crantz) breeding germplasm.* (2022) *G3* 12(1). <https://doi.org/10.1093/g3journal/jkab372>.

## PRESENTATIONS

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Villwock, S.; Mbanjo, G.; Parkes, E.; Rabbi, I.; Jannink, JL. *Genetic and metabolic insights into the carotenoid/starch trade-off in cassava to guide biofortification breeding.* Invited oral presentation, NAPB Annual Meeting, May 22 2025, Kona, HI.

Villwock, S.; Li, L.; Jannink, JL. *Carotenoid-Carbohydrate Crosstalk: Evidence for genetic and physiological interactions in storage tissues across crop species.* Invited oral presentation, Carotenoids Gordon Research Conference, Jan. 4 2025, Ventura Beach, CA.

Villwock, S.; Mbanjo, G.; Parkes, E.; Rabbi, I.; Jannink, JL. *Bivariate GWAS reveals genome-wide contributions to negative covariance between carotenoids and dry matter in cassava roots.* Invited oral presentation, ASA-CSA-SSSA Annual Meeting, Nov. 12 2024, San Antonio, TX.

Villwock, S.; Mbanjo, G.; Parkes, E.; Rabbi, I.; Jannink, JL. *Bivariate GWAS reveals genome-wide contributions to negative covariance between carotenoids and dry matter in cassava roots.* Poster presentation, NAPB Annual Meeting, July 22 2024, St. Louis, MO.

Villwock, S.; Li, L.; Jannink, JL. *Carotenoid-Carbohydrate Crosstalk: Evidence for genetic and physiological interactions in storage tissues across crop species.* Invited oral presentation, ASPB Northeastern Section Meeting, April 20 2024, Ithaca, NY.

Villwock, S.; Thannhauser, T.; Fish, T.; Li, L.; Rabbi, I.; Gore, M.; Jannink, JL. *Examining carotenoid regulation and interactions with carbohydrate metabolism in cassava roots.* Poster presentation, NAPB Annual Meeting, July 17 2023, Greenville, SC.

Villwock, S.; Tegtmeier, R.; Kunze, K.; Lukach, M. *Everything home gardeners want to ask about plant breeding.* Oral presentation [online], Cornell Cooperative Extension Master Gardeners Program, March 3 2023.

Brzozowski, L.; Villwock, S. *Plant Breeding for Equitable Futures Symposium.* Symposium organization and introductory oral presentation, ASA-CSA-SSSA Annual Meeting, Nov. 8 2022, Baltimore, MD.

Villwock, S.; Rabbi, I.; Ikpan, A.; Kayode, O.; Kehinde, N.; Kayondo, S.; Wolfe, M.; Jannink, JL. *Examining linkage drag in the *Manihot glaziovii* introgression on cassava chromosome 1.* Poster presentation, NextGen Cassava Annual Meeting, Sept. 15 2022, Abuja, Nigeria.

Villwock, S.; Jannink, JL. *Understanding the negative correlation between carotenoids and dry matter content in cassava.* Oral presentation, International Institute of Tropical Agriculture, Aug. 9 2021, Ibadan, Nigeria.

## PROFESSIONAL AFFILIATIONS

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Crop Science Society of America, National Association of Plant Breeders, American Society of Plant Biologists, Phi Beta Kappa Honor Society