

PLANT BREEDING (PHD)

Graduate School

Program Website (<https://cals.cornell.edu/school-integrative-plant-science/degrees-programs/msphd-graduate-fields/msphd-field-plant-breeding/>)

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Graduate Field

Plant Breeding (<https://catalog.cornell.edu/graduate-school/plant-breeding/>)

Program Description

The field of plant breeding encourages applications from students interested in crop improvement in the context of global agriculture. Faculty research areas include not only applied breeding of major crops such as cereals, forages, potato, and diverse fruits and vegetables but also molecular genetics and genomics of crop plants.

The applied breeding program deals with development of plant materials for greater yield, disease resistance, adaptability, quality, etc. and with studies of breeding methods and principles. Molecular and biochemical studies to identify and isolate agriculturally important genes seek to relate information from model species to crop plant genomes, to compare crop genomes, to assess genetic diversity, and to develop bioinformatic tools relevant to crop improvement. Conservation and evolutionary genetics of crop plants and their wild relatives is an additional topic of research. Many faculty members include both applied breeding and molecular study in their programs.

Faculty are located in the Department of Plant Breeding and Genetics, Boyce Thompson Institute, USDA Robert W. Holley Center (all in Ithaca) and in the Department of Horticultural Sciences (Geneva). Extensive greenhouse and field facilities are available. The molecular programs benefit from well equipped laboratories, the many plant-oriented programs in the College of Agriculture and Life Sciences, and collaborative activities with other areas of life sciences at Cornell.

Course work available ranges from plant breeding methods to molecular breeding to intellectual property issues. Special opportunities are available for students interested in international experience. Graduate students receive a broad education preparing them for careers in many areas of plant biology and agriculture.

Prospective applicants may wish to correspond with faculty members in their area of interest. The field list of faculty gives general topics of research and/or crops studied for each field member. Additional information, including more detailed descriptions of faculty research and courses, is available on the Plant Breeding website (<https://cals.cornell.edu/school-integrative-plant-science/school-sections/sips-plant-breeding-genetics-section/>) or from the graduate field office.

Concentrations

- Plant breeding
- Plant genetics

Program Information

- Instruction Mode: In Person
- Location: Ithaca, NY
- Minimum Credits for Degree: 72

Program Requirements

- Minimum Semesters for Degree: 6

Graduate School Milestones

- Responsible Conduct of Research Training: Required
- Open Researcher and Contributor ID (ORCID): Required
- Student Progress Reviews (SPR) begin: Second Year
- Examination for admission to candidacy (A Exam): Spring of third year
- Defense of Dissertation (B Exam): Spring of seventh year

Field Specific Milestones

- One semester of teaching assistantship required

Course Requirements

- Course requirements are determined by the student's Special Committee.
- Enrollment in a GRAD research course or the equivalent field specific research course is expected of all students.

University Graduation Requirements Requirements for All Students

In order to receive a Cornell degree, a student must satisfy academic and non-academic requirements.

Academic Requirements

A student's college determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. It is the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing their chosen program of study. See the individual requirements listed by each college or school or contact the college registrar's office (<https://registrar.cornell.edu/service-resources/college-registrar-directory/>) for more information.

Non-academic Requirements

Conduct Matters. Students must satisfy any outstanding sanctions, penalties or remedies imposed or agreed to under the Student Code of Conduct (Code) or Policy 6.4. Where a formal complaint under the Code or Policy 6.4 is pending, the University will withhold awarding a degree otherwise earned until the adjudication process set forth in those procedures is complete, including the satisfaction of any sanctions, penalties or remedies imposed.

Financial Obligations. Outstanding financial obligations will not impact the awarding of a degree otherwise earned or a student's ability to access their official transcript. However, the University may withhold issuing a diploma until any outstanding financial obligations owing to the University are satisfied.

Learning Outcomes

The learning outcomes for the field of plant breeding are broad as they are intended to encompass the shared core competencies that all students must have to succeed in their graduate work and future careers.

When students complete the Ph.D., they should be able to:

- Possess a comprehensive knowledge of plant genetics relevant to breeding including an understanding of areas where knowledge is deficient.
- Have in depth expertise in a study system, be that a specific crop or a technical domain such as gene editing or bioinformatics.
- Understand how to develop an experimental program to test scientific hypotheses in plant breeding/genetics and their chosen minor fields.
- Be comfortable with the entire process of writing and publishing scientific research in plant breeding/genetics and their chosen minor fields.
- Have experienced persuasive grant writing for the purpose of bringing resources to fulfill plant breeding/genetic objectives.
- Communicate effectively with professional and lay audiences about their research and current issues in the discipline.
- Have developed the beginnings of a professional network beyond Cornell.