

## PLANT BIOLOGY

### OVERVIEW

The Plant Biology Department offers a research-oriented thesis-based program toward a M.S. or a Ph.D. in Plant Biology that provides training in basic scientific research in diverse aspects of plant biology. These include physiology, developmental genetics, molecular regulation of gene expression, cell biology, plant-microbe interactions, ecological genomics, systematics and biogeography, and ecology of plant population and community dynamics. Information on specific faculty research programs may be found on the department's web page. Most graduate students in the Plant Biology graduate program earn a Ph.D. though exceptional candidates seeking a M.S. are also accepted.

### DEGREES

- Field Naturalist M.S.
- Plant Biology M.S.
- Plant Biology Ph.D.

### FACULTY

**Barrington, David Stanley;** Professor, Department of Plant Biology; PHD, Harvard University

**Beckage, Brian;** Professor, Department of Plant Biology; PHD, Duke University

**Delaney, Terrence Patrick;** Associate Professor, Department of Plant Biology; PHD, University of Washington Seattle

**Harris, Jeanne M.;** Associate Professor, Department of Plant Biology; PHD, University of California Berkeley

**Keller, Stephen Robert;** Assistant Professor, Department of Plant Biology; PHD, University of Virginia

**Lintilhac, Philip;** Research Associate Professor, Department of Plant Biology; PHD, University of California Berkeley

**Molofsky, Jane;** Professor, Department of Plant Biology; PHD, Duke University

**Paris, Catherine Ann;** Senior Lecturer, Department of Plant Biology; PHD, University of Vermont

**Perkins, Timothy David;** Research Professor, Department of Plant Biology; PHD, University of Vermont

**Preston, Jill C.;** Assistant Professor, Department of Plant Biology; PHD, University of Missouri

**Stratton, Donald Arthur;** Senior Lecturer, Department of Plant Biology; PHD, SUNY Stony Brook

**Tierney, Mary Loretta;** Associate Professor, Department of Plant Biology; PHD, Michigan State University

**van den Berg, Abby Katrien;** Research Assistant Professor, Department of Plant Biology; PHD, University of Vermont

**Vogelmann, Thomas;** Professor, Department of Plant Biology; PHD, Syracuse University

### Courses

#### **PBIO 209. Biology of Ferns. 3 Credits.**

Evolutionary biology; a survey of New England ferns and discussion of their phylogenetic relationships; current research emphasizing morphological, biogeographical, genetic, and phytochemical aspects of speciation. Prerequisite: PBIO 108 (BCOR 101 recommended). Alternate years.

#### **PBIO 213. Plant Communities. 0-3 Credits.**

Plant sociology; structure and organization of the plant community; sampling methods and analysis of data; climatic and edaphic factors; field work. Prerequisite: PBIO 109 or Department permission.

#### **PBIO 223. Fundamentals of Field Science. 3 Credits.**

Pattern and process in natural systems. Weekly discussion of unifying questions in science. Field labs teach sampling and analysis of vegetation, soils, and animals. Prerequisite: Graduate standing or several university courses in earth sciences, life sciences, and chemistry.

#### **PBIO 226. Environmental Problem Solving. 1-3 Credits.**

Students negotiate a contract, work as a team, and map and inventory forested natural areas as they apply problem solving skills to Vermont environmental project. Prerequisite: Instructor permission. One to three hours.

#### **PBIO 232. Botany Field Trip. 1 Credit.**

Trips to selected environments outside Vermont, led by faculty members representing different fields of botany. Overall, integrated approach to ecology, structure, and function.

#### **PBIO 241. Tropical Plant Systematics. 3 Credits.**

Principles and methods of angiosperm phylogeny. Recent systematic and evolutionary research on flowering plants; survey of tropical flowering plant families. Student presentations on recent research. Prerequisite: PBIO 109. Alternate years.

#### **PBIO 251. Principles of Light Microscopy. 1 Credit.**

Introduction to the optics, construction, and care of the light microscope. Theory of phase and interference contrast, fluorescence, and video methods. Prerequisites: One year of Physics or Instructor permission.

#### **PBIO 261. Plant Growth & Development. 3 Credits.**

Concepts in plant structure and development. Biophysics of plant structure and pattern-formation. Introduction to methods of plant microscopy and microtechnique. Prerequisites: PBIO 104, PBIO 108, introductory Physics or Instructor permission.

#### **PBIO 275. Global Change Ecology. 3 Credits.**

Survey of global climate change including its causes, mechanisms, and ecological and societal impacts. Prerequisite: BCOR 102 or equivalent.

#### **PBIO 281. Botany Seminar. 0 Credits.**

Presentations of personal research by faculty, graduate students, and outside guest speakers. Attendance required of plant biology Graduate students and Seniors in botanical research programs. Without credit.

**PBIO 282. Botany Seminar. 0 Credits.**

Presentations of personal research by faculty, graduate students, and outside guest speakers. Attendance required of plant biology Graduate students and Seniors in botanical research programs. Without credit.

**PBIO 294. Ecological Modeling. 3 Credits.**

Provide an introduction to the modeling of ecological processes and data, emphasizing likelihood and Bayesian approaches to data modeling and analytical and computational models of ecological process. Uses R, Python, and Wolfram programming languages. Prerequisite: BCOR 102 or Instructor permission.

**PBIO 295. Advanced Special Topics. 1-18 Credits.**

For advanced students within areas of expertise of faculty. Aspects of ecology, physiology, genetics, cytology, bryology, pteridology, paleobotany, photobiology, membrane physiology, and cell biology. Prerequisite: Department permission.

**PBIO 301. Cell & Molecular Biology. 3 Credits.**

Advanced survey of cell organelles, their composition, origin, and the relationship between their structure and function. Emphasis on recent literature and current controversies. Prerequisites: CHEM 142, Graduate standing in Biology or Instructor permission. Cross-listed with: BIOL 301, CLBI 301.

**PBIO 311. Field Naturalist Practicum. 0-3 Credits.**

Landscape analysis; planning and designing field projects; integrated problem solving. Prerequisite: Enrollment in the Field Naturalist program. Variable hours up to three.

**PBIO 333. Professional Writing. 0.5-1 Credits.**

Writing workshop that explores essay and report writing, as published in both popular and professional journals that examine the natural world and its resources. Prerequisites: None, but preference is given to FN and EP Graduate students; other students may enroll with Instructor permission. Cross-listed with: NR 333.

**PBIO 334. Professional Writing. 1 Credit.**

Writing workshop that explores essay and report writing, as published in both popular and professional journals that examine the natural world and its resources. Prerequisite: None, but preference is given to FN and EP graduate students; other students may enroll with Instructor permission. Cross-listed with: NR 334.

**PBIO 369. Field Botany for NR Profession. 2 Credits.**

Identification of flowering plants and ferns; survey of prominent Vermont plant families; natural communities, ecological determinants of plant distribution, especially soils; preparation of herbarium specimens. Prerequisite: Graduate Standing; Instructor Permission.

**PBIO 381. Adv Topics in Plant Biology. 1-4 Credits.**

Subject matter varies. Topics will stress current graduate student and faculty research interests in a journal review or presentation-discussion format. Prerequisite: Instructor permission.

**PBIO 382. Adv Topics in Plant Biology. 1-4 Credits.**

Subject matter varies. Topics will stress current graduate student and faculty research interests in a journal review or presentation-discussion format. Prerequisite: Instructor permission.

**PBIO 391. Master's Thesis Research. 1-10 Credits.**

Credit as arranged.

**PBIO 392. Master's Project Research. 0-3 Credits.**

Credit as arranged.

**PBIO 491. Doctoral Dissertation Research. 1-15 Credits.**

Credit as arranged.