

Plant Breeding and Genetics Strategic Plan

This document expresses the long term vision of Plant Breeding and Genetics at Cornell. Rather than summarizing the contemporary efforts of our group, it strives to be far forward looking and succinctly capture areas of enduring contribution with impact and the contributions that will serve these themes in future generations.

Long Term *In Situ* Breeding of Keystone Crop Cultivars for Regional and National Food Security

- NYS crops that nourish in season, provide surplus for export
- Crops that store well to provide caloric and nutritional stability
- Crops that provide energy, ecosystem services, new livelihood opportunities, cropping system diversity, beauty, and social fabric

Public Resource, Information and Extension Commitment

- Steward open access to plant breeding knowledge resources to complement private industry and build greater access in the public domain
 - Digital public library of plant breeding
 - Information to support seed production
 - Develop and distribute stocks of elite, adapted genetics
 - Conduct public variety trials of cultivars
- Serve as a national hub for participatory plant breeding
- Continue to support and expand programs to disseminate plant breeding work for an applied agricultural setting

Collaboration and Innovation Hub on Campus and Globally

- Expand and sustain partnerships with key international education and research institutions
- Partner with USDA-ARS Breeding Insight to accelerate agricultural breeding nationally
- Expand collaborative partnerships with EPSCoR
- Support work in crops that are priorities to not only large farming operations, but also
 - historically marginalized NYS farmers
 - urban farming initiatives
 - bridge international collaborations
- Convene intercollege dialogue and collaboration
 - Dyson School - socio-technical bundles, formal and informal seed systems, supply chain development, collaboration with partners (private and public) across the whole value chain
 - Human Ecology - human centered design
 - American Indian and Indigenous Studies Program – provenance of crop varieties
 - Engineering – sensing, biological mechanism inquiry, mechanization
- Engage across locations, Ithaca, AgriTech, LIHREC and beyond

Graduate and Undergraduate Cornell Student Training

- Augment breadth of experience, diversity of trainees, and opportunities for specialized excellence
- Experiential and engaged learning
 - Develop active internship and placement programs
 - industry, government, international centers, and universities
 - Federally funded training grants
 - Community internships for equity and justice focused research
 - MPS program in Plant Breeding
 - On-farm research and trials in conventional and organic systems
- Develop spoken and written skills in science communication and inter-group dialogue
- Build exchange visits for US-based Cornell graduate students for medium term research visits with partner institutions

Leadership in Technology, Methods and Approaches

- Tools to interrogate crop value and performance
- Tools to accelerate breeding progress
- Tools to measure sustainability gains
- Participatory plant breeding research methods
- Equity focused engagement approaches
- Operations research to optimize breeding pipelines
- Computation systems to store, analyze and visualize large, complex datasets
- Controlled environment agriculture

Stakeholder Engagement

- Two-way dialog with farmers, agricultural service providers, industry liaisons, government officials, policy makers, and consumers to calibrate and articulate our value
- Measure and report impact
- Map grants, projects, and individual endeavors that leverage PBG
- Prioritize research and student projects that emerge from stakeholder engagement with historically marginalized NYS farmers
- Support research on stakeholder impact and engagement
- Engage American Indian and Indigenous Studies Program to facilitate co-design of research and recruitment opportunities that reflect priorities of NYS tribal nations

Funding to Sustain Long-Term Multi-Generational Endeavor

- Garner investment from industry to training pipeline
- Expand Community and Industry Professional training programs
- Reinvestment in cultivar development
- Partner with NYS economic and community development initiatives
- Prominent disruptive visions to secure endowment donations