Biology

Degrees Offered

• Master of Science
• Doctor of Philosophy

Nature of the Program

The Department of Biology’s graduate program is dedicated to scholarship in academics and research. The objectives of the program are to empower students through the following:

1. Recognize important biological problems
2. Design, execute, and analyze experiments aimed at solving important problems
3. Communicate their findings in oral and written form
4. Foster an awareness of the social and political issues of the day related to biology
5. Create a desire to continue independent study after graduation

The Department of Biology offers graduate courses and research that lead to M.S. and Ph.D. degrees in biology. The focal areas of research in the graduate program are: biochemistry and molecular biology, bioinformatics, genetics, genomics and evolutionary biology, biology education, cell and developmental biology, ecology, forensic biology, neurobiology, behavior and physiology, and plant sciences.

Faculty

Chairperson

• Richard B. Thomas - Ph.D. (Clemson University)

Professors

• Ashok Bidwai - Ph.D. (Utah State University)
  Biochemical and Molecular Genetic Analysis of Protein Kinases
• Jonathan R. Cumming - Ph.D. (Cornell University)
  Plant Physiology, Rhizosphere Ecology
• Jorge A. Flores - Ph.D. (George Washington University)
  Endocrinology of Reproduction, Signal Transduction
• James B. McGraw - Ph.D. (Duke University)
  Plant Ecology, Plant Population Biology, Conservation Biology
• Richard B. Thomas - Ph.D. (Clemson University)
  Physiological Plant Ecology, Global Environmental Change

Associate Professor

• Jim Belanger - Ph.D. (University of Toronto)
  Neural Basis of Behavior, Adaptive Behavior, Comparative Physiology
• Clifton P. Bishop - Ph.D. (University of Virginia)
  Developmental and Molecular Biology of Drosophila
• Kevin C. Daly - Ph.D. (University of Arizona)
  Psychophysics and Neurophysiology of Manduca Sexta
• Stephen DiFazio - Ph.D. (Oregon State University)
  Plant Genomics, Ecological Genetics
• Sarah M. Farris - Ph.D. (University of Illinois)
  Nervous System Evolution and Development, Entomology
• William T. Peterjohn - Ph.D. (Duke University)
  Biogeochemistry, Ecosystem Ecology

Assistant Professor

• Andrew Dacks - Ph.D. (University of Arizona)
  Neural Basis of Behavior States, Nervous System Evolution
• Jennifer Gallagher - Ph.D. (Yale University)
Molecular Mechanisms of Genetic Variation

• Jennifer Hawkins - Ph.D. (Iowa State University)
  Plant Comparative Genomics, Molecular Evolution, Regulation of Gene Expression

• Gary Marsat - Ph.D. (McGill University)
  Sensory Processing of Communication Signals; Systems Neuroscience and Computational Neuroscience

• Rita V. M. Rio - Ph.D. (Yale University)
  Microbial Symbiosis, Functional Genomics, Vector-borne Diseases

• Shuo Wei - Ph.D. (University of Miami, Florida)
  Molecular and Cellular Mechanisms of Early Vertebrate Development; Protease Biochemistry

• Michelle D. Withers - Ph.D. (University of Arizona)
  Biology Education: Scientific Teaching

Clinical Associate Professor

• Donna Ford-Werntz - Ph.D. (Washington University, St. Louis)
  Plant Systematics

Master of Science

Prerequisites and Requirements

Applicants for the master of science program in biology must show, at the minimum, the equivalent of a bachelor’s degree from an accredited institution; an undergraduate grade point average of 3.0; a fortieth percentile ranking for the verbal, quantitative, and analytical sections of the Graduate Record Examination; and an adequate science and mathematics background (normally one year of mathematics, one year of physics, and two years of chemistry). Certain international applicants must have a TOEFL score greater than 250 for the computer-based exam, which is roughly equivalent to more than 600–603 for the paper-based test and roughly equivalent to more than 100 for the internet-based test.

Applicants are requested to submit a one to two-page essay describing past research experience and expectations for career goals. Three letters of recommendation from individuals familiar with the applicant’s academic performance are required as well as official transcripts from all colleges or universities attended. Prior to admission, a member of the faculty must agree to provisionally serve as the student’s faculty advisor. The Department of Biology’s Graduate Committee reviews the applicant’s records and makes the admission decisions.

The WVU general requirements for the master of science are outlined elsewhere in the graduate catalog. Students in the biology M.S. program may apply up to six hours of research credit toward the thirty-hour requirement; the remaining twenty-four hours of credit must be earned in graduate courses that reflect a diversified exposure to biology. The establishment of an advisory committee and the generation of a program of study are explained in detail in the department’s Graduate Student Handbook. A final oral examination is administered by the advisory committee after the program of study has been completed and the thesis has been submitted.

Doctor of Philosophy

Program

The program for the degree of doctor of philosophy reflects a flexible, research-oriented approach geared to develop the interests, capabilities, and potentials of mature students. Applicants must have met all the entrance requirements listed above for the master of science program, but a fiftieth percentile ranking or higher in the verbal quantitative and analytical section of the Graduate Record Examination is expected. Acceptance into the Ph.D. program is by vote of the Graduate Committee of the Department of Biology. This committee ensures that all entrance requirements are met or that provisions have been made to remedy the deficiencies, and that facilities and personnel are adequate to support the program to a successful conclusion.

Each student admitted to the Ph.D. program works under the close supervision of a faculty research advisor and an advisory committee; details on the composition and establishment of an advisory committee are available in the department’s Graduate Student Handbook. Students must have a program of study formulated and approved by the end of the second semester of entering the Ph.D. program; all deficiencies must have been removed earlier. Significant deviations from an established program of study require approval from the advisory committee and the Graduate Committee.

Examinations and Dissertation Proposal

The advisory committee is responsible for overseeing the progress of the student and for administering and judging performance in the required examinations. The advisory committee ensures that all of the Department of Biology, Eberly College of Arts and Sciences, and University requirements are met during the course of the student’s program of study. The program of study outlines the coursework to be taken in support of the proposed research.
Students must successfully complete a preliminary exam with written and oral components before being promoted to candidacy for the Ph.D. The preliminary exam is given no later than the end of the third semester in residence. All doctoral students must also write and defend a research proposal (the proposal exam) no later than the end of the fourth semester in residence.

Candidacy

Successful passage of the preliminary examination leads to promotion to candidacy. Because the qualifying examination attests to the academic competence of the student who will become an independent researcher or practitioner, the examination cannot precede the conferring of the degree by an extended period. Consequently, doctoral candidates are allowed no more than five years in which to complete remaining degree requirements (http://catalog.wvu.edu/graduate/degerequirementsdoctoraldegrees/#doctoraldegreeertext ). The expected time to completion of the Ph.D. degree is four-five years; however, all requirements for a graduate degree must be completed within a period of eight years, starting with the initial enrollment after the most recent degree. The final examination consists of the submission of a completed and acceptable written dissertation and an oral dissertation defense. A formal departmental seminar covering the dissertation research must be presented before graduation.