Ellie Taagen

Quantitative Geneticist • Recombination Scientist • USA & EU citizen

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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

Research 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.

Characterizing circadian rhythm mechanisms of growth-phase transitions in Arabidopsis — *University of Washington*

Undergraduate RA | advisor Dr. Takato Imaizumi — *2015 - 2016*

- Assessed mechanistic sequence of genes involved in vegetative to reproductive growth transition and characterized circadian rhythm gene.
- Showcased at undergraduate research symposium.

Investigating tuberculosis drug discovery — *Seattle, WA*

Undergraduate lab assistant | Dr. David Sherman — *2013 - 2014*

- Supported communication between researchers and maintained solution stocks for the lab at the Center for Global Infectious Disease Research.
- Developed a standardized protocol for unique growth media based on experimental design.

Expertise

Quantitative Genetics	genome to phenome modeling, structural variant identification, reference genome database mining and navigation, fine-mapping, QTL mapping, GWAS, RNA-seq analysis, allopolyploid, research-based summary statistics
Programming	R, Python, Linux command line, LaTeX, skillful data visualization
Data Science	reproducible analyses, Git, multi-omics data, management of whole transcriptome sequencing (17 Gb genome)
Statistics	experimental design, analysis of variance, generalized linear and mixed model, principle component analysis, multi-dimensional data analysis, model comparisons, supervised statistical learning
Plant breeding	mapping population development (>7,000 lines), tissue culture/ growth chamber/ greenhouse/ field, cereal crossing techniques, marker assisted and phenotypic selection, value chain extension
Molecular Biology	DNA/RNA extraction, primer design/optimization, PCR, gel electrophoresis, agrobacterium transformation
Soft Skills	interdisciplinary communication, project management, team leader, creative problem solver, hire/ on-board/ mentor, relationship building, listserv/ social media management

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

Song, Y.H. *et al. Molecular basis of flowering under natural long-day conditions in Arabidopsis.* **(2018)** Nature Plants

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*

Presentations

Topic: Identifying genomic structural variant barriers to gene positional cloning

2020	**Plant and Animal Genome Conference**, poster pdf	*San Diego, CA*
2019	**ASA/CSSA/SSSA annual meeting**, talk video link	*San Antonio, TX*
2019	**Cornell Plant Breeding and Genetics seminar**, talk video link, peer feedback: **4.8/5**	*Ithaca, NY*
2019	**Grass Group**, Cornell University seminar series	*Ithaca, NY*
2018	**Cornell Plant Breeding and Genetics seminar**, talk video link, peer feedback: **4.6/5**	*Ithaca, NY*
2018	**ASA/CSSA annual meeting**, poster abstract	*Baltimore, MD*
2018	**Plant and Animal Genome Conference**, annual grant meeting talk	*San Diego, CA*

Outreach

-	**Twitter @etaagen**, audience: geneticists, breeders, graduate students	-
2018	**Grow NYC Variety Showcase**, audience: chefs, bakers, consumers	*NYC, NY*
2018	**ASA/CSSA/SSSA congressional visit days**, audience: congressperson and staff	*Washington DC*
2018	**Cornell Botanical Garden Judy's day**, audience: children and families	*Ithaca, NY*
2018	**Cornell small grains field days**, audience: farmers, seed companies, extension agents	*Ithaca, NY*

Teaching Experience

Laboratory in Genetics and Genomics graduate TA — *Cornell University*

Course BioMG 2801 — *2021*

- Taught lecture and hands-on-learning for gene cloning, gene mapping, and CRISPR-Cas9 research applications

Methods of Plant Breeding curriculum design & guest lecture — *Cornell University*

Course PLBRG 4060 — *2019*

- Created and taught lecture and hands-on-learning for fine-mapping/cloning with Dr. Shantel A. Martinez
- View lecture & exercise

Graduate student mentor — *Cornell University*

Cornell Small Grains lab — *2018-2020*

- Hired, trained, and mentored three undergraduate research assistants

Mentorship & Management

Corteva 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.
- Served on the SIPS graduate student council.
- Co-authored survey and visualized results to assess SIPS graduate student satisfaction and concerns with unification of the five sections, career path exploration, mental health resources and inclusion initiatives.

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

Committee member, 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.

ASA, CSSA and SSSA annual leadership conference — *San Antonio, TX*

Accepted applicant — *2019*

- Trained in STEM industry professionalism and charted conflict management strategies.
- Learned personal DiSC assessment and tools for engaging successfully with all DiSC personalities.

Jannink/Sorrells lab meetings — *Cornell University*

Coordinator — *2018-Present*

- Streamlined meeting schedule and presentation rotations with access to centralized Google drive for 18 people across 2 lab groups.
- Unified communication across listserv, Slack, and Zoom.

Graduate student mentor — *Cornell University*

Undergraduate plant science senior honors thesis — *2018-2019*

- Trained talented young scientist and supervised honors thesis, titled *Fine-mapping wheat grain weight and length QTL on chromosome 2D.*
- Coached 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*.

Graduate Women in Science — *Cornell University*

Executive of online communications — *2017-2019*

- Operated digital outreach and authored biweekly newsletter for >400 listserv members.
- Devised and improved advocacy, educational, and social events based on polled membership interests.

Pioneer Symposium — *Cornell University*

Organizing committee — *2017-2018*

- Coordinated symposium theme and speaker nominations, and established location to seat >200 attendees with technical support.
- Revitalized networking and panel event to highlight and discuss groundbreaking plant breeding innovations

Relevant Workshops

Enrolled	**Statistical Learning**, ten-week course	*edX Stanford Online*
2020	**Bayer Professional Development**, NAPB	*Virtual*
2020	**Collaborative and Reproducible Data Science in R**, Cornell NTRES 6940	*Ithaca, NY*
2019	**Linux for Biologists**, Cornell University Institute of Biotechnology	*Ithaca, NY*
2019	**Cornell IARD**, tours of farms and research stations in Kerala and Telangana, 3 weeks	*India*
2018	**Finding Your Research Voice**, science communications and presentations	*Ithaca, NY*
2018	**Story Collider**, writing true, personal stories about science	*Ithaca, NY*
2018	***Breeding for Quantitative Traits in Plants***, book club facilitator	*Ithaca NY*
2017	**Tucson Plant Breeding Institute**, quantitative genetics bootcamp	*Ithaca, NY*

Affiliations & Memberships

- **National Association of Plant Breeders**, student member, 2020-Present
- **Theoretical and Applied Genetics**, peer reviewer, 2019
- **Crop Science Society of America**, student member, 2017-Present