

PLANT BIOLOGY (GRADUATE FIELD)

Program Website (<https://cals.cornell.edu/school-integrative-plant-science/school-sections/sips-plant-biology-section/>)

Field Description

Programs in the Field of Plant Biology range from the molecular/genetic investigation of fundamental plant processes and mathematical modeling of plant development to study of plant diversity and evolution. In addition to studying a major subject in the Field of Plant Biology, students also take course work in two other minor subjects of their choice, either in or outside the field. The field has no language requirement.

Students who want to major in plant ecology are encouraged to apply through the Field of Ecology and Evolutionary Biology.

Research Facilities

The field provides equipment and expertise in all research programs related to the special interests of the faculty. Instrumentation of modern molecular and biochemical techniques, visible and electron microscopy, biological spectrometry, and computing equipment are available. Growth chambers, cell culture and transformation facilities, greenhouses, and field plots are also readily available. L. H. Bailey Hortorium Herbarium, adjacent to the Plant Science Building, houses one of the nation's major systematics resources.

Data and Statistics

- Doctoral Program Statistics (<https://gradschool.cornell.edu/about/program-metrics-assessments-and-outcomes/doctoral-program-statistics/?SelectGradField=67>)

Field Manual

- Manual (<https://cals.cornell.edu/school-integrative-plant-science/degrees-programs/msphd-graduate-fields/phd-field-plant-biology/graduate-field-requirements-plant-biology/>)

Subject and Degrees

Plant Biology

- Plant Biology (PhD) (<https://catalog.cornell.edu/programs/plant-biology-phd/>)

Concentrations by Subject

Agriculture and Life Sciences (Plant Biology)

- plant biotechnology (minor) (*minor*)

Plant Biology

- cytology
- paleobotany
- plant biochemistry
- plant biotechnology
- plant cell biology
- plant ecology
- plant molecular biology

- plant morphology, anatomy, and biomechanics
- plant physiology
- systematic botany

Faculty

Daniel Nicolas Anstett (<http://cals.cornell.edu/daniel-anstett/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; systematic botany
- **Research Interests:** Rapid evolution to climate change, landscape and temporal genomics, herbivory and plant defenses

Stephane Bentolila (<http://cals.cornell.edu/stephane-bentolila/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology
- **Research Interests:** cytoplasmic male sterility in plants; RNA editing; molecular genetics; genome editing; organellar gene expression

Adam Bogdanove (<http://cals.cornell.edu/adam-j-bogdanove/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology
- **Research Interests:** plant pathology, gene editing, plant pathogen interaction

Clare L Casteel (<http://cals.cornell.edu/clare-casteel/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant physiology
- **Research Interests:** genomics, transcriptomics, bioinformatics, systems biology

William L Crepet (<http://cals.cornell.edu/william-l-crepet/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: paleobotany; systematic botany
- **Research Interests:** paleobotany; systematics and evolution of angiosperms; evolutionary history of floral structure and angiosperm pollination mechanisms

Jeffrey J Doyle (<http://cals.cornell.edu/jeffrey-j-doyle/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; systematic botany
- **Research Interests:** molecular plant systematics; gene phylogeny and evolution; evolution of nodulation

Zhangjun Fei (<http://btiscience.org/explore-bti/directory/zhangjun-fei/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant molecular biology; plant physiology
- **Research Interests:** genomics, transcriptomics, metabolomics, proteomics, bioinformatics, systems biology

Margaret Hannah Frank (<http://cals.cornell.edu/margaret-hannah-frank/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology; plant morphology, anatomy, and biomechanics; plant physiology
- **Research Interests:** graft-induced vigor, long-range molecular signaling in chimeric plants

Susheng Gan (<http://cals.cornell.edu/susheng-gan/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant physiology
- **Research Interests:** plant genomics, molecular regulatory mechanisms and biotechnology of plant senescence; molecular post-harvest biology

Maria Alejandra Gandolfo Nixon (<http://cals.cornell.edu/maria-alejandra-gandolfo-nixon/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: paleobotany; plant morphology, anatomy, and biomechanics; systematic botany
- **Research Interests:** angiosperm, origin and diversification

James Jeff Giovannoni (<http://cals.cornell.edu/James-Giovannoni/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant molecular biology; plant physiology
- **Research Interests:** molecular genetics of fruit development and ripening; plant biochemistry

Laura Helen Gunn (<http://cals.cornell.edu/laura-gunn/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant molecular biology; plant physiology
- **Research Interests:** transcriptomics, synthetic biology, metabolomics, systems biology

Maureen R Hanson (<http://cals.cornell.edu/maureen-hanson/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: cytology; plant cell biology; plant molecular biology
- **Research Interests:** organelle gene and genome structure and expression; RNA editing; nuclear genes for organelle proteins

Maria J. Harrison (<http://cals.cornell.edu/maria-harrison/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology
- **Research Interests:** molecular basis of arbuscular mycorrhizal symbiosis; plant phosphate transport; plant phosphate nutrition; root biology

Jian Hua (<http://cals.cornell.edu/jian-hua/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology

- **Research Interests:** molecular genetics of temperature responses in plants; regulation of plant defense responses

Georg Jander (<http://cals.cornell.edu/georg-jander/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant molecular biology; plant physiology
- **Research Interests:** plant-insect interactions; plant amino acid biosynthesis; plant biochemistry

Magdalena Maria Julkowska (<http://btscience.org/our-research/connect-with-faculty/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biotechnology; plant ecology; plant molecular biology; plant physiology; Agriculture and Life Sciences (Plant Biology): plant biotechnology (minor)
- **Research Interests:** Identification of genetic components underlying salt stress-induced reprogramming of plant architecture using quantitative genetics, descriptive growth modeling, RNA sequencing, Green-gateway cloning, CRISPR-Cas9 system for targeted gene silencing, development of interactive data applications

Andre Kessler (<http://ecologyandevolution.cornell.edu/andre-kessler/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant ecology; plant molecular biology
- **Research Interests:** molecular and chemical ecology; plant-insect interactions; induced plant responses to herbivory

Sijin Li (<http://www.cheme.cornell.edu/cbe/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant morphology, anatomy, and biomechanics
- **Research Interests:** synthetic biology, genomics

Li Li (<http://cals.cornell.edu/li-li/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology
- **Research Interests:** enhancement of nutritional value of food crops

Fay-Wei Li (<http://cals.cornell.edu/fay-wei-li/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant morphology, anatomy, and biomechanics; systematic botany

Jiping Liu (<http://cals.cornell.edu/jiping-liu/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biotechnology; plant molecular biology; plant physiology; Agriculture and Life Sciences (Plant Biology): plant biotechnology (minor)
- **Research Interests:** Abiotic stresses and stress signaling; ion transport; acid soils; ce; root exudates; abiotic; Acid soils, aluminum toxicity and tolerance; Root exudates and architecture

Hannah Elizabeth Marx (<http://hannahmarx.com/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant ecology; systematic botany

Gaurav Dilip Moghe (<http://www.moghelab.org/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant physiology; systematic botany
- **Research Interests:** evolutionary biochemistry of metabolomic diversity in plants

Andrew Nelson (<http://cals.cornell.edu/andrew-nelson/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant physiology
- **Research Interests:** genomics, transcriptomics, machine learning, bioinformatics, systems biology

Kevin C Nixon (<http://cals.cornell.edu/kevin-nixon/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: systematic botany
- **Research Interests:** taxonomy of oaks (*Quercus*); cladistic theory; paleobotany and phylogeny of angiosperms; cladistic computer programs

Wojtek Pawlowski (<http://cals.cornell.edu/wojtek-pawlowski/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology
- **Research Interests:** plant molecular biology; meiosis mechanisms of homologous chromosome pairing and meiotic recombination

Miguel Alfonso Pineros (<http://cals.cornell.edu/miguel-pineros/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant physiology
- **Research Interests:** ion transport, stress response, aluminum tolerance, calcium signaling

Robert A. Raguso (<http://nbb.cornell.edu/robert-raguso/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant ecology
- **Research Interests:** chemical communication between flowering plants and their pollinators and natural enemies

Eric J. Richards (<http://cals.cornell.edu/eric-richards/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology
- **Research Interests:** epigenetics of *Arabidopsis*

Adrienne H.K. Roeder (<http://cals.cornell.edu/adrienne-roeder/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant cell biology; plant molecular biology; plant morphology, anatomy, and biomechanics; plant physiology

- **Research Interests:** plant development; molecular genetics; cell division; cell differentiation

Jocelyn K. C. Rose (<http://cals.cornell.edu/jocelyn-kenneth-campbell-rose/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant cell biology; plant molecular biology; plant physiology
- **Research Interests:** structure and function of plant cell walls and the critical role that primary walls play in the regulation of most aspects of plant growth and development

Michael J. Scanlon (<http://cals.cornell.edu/michael-j-scanlon/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant morphology, anatomy, and biomechanics
- **Research Interests:** plant development; comparative analysis of meristem function; evolution of leaf morphology

Emily Sessa (<http://cals.cornell.edu/emily-b-sessa/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: paleobotany; plant ecology; plant morphology, anatomy, and biomechanics; systematic botany
- **Research Interests:** phylogenetics and physiological ecology of fern evolution

Jed P Sparks (<http://ecologyandevolution.cornell.edu/jed-p-sparks/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant physiology
- **Research Interests:** plant physiological ecology; plant physiology; biosphere-atmosphere interactions; stable isotopes

Chelsea Dvorak Specht (<http://cals.cornell.edu/chelsea-specht/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant morphology, anatomy, and biomechanics; systematic botany
- **Research Interests:** molecular evolution, genetics and genomics of trait evolution including floral development, carnivory and plant thermogenesis

David B Stern (<http://cals.cornell.edu/david-stern/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology
- **Research Interests:** regulation of plant organelle gene expression by nuclear factors

Dennis Stevenson (<http://cals.cornell.edu/dennis-stevenson/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: paleobotany; plant morphology, anatomy, and biomechanics; systematic botany

E Robert Turgeon (<http://cals.cornell.edu/robert-turgeon/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: cytology; plant cell biology; plant molecular biology; plant morphology, anatomy, and biomechanics; plant physiology
- **Research Interests:** phloem transport; carbohydrate synthesis; phloem loading; structure and function of plasmodesmata

Klaas Van Wijk (<http://cals.cornell.edu/klaas-van-wijk/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant biochemistry; plant molecular biology; plant physiology
- **Research Interests:** chloroplast biogenesis; proteomics; mass spectrometry; protein complexes; Arabidopsis; plant biochemistry

Olena K. Vatamaniuk (<http://cals.cornell.edu/olena-k-vatamaniuk/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: plant molecular biology; plant physiology
- **Research Interests:** molecular analysis of heavy metal detoxification in plants; proteome and metabolome responses to heavy metal toxicity

Randy O Wayne (<http://cals.cornell.edu/randy-o-wayne/>)

- **Campus:** Ithaca
- **Concentrations:** *Plant Biology*: cytology; plant cell biology; plant physiology
- **Research Interests:** understanding plant cell responses of light, gravity, and salt stress