Microbiology

Department Head: Dr. Charlene Wolf-Hall
Graduate Coordinator: Dr. John McEvoy
Department Location: Van Es Hall
Telephone Number: (701) 231-7667
Degrees Offered: Ph.D., M.S.
Application Deadline: February 15 for fall
Test Requirements: GRE
English Proficiency TOEFL ibT 71
Requirements: IELTS 6

Program Description

The Department of Veterinary and Microbiological Sciences offers graduate study leading an M.S. in Microbiology, and a Ph.D. in Molecular Pathogenesis. Faculty in the department have expertise in pathogenic microbiology, virology, immunology, epidemiology, microbial genetics, bacterial physiology and food microbiology. The Master's in Microbiology emphasizes research methodology and laboratory techniques. The Ph.D. in Molecular Pathogenesis is a comprehensive program that integrates microbial genetics, mechanisms of pathogen-host interaction, and immunology to better understand the molecular basis of disease.

Admissions Requirements

In addition to the Graduate School requirements (http://bulletin.ndsu.edu/past-bulletin-archive/2014-15/graduate/admission-information) , applicants must have evidence of a strong academic record in the biological sciences. The following science courses are required or recommended:

Biology

- One year of general biology with laboratory (required)
- One course in genetics (required)
- At least one course in cellular biology, cellular physiology, animal physiology, or bacterial physiology (required)
- Microbiology and immunology (recommended)

Chemistry

- One year of general chemistry with laboratory (required)
- Two sequential terms of organic chemistry with a laboratory course (required)
- Biochemistry (required)

Physics

- Two sequential terms of physics with a laboratory (required)

M.S. in Microbiology

A Master's degree in Microbiology at NDSU emphasizes research methodology and laboratory techniques. Student research and academic programs are individually tailored to meet the needs and interests of each student. Graduates are prepared for positions in research or commercial laboratories or for further graduate study. Students shall select a major adviser by the end of the first semester in residence. By the end of the first year in residence, the student and major adviser will select a supervisory committee. Students are encouraged to visit with each faculty member and spend time in each laboratory to acquaint themselves with the department's research programs.

Ph.D. in Molecular Pathogenesis

The Ph.D. in Molecular Pathogenesis encompasses the study of molecular pathogenesis of infectious and non-infectious diseases with an emphasis on zoonotic diseases and public health. The comprehensive Doctoral degree in Molecular Pathogenesis integrates the study of microbial genetics, mechanisms of pathogen-host interaction, and cellular immunology to better understand the molecular basis of disease. Doctoral candidates in Molecular Pathogenesis focus on research and utilize the expertise of one or more departmental faculty members. Course work is designed to be relevant to future careers in academia, industry, and government.

Financial Assistance

The student must first apply to the Graduate School and be accepted in full or conditional status before he/she is eligible for an assistantship. Research and teaching assistantships are contingent upon availability of funds and are awarded competitively. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need.

M.S. in Microbiology

The Master's program requires 24 months of full-time study, completing a minimum of 30 semester credits with an overall GPA of 3.0 or better. Students with inadequate undergraduate training in microbiology will be required to complete undergraduate courses in microbiology in addition to the required minimum 30 semester credits. The M.S. degree in microbiology requires a research-based thesis, a public seminar of the thesis research, and a final oral defense of the thesis. The supervisory committee administers the oral thesis examination.

Ph.D. in Molecular Pathogenesis

Degree requirements are in agreement with NDSU Graduate School requirements. The student and major adviser will prepare a plan of study by the end of the first year in residence. The Graduate School requires the plan of study for the Ph.D. degree to include no less than 90 semester graduate credits. Of these, no less than 27 credits must be in courses other than seminar or research credits, and must include 15 credits at the 700-789 level. An overall GPA of 3.0 or higher must be maintained. Please refer to the department website for more information on course requirements for this program.

Core courses must be completed before the student takes the oral or written preliminary examination, whereas elective classes can be completed any time prior to the defense of the written dissertation.

Examinations

Both a written and an oral, comprehensive, preliminary examination must be successfully completed to admit the student of candidacy for the Doctoral degree. These examinations should be taken no later than the end of the third year in residence. The written examination will consist of an approved, non-thesis research proposal written by the student in the format of a National Institutes of Health, National Science Foundation, or USDA postdoctoral fellowship proposal. Questions on the oral exam will be based upon the written proposal and upon graduate course work. After successful completion of the comprehensive written and

oral preliminary examinations, the student will be formally admitted to candidacy for the Doctor of Philosophy degree.

Dissertation Research

In addition to the defense of the written dissertation in the final oral examination, the candidate will present a final public seminar based on the dissertation research. At least one academic semester, and preferably two semesters, shall elapse between the preliminary examinations and the oral defense of the research-based dissertation.

Peter Bergholz, Ph.D.
Michigan State University, 2007
Research Interests: Environmental Microbiology

Teresa Bergholz, Ph.D.
Michigan State University, 2007
Research Interests: Foodborne Pathogenesis

Eugene S. Berry, Ph.D.
Northeastern University, 1983
Research Interests: Animal virology, Molecular pathogenesis of ss(+) RNA viruses

Glenn Dorsam, Ph.D.
Virginia Commonwealth University, 1998
Research Interests: Molecular Pathogenesis

Neil W. Dyer, D.V.M., M.S.
Iowa State University, 1991
Research Interests: Studies with Bacillus anthracis, porcine pneumonia, new malignant catarrhal fever herpesvirus

Nathan A. Fisher, Ph.D.
University of Michigan, 2006
Research Interests: Infectious Disease and Public Health

Penelope S. Gibbs, Ph.D.
University of Georgia, 2001
Research Interests: Avian E.coli, bacterial molecular pathogenesis, antimicrobial resistance, food safety

John M. McEvoy, Ph.D.
University of Ulster, 2002
Research Interests: Pathogenicity and virulence of Cryptosporidium

Birgit Pruess, Ph.D.
Ruhr-Universitat Bochum, 1991
Research Interests: Global gene regulation in enteric bacteria, complex regulatory networks

Sheela Ramamoorthy, Ph.D.
Virginia Tech, 2006
Research Interests: Virology and Vaccinology

Jane M. Schuh, Ph.D.
North Dakota State University, 2000
Research Interests: Immunology; biomedical significance of the initiation and maintenance of allergic asthma; the innate immune response in health and disease; murine models of human asthma; Aspergillus fumigatus -induced immune response

Charlene E. Wolf-Hall, Ph.D.
University of Nebraska-Lincoln, 1995
Research Interests: Food microbiology and toxicology