Biology Ph.D.

All students must meet the Requirements for the Doctor of Philosophy Degree

Overview

While faculty research interests fall into two broad groupings, we encourage students to consider research projects that cross disciplines.

The broad groupings are:

1. cell and molecular biology, neuroscience, physiology and behavior
2. ecology and evolution

Current research projects under the first group include: molecular biology of cilia; chemical sensing by micro-organisms; signal transduction in neurodevelopment and chemical sensing; visual system development in zebrafish; smell and taste receptor cell function using molecular biology, calcium imaging and electrophysiology; olfactory and taste driven behavior; muscle function, development, and aging; structure and biomechanics of myofilaments; proteomics, biochemistry and cell biology applied to molecular mechanisms of signal transduction governing neuronal positioning; thermal stress and cellular physiology; and chemotherapeutic drug effects on taste cells.

Current research projects under the second group include: evolutionary genomics and systems physiology in sea urchins and horned beetles; microbial ecology and genomics; evolutionary genomics of RNA viruses; physiology, development and evolution of marine invertebrates and fruit flies; community ecology and evolutionary ecology of carnivorous plants; phylogenetics to study evolution and biogeography of spiders and other groups; ecology, zoogeography and conservation of small mammals; modeling and analysis of complex biological and environmental systems; multi-species interactions among plants, their mutualist pollinators and antagonists that include herbivores, seed predators, and competitors; developmental plasticity interactions with extreme sexual size dimorphism in spiders; evolution, ecology, and behavior of social insects; and ecology and evolution of disease.

Current research that crosses between disciplines includes proteomic analysis of Chagas disease vectors; evolution and adaptation of flight muscle proteins; evolution of muscle and courtship behavior in flies; and ecological proteomics.

Specific Requirements

Requirements for Admission to Graduate Studies for the Degree of Doctor of Philosophy

Satisfactory completion of: college-level courses appropriate for science majors including a year of mathematics, a year of physics, organic chemistry, at least one year of biology; scores from the Graduate Record Examination, general (aptitude) section; and acceptability to the faculty member with whom the candidate wishes to do dissertation research or rotations. Deficiencies in prerequisites may be made up after entering the program.

Minimum Degree Requirements

There are seventy-five required credits, of which at least thirty credits must be earned in graduate courses including six credits of Graduate Colloquia. The selection of courses will be designated for each student by the advisor and graduate studies committee. At least twenty, but not more than forty-five, credits must be earned in dissertation research. Each candidate must participate in the teaching of at least one undergraduate course.

Comprehensive Examination

The comprehensive examination must be taken by the end of the second semester of the second academic year. The format is a written proposal and oral defense of the proposal that will include examination of broad knowledge in the student’s discipline. The details and format of the examination are decided upon by the Studies Committee and will be discussed with the student well in advance of the exam.

Requirements for Advancement to Candidacy for the Degree of Doctor of Philosophy

The diagnostic examination prior to registration for the first semester; the comprehensive exam; minimum requirement course work of thirty credits and additional courses as required by the advisor and graduate studies committee; at least one academic year of graduate study at the University of Vermont.