MASTER OF SCIENCE IN BIOLOGY

PROGRAM DIRECTOR

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PROGRAM DESCRIPTION

The Department of Biological Sciences offers a graduate program leading to the M.S. degree. This program provides both a strong foundation in fundamental principles and theories and an understanding of the advanced application of this information within the diverse disciplines of the life sciences. Students prepare, through coursework and faculty-guided original research, to pursue career paths in the professions, academia, research, business, and industry.

The Department of Biological Sciences includes faculty in: (1) molecular biology, microbiology, and genetics; (2) physiology and anatomy; and (3) environmental biology. Students may pursue specific areas of specialization within and among these areas, including ecology, microbiology, molecular biology, genetics, immunology, entomology, vertebrate physiology, neuroendocrinology, neurobiology, cell biology, or human anatomy.

The department is housed in Ward Beecher Hall. Specialized facilities include an analytical research laboratory housing modern analytical instruments, tissue culture laboratories, an animal facility, laboratories equipped for molecular and cellular research, and an extensive greenhouse facility. The department has exclusive use of two unique outdoor laboratories for field studies: the Youngstown State University Arboretum (a 115-acre reserve) and the Meander Reservoir (a 6,000-acre wildlife refuge and water impoundment), which collectively provide a valuable resource for environmental biology.

FACTOR Y RESEARCH INTERESTS

David K. Asch, Ph.D., Associate Professor
Gene regulation in eukaryotic organisms; carbon catabolite repression in Neurospora crassa

Michael T. Butcher, Ph.D., Associate Professor
Comparative biomechanics: muscle structure and function with regard to locomotion and adaptive behaviors

Jonathan J. Caguiat, Ph.D., Associate Professor
Industrial microbiology and genetic and molecular biology techniques to characterize selenite and heavy metal resistant bacteria

Chester R. Cooper, Jr., Ph.D., Professor
Molecular biology and microbiology; morphogenesis and virulence of pathogenic fungi; identification of anti-fungal targets

Thomas Diggins, Ph.D., Professor
Field-based community and ecosystem ecology of streams and riparian zones

Diana L. Fagan, Ph.D., Professor
Microbiology and immunology; inflammation and regulation of immune responses; stem cell in wound healing

Jill M. Tall Gifford, Ph.D., Associate Professor
Effects of environmental influences on acute inflammatory and chronic neuropathic pain

Carl Johnston, Ph.D., Associate Professor
Microbiology; microbial and fungal ecology; interactions within microbial communities

Johanna Krontiris-Litowitz, Ph.D., Professor
Neurobiology and physiology; regulation and phenotypic expression of collagen in ventricular hypertrophy and fibrotic diseases
Robert E. Leipheimer, Ph.D., Professor
Reproductive neuroendocrinology; hormone-neurotransmitter and smooth muscle interactions

Xiangjia (Jack) Min, Ph.D., Associate Professor
Bioinformatics; gene and genome annotation and evolutionary analysis; knowledge database development for secretomes and alternatively spliced genes

Ian J. Renne, Ph.D., Associate Professor
Plant community ecology; invasive species; community structure; allelopathic systems; avian ecology

Gary Walker, Ph.D., Professor
Cellular growth and movement in embryonic tissue; molecular processes underlying cell division; biofuel production

Mark Womble, Ph.D., Professor
Human anatomy; neurophysiology; histological analysis of tissues and wound healing

**Admission Requirements**

In addition to the minimum School of Graduate Studies and Research admission requirements applicants must have completed at least 20 semester hours of undergraduate biology courses (or equivalents which could include biochemistry) with at least a 3.0 grade point average, plus one year of organic chemistry, one year of introductory physics, and one semester of statistics. Students with deficiencies in these areas should contact the Biology graduate director prior to applying for admission. The Graduate Record Examination (general test) is also required and students must obtain an acceptable score.

**Degree Requirements**

Students may pursue the M.S. degree in biological sciences in one of two options. The thesis option is a research-intensive program designed to provide students a strong foundation in fundamental biological principles and theories through coursework and the completion of a faculty-guided research project (thesis). The nonthesis option allows students to gain an in-depth understanding of biology through coursework and the writing of a graduate research paper.

**Thesis Option**

Under this option, students work on a faculty-guided, original research project and gain practical experience in research techniques and data collection. It is designed for students who wish to pursue careers in academic or industrial laboratories or continue toward the Ph.D. degree.

A minimum of 36 semester hours of credit is required for the M.S. degree with thesis option. Students must submit an acceptable thesis proposal, pass an oral review of the proposal, submit an acceptable thesis reporting the results of a faculty-supervised research project, and pass an oral defense of the thesis. Students may repeat BIOL 6990 Master's Thesis Research to a maximum of six semester hours and must take Research Methods for Thesis (BIOL 6991) to a maximum of six semester hours. All students must take two semester hours of BIOL 6988 Seminar in Biological Sciences and one semester hour of Topics (BIOL 6996–7000). An additional 21 semester hours of course work is required, with no more than eight semester hours at the 5000 level. A minimum grade point average of 3.0 is required for graduation.

**Nonthesis Option**

This option provides students with a strong understanding of biological theories and principles but does not require an original research project. It is designed for students whose future goal is a nonresearch-oriented career, such as professional school or pharmaceutical sales.

A minimum of 38 semester hours of credit is required for the M.S. degree with a nonthesis option. Students must take BIOL 6994 Research Methods for Nonthesis, which requires the submission of an acceptable graduate research paper and the oral review of this paper before their graduate committee. Students must also take two semester
hours of BIOL 6998 Seminar in Biological Sciences and one semester hour of Topics (BIOL 6996–7000). An additional 33 semester hours of coursework must also be completed with no more than 12 semester hours at the 5000 level. Students must also pass a final examination administered by their graduate committee and achieve a minimum grade point average of 3.0 for graduation.

ADVISEMENT

Each student’s course of study will be devised in consultation with the student’s major advisor and will be approved by the student's graduate committee. The course of study will be based on the student’s area of specialization, background, and career interests. Students must have their course schedules approved by their major advisor or the graduate director every semester.