Ellie Taagen

Quantitative Geneticist · Recombination Scientist · USA & EU citizen

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Summary

As a quantitative geneticist, I love to discover the relationships between recombination variation and desirable phenotypes and am driven by their potential to enhance breeding pipeline efficiency and genetic gain. Detail oriented planning and interdisciplinary communication are core pillars of my creative and critical thinking approach to problem solving. I am pursuing a Ph.D. in Plant Genetics at Cornell University with an expected graduation spring 2022, and am drawn to career paths in industry at the intersection of genetics, data science, and molecular biology.

Expertise

Quantitative Genetics	whole genome associations, causal variant identification, multi-omics analysis, recombination mechanisms
Programming	R, Python, Linux command line, LaTeX, Git, bionformatics tools
Data Science	simulations, reproducible analyses, skillful data visualization, large dataset management (17 Gb)
Statistics	experimental design, generalized linear and mixed model, supervised statistical learning
Soft Skills	multi-disciplinary communication, project management, team leader, creative problem solver

Education

Cornell University — *Ithaca, NY, USA*

Ph.D. in Plant Genetics — *2017 - expected 2022*

- Minors: Plant Molecular Biology and International Agriculture and Rural Development

University of Washington — *Seattle, WA, USA*

B.S. in Molecular, Cellular, Developmental Biology — *2012 - 2016*

- Minor: Nutritional Sciences

Relevant Experience

Characterizing recombination rate distribution and heritability — *Bayer Crop Science*

Data Science Intern | Genomics Discovery and Application team — *2021 - Present*

- Measuring recombination rate variation and discovering genetic determinants that may affect recombination in maize cohorts, in order to provide recommendations of which controlled recombination technologies to apply.
- Six-month, full-time position exposure to multi-disciplinary team-based projects and industry-paced research setting.

Simulating controlled recombination in allopolyploid genomes — *Cornell University*

Ph.D. | advisor Dr. Jean-Luc Jannink — *2020 - Present*

- Leveraging simulation and bioinformatics tools to better understand controlled recombination's (Taagen et al. 2020) potential to reveal currently inaccessible genetic diversity and innovate increased control over the inheritance of preferred haplotypes.
- Exploring the biological constraints of meiotic recombination, gamete segregation, genome editing, and prediction-based decisions in a plant breeding simulation context.
- Designing novel methods that compare efficiency of cost of traditional breeding to controlled recombination.

Identifying genomic structural variant barriers to gene positional cloning — *Cornell University*

Ph.D. | advisor Dr. Mark Sorrells — *2017 - 2021*

- Applied traditional population development strategies, along with cutting-edge tools in genomics and transcriptomics to better understand the landscape of causal variation based breeding decisions. Talk video link, peer feedback: **4.8/5**
- Determined that chromosome structural variants can overpower traditional fine-mapping approaches to gene discovery, especially in polyploids, and proposed recommendations for new experimental design standards.
- Results published in (Taagen et al. 2021) and all analysis conducted is reproducible and publicly available as a learning resource at: github.com/etaagen.

Breeding value chain engagement — *Washington State University*

Post-baccalaureate RA | advisor Dr. Stephen Jones — *2016 - 2017*

- Surveyed and engaged supply chain stakeholders and end-users when setting objectives for small grains breeding program.
- Delivered lab and field support for graduate student breeding projects sourced from a broad base of genetic diversity.

Mentorship & Management

Corteva Agriscience and Cornell School of Integrative Plant Science (SIPS) networking — *Virtual*

Coordinator — *2020 - Present*

- Built network and relationship pipeline with Corteva Global Academic Relations Manager and Cornell SIPS industry partnerships liaison.
- Developed system for matching 50 graduate students with Corteva scientists based on shared career interests.

Diversity and Inclusion Committee, SIPS Cornell — *Cornell University*

Graduate Student Representative — *2020 - 2021*

- Facilitate monthly meetings, titled OpenUpSTEM, which provide a space for graduate students to learn about, discuss, and take action towards building a sustainable culture of anti-racism in our community.

Synapsis, Plant Breeding and Genetics GSA — *Cornell University*

President — *2019-2020*

- Executed 2020 graduate student recruitment visitation for 15 students.
- Oversaw communication between current plant breeding and genetics students and faculty.

Plant Breeding and Genetics faculty search committee — *Cornell University*

Graduate Student Representative — *2019-2020*

- Screened and evaluated 54 applicant packages, and conducted full day interviews with top 3 candidates (research /teaching /chalk-talk).
- Facilitated graduate student meetings with top candidates and documented graduate student preferences for clear communication to faculty.

Graduate student mentor — *Cornell University*

Undergraduate research assistants — *2018-2020*

- Hired, trained, and mentored three talented undergraduate research assistants and supervised one honors thesis
- Coached one graduate school application and interview process, accepted to five plant sciences PhD programs.

Bonsai Professional Coaching Service — *Virtual*

Mentee — *2018-2020*

- Partnered with leadership coach Loriana Sekarski to identify and apply personalized Clifton Strengths by Gallup. Top five strengths: *Learner, Achiever, Focus, Communication, Individualization*.
- Trained in STEM industry professionalism and charted conflict management strategies.

Awards & Scholarships

2021	**WIT Early Career Award**, Borlaug Global Rust Initiative	*Virtual*
2020	**Borlaug Scholar**, National Association of Plant Breeders	*Virtual*
2020	**3rd Place**, C7 Plant and Animal Genome conference poster competition	*San Diego, CA*
2019	**Awardee**, Cornell IARD winter interim travel grant	*Kerala, India*
2018	**Awardee**, ASA, CSSA and SSSA Congressional Visit Day travel grant	*Washington DC*
2018	**Future Leader in Science**, ASA, CSSA and SSSA	*Washington DC*

Relevant Workshops

Enrolled	**Statistical Learning**, ten-week course	*edX Stanford*
2020	**Collaborative and Reproducible Data Science in R**, NTRES 6940	*Cornell University*
2019	**Linux for Biologists**, Institute of Biotechnology	*Cornell University*
2018	***Breeding for Quantitative Traits in Plants***, book club facilitator	*Cornell University*
2017	**Tucson Plant Breeding Institute**, quantitative genetics bootcamp	*Cornell University*

Publications

Taagen, E., J., Gul, A., & Sorrells, M. E. *Positional based cloning "fail-safe" approach is overpowered by wheat (Triticum aestivum) chromosome structural variation.* **(2021)** The Plant Genome

Taagen, E., Bogdanove, A. J. & Sorrells, M. E. *Counting on Crossovers: Controlled Recombination for Plant Breeding.* **(2020)** Trends in Plant Science

Taagen, E., Bogdanove, A. J. & Sorrells, M. E. *Achieving Controlled Recombination with Targeted Cleavage and Epigenetic Modifiers.* **(2020)** Trends in Plant Science

Sweeney, D. W., Sun, J., **Taagen, E.** & Sorrells, M. E. *Genomic Selection in Wheat.* (Woodhead Publishing. **(2019)** in Applications of Genetic and Genomic Research in Cereals, 273-302