# Seren Villwock

Ithaca, New York, USA
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## EDUCATION

**Cornell University, PhD candidate** (GPA: 4.145 / 4.3) — Ithaca, NY
Plant Breeding and Genetics Section, School of Integrative Plant Sciences — 2020 - exp. May 2025
Minors: Plant Genetics and Plant Molecular Biology

**Lewis & Clark College** — Portland, OR
Bachelor of Arts in Biology with honors (GPA: 4.0 / 4.0) — 2015 - 2018
Study abroad: **School for International Training** Peace & Conflict Studies — Rwanda & Uganda 2016

## RESEARCH EXPERIENCE

**Graduate research fellow** — Ithaca, NY
Cornell University, School of Integrative Plant Sciences — AUG 2020 - present
Field of Plant Breeding and Genetics (Advisor: Dr. Jean-Luc Jannink)

- Integrating genomic, transcriptomic, and metabolite data to investigate interactions between carotenoid and starch metabolism in biofortified cassava
- Employed multivariate mixed linear models to conduct a genome-wide association study for negatively correlated quality traits
- Fine-mapped a wild introgression segment to distinguish effects on yield, quality, and genetic load
- Designed and employed a panel of KASP markers to screen for wild introgressions
- Led 2 years of field trial data collection at the International Institute of Tropical Agriculture, Nigeria in collaboration with the NextGen Cassava Breeding Project
- Mentored and supervised 4 undergraduate research summer interns

**Undergraduate researcher** — Portland, OR
Lewis & Clark College (Advisor: Dr. Paulette Bierzychudek) — 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
- Mentored 2 research assistants through first-generation student research experience program

**NSF Research Experience for Undergraduates internship** — St. Louis, MO
Donald Danforth Plant Science Center (Advisor: Dr. Malia Gehan) — MAY - AUG 2018

- High-throughput phenotyping of *Setaria viridis* diversity panel under heat and drought stress
- Quantified growth curves and stress responses using Python-based image analysis tool "PlantCV"

## TEACHING EXPERIENCE

**Graduate Teaching Assistant** — Ithaca, NY
Introduction to Evolutionary Biology and Diversity course, Cornell University — JAN - MAY 2023

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

**Lab and Teaching Assistant** — Portland, OR
Biology Department, Lewis & Clark College — SEPT 2015 - DEC 2017

- Assisted with lab preparation and teaching of Investigations in Genetics & Evolutionary Biology Lab
- Provided weekly one-on-one tutoring for students in Cell Biology and Ecology courses

## WORK & SERVICE EXPERIENCE

**Synapsis Leadership** Ithaca, NY
Cornell Plant Breeding & Genetics Graduate Student Association SEPT 2020 - present

- Co-President (‘23-24), Chair of Cornell Corteva Symposium 2023 (‘22-23); Leadership Council (‘20-21); Social Committee (‘20-’22); Diversity & Inclusion Council representative (‘21-23)

**Plant Tissue Culture Technician** Portland, OR
Conception Nurseries OCT 2019 - JUNE 2020

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

**Farming for Peace Program Logistics Manager** Lira, Uganda
Children of Peace Uganda OCT 2015 - SEPT 2017

- Developed and implemented a two-month agricultural training course for youth affected by war in Uganda in collaboration with a nonprofit; funded by $10,000 grant from Davis Projects for Peace

## GRANTS AND SCHOLARSHIPS

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|---|---|
| 2024 | NAPB Borlaug Scholar |
| 2023 | USDA NIFA Predoctoral Fellowship ($180,000) |
| 2023 | Russell R. Billings Graduate Assistantship Award |
| 2022 | Schmittau-Novak School of Integrative Plant Science Grant ($9,000) |
| 2022 | Honorable Mention, NSF Graduate Research Fellowship Program |
| 2020 | Cornell University Graduate Recruitment Fellowship |
| 2018 | Phi Beta Kappa induction & Oregon STEM Scholarship |
| 2017 | Davis Projects for Peace Grant ($10,000) |
| 2016 - 2018 | Kent Swanson Jr. Memorial Biology Scholarship |
| 2015 - 2018 | Lewis & Clark Trustee Endowed Scholarship |
| 2015 - 2018 | Lewis & Clark Leadership & Service Award Scholarship |

## PUBLICATIONS

**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.* In prep **(2024).**

**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 prep **(2024).**

**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

*Bivariate GWAS reveals genome-wide contributions to negative covariance between carotenoids and dry matter in cassava roots.* Rapid talk, Crop Breeding and Genetics Oral Session, ASA-CSA-SSSA Annual Meeting, Nov 12 2024, San Antonio, TX.

*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.*

**** 1st place PhD poster award, NAPB 2024***

*Carotenoid-Carbohydrate Crosstalk: Evidence for genetic and physiological interactions in storage tissues across crop species.* Oral presentation, ASPB Northeastern Section Meeting, April 20 2024, Ithaca, NY.

*Multivariate genome-wide association study for carotenoids and dry matter, correlated traits in cassava.* Plant Breeding & Genetics Seminar presentation, March 5 2024, Cornell University, Ithaca, NY.

*Examining carotenoid regulation and interactions with carbohydrate metabolism in cassava roots.* Poster presentation. NAPB Annual Meeting, July 17 2023, Greenville, SC.

*Examining the regulation of carotenoid content and its interactions with carbohydrate metabolism in cassava.* Plant Breeding & Genetics Seminar presentation, May 2 2023, Cornell University, Ithaca, NY.

*Everything home gardeners want to ask about plant breeding.* Cornell Cooperative Extension Master Gardeners presentation, March 3 2023, Cornell University, Ithaca, NY.

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

*Examining linkage drag in the* Manihot glaziovii *introgression on cassava chromosome 1.* Poster presentation. NextGen Cassava Annual Conference, Sept. 15 2022, Abuja, Nigeria.

*Examining effects of the* Manihot glaziovii *introgression on cassava chromosome 1.* Plant Breeding & Genetics Seminar presentation, March 15 2022, Cornell University, Ithaca, NY.

*Understanding the negative correlation between carotenoids and dry matter content in cassava.* International Institute of Tropical Agriculture research presentation. Aug. 9 2021, Ibadan, Nigeria.

## PROFESSIONAL AFFILIATIONS

Crop Science Society of America, National Association of Plant Breeders, National Center for Faculty Development and Diversity

## RELEVANT SKILLS

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|---|---|
| **Quantitative Genetics** | Genome-wide associations, mixed linear modeling, genetic mapping |
| **Bioinformatics** | Multiple sequence alignment, genomic data analysis, RNAseq analysis |
| **Programming** | R, Python, Unix, LaTeX, Git |