MICROBIOLOGY

www.life.illinois.edu/micro (http://www.life.illinois.edu/micro)

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Directors of Graduate Studies: Peter Orlean, Joanna Shisler, and Richard Tapping
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Major: Microbiology
Degrees Offered: M.S., Ph.D.

Medical Scholars Program: Doctor of Philosophy (Ph.D.) in Microbiology and Doctor of Medicine (M.D.) through the Medical Scholars Program (https://www.med.illinois.edu/medicalscholars)

Graduate Degree Programs

The Department of Microbiology at Illinois offers unique opportunities for graduate students to become skilled and creative microbiologists. Our graduate program of study leads to the doctor of philosophy degree (Ph.D.). We have outstanding resources in our internationally recognized faculty, graduate students, and research facilities. This exposes our students to the latest research techniques and fosters their development as independent scientists. The program has particular strengths in the areas of microbial physiology, metabolism, genetics, evolution, and pathogenesis. For an application and departmental materials that provide greater detail on programs, offerings, admission, degree requirements, and financial aid, visit our website at www.mcb.illinois.edu/departments/microbiology/index.html (http://www.mcb.illinois.edu/departments/microbiology).

Graduates from the Department of Microbiology are employed in colleges and universities, industry, and government. Scientific advances in genetic engineering and biotechnology provide many opportunities in pharmaceutical, chemical, and genetic engineering companies.

The Department of Microbiology is a part of the School of Molecular and Cellular Biology (MCB), which also includes the Departments of Biochemistry, Cell and Developmental Biology, and Molecular and Integrative Physiology. The Department is part of an umbrella program in MCB that encompasses over 70 different research laboratories. Students admitted into any of these departmental graduate programs can select faculty thesis advisors from these active research laboratories in the School. Close ties are also maintained with the School of Integrative Biology, the School of Chemical Sciences, the College of Medicine, and the College of Veterinary Medicine.

Admission

Students interested in this program must apply directly to the School of Molecular and Cellular Biology (mcb.illinois.edu/graduate/gradprospect.html). During the first semester, students perform three laboratory rotations, choosing from any laboratory in the School. Students select a laboratory for their thesis research in December and formally join the appropriate graduate program/department at that time.

Students electing microbiology as a major for an advanced degree should have had a total of at least 15 credit hours of physical or biological sciences, including general biology or microbiology, chemistry through organic chemistry and biochemistry, and mathematics through calculus. Admission requirements include: a bachelor's degree with coursework in biological sciences, chemistry, and physics; Graduate Record Examination (GRE) scores. In addition to the above requirements, international students must attain a minimum Test of English as a Foreign Language (TOEFL) score of 96 on the internet-based test (iBT), with a score of 24 on the speaking section, is also accepted. The department does not admit students into the M.S. program.

Medical Scholars Program

The Medical Scholars Program permits highly qualified students to integrate the study of medicine with study for a graduate degree in a second discipline, including Microbiology. Students may apply to the Medical Scholars Program prior to beginning graduate school or while in the graduate program. Applicants to the Medical Scholars Program must meet the admissions standards for and be accepted into both the doctoral graduate program and the College of Medicine. Students in the dual degree program must meet the specific requirements for both the medical and graduate degrees. On average, students take eight years to complete both degrees. Further information on this program is available by contacting the Medical Scholars Program, 125 Medical Sciences Building, (217) 333-8146 or at www.med.illinois.edu/msp (http://www.med.illinois.edu/msp).

Graduate Teaching Experience

Experience in teaching is considered to be a vital part of the graduate program and is required as part of the academic work of all Ph.D. degree candidates. For the Department of Microbiology, a minimum of two semesters of teaching experience is a degree requirement.

Faculty Research Interests

Major areas of research interest are gene expression and regulation in prokaryotes and eukaryotes; viral function and development including virus host-cell interactions; membrane biogenesis, including protein insertion; Lipid and polysaccharide synthesis in bacteria and yeast; cell wall biogenesis; bacterial pathogenesis and bacteria-host interactions; immunity; DNA replication, recombination, and repair; anaerobic microbiology; the biochemical and physiological mechanisms of methane formation; mechanisms of oxygen toxicity; bacterial and archaeal phylogeny, genomics, and evolution; and archaea. For further details, please consult the Department of Microbiology's website (www.mcb.illinois.edu/departments/microbiology).

Facilities and Resources

The Microbiology Department is located in the modern Chemical and Life Sciences Laboratory (CLSL). Central to main campus, the CLSL houses all of the major equipment and expertise necessary for research in microbiology, cell biology, molecular biology, and biochemistry.

The University of Illinois has excellent core facilities to aid in scientific research, many of which are located in buildings adjacent to CLSL. Each core facility has full-time salaried support staff for training and support. The William Keck Center for Comparative and Functional Genomics provides sequencing and oligonucleotide synthesis, DNA microarray facilities, and bioinformatics specialists. The Roy J. Carver Biotechnology Center offers a range of services. The Protein Sciences
Facility aids researchers in protein sequence analysis, peptide synthesis, and 2D gel electrophoresis. Services offered by the Immunological Resources Center include the creation, purification, and immunochemical labeling of antibodies. In addition to a state-of-the-art cell sorter, the Flow Cytometry Facility maintains several satellite flow cytometry machines throughout campus. The Center for Microscopic Imaging is a campus-wide service center for electron, confocal, and light microscopy. The University of Illinois has the top academic NMR laboratory in the country for all modern methods of organic mass spectrometry. The Transgenic Animals Facility produces transgenic lines by microinjection technology. The X-ray diffraction laboratories allow for detailed X-ray analysis of materials.

Several services are available to graduate students for support outside of the classroom and laboratory. The University of Illinois library is the nation’s third largest university library, allowing access to reference books and online scientific journals. The Writers Workshop offers free, personal writing assistance for class assignments, scientific manuscripts, and theses. Graduate students also have access to laboratory computers, which are connected via the network maintained by the Office of Information Technology. Please visit the School of Molecular and Cellular Biology (http://www.mcb.illinois.edu) to learn about these and other resources available to graduate students.

Financial Aid
All students admitted into the Ph.D. program receive financial support throughout their graduate training. Incoming graduate students are supported by the School of Molecular and Cellular Biology. Several University Fellowships are awarded to outstanding applicants on a competitive basis. Financial support is usually in the form of a research assistantship, teaching assistantship, and/or fellowship. In addition to this stipend, we offer a tuition and service fee waiver. A health insurance fee and other miscellaneous fees, must be paid by the student.

Master of Science in Microbiology
Students are not admitted to the M.S. program; these requirements are completed as part of the Ph.D. program.

Thesis Option
Coursework (not including MICR 590) 8
Research/Project Hours (4 min applied toward degree) 4
MICR 599 Thesis Research (0 min applied toward degree) 0
Total Hours 32

Other Requirements
Other requirements may overlap
Minimum Hours Required Within the Unit: 8 (500 level)
Minimum Number of 500-level Hours Required Overall in Program: 12
Completion of one of the following and approval by the research advisor and head of the department: a research thesis; submission of a manuscript with the candidate as first author and to which the candidate has made the major contribution; the successful passing of the departmental preliminary exam.
Minimum GPA: 3.0

Doctor of Philosophy in Microbiology
The requirements for receiving a Ph.D. from the Department of Microbiology include successful completion of course work, teaching, publication of 2 first-author manuscripts in peer-reviewed journals, passing preliminary/qualifying examinations, and writing and depositing of a research thesis.

Master's level requirements 32
Core coursework:
  MCB 501 Advanced Biochemistry
  MCB 502 Advanced Molecular Genetics
  MCB 580 Res Ethics & Responsibilities
  MCB 581 Laboratory Rotation I
  MCB 582 Laboratory Rotation II
  MCB 583 Laboratory Rotation III
  MCB 585 Current Topics in Microbiology
Registration in MICR 595 every semester of enrollment (9 min) 9
400- or 500-level discussion-based courses (3 min) 3
400- or 500-level lecture-based courses (12 min) 12
Research/Project Hours (min/max applied toward degree): before prelim
MICR 599 | Thesis Research (min/max applied toward degree) | after prelim

| Total Hours | 96 |

**Other Requirements**

Other requirements may overlap

At least two first author publications in which the candidate has made the major scientific research contribution. At the time of graduation at least one of these manuscripts must be accepted to a peer-reviewed journal and a second paper must, at minimum, be ready for submission.

Masters Degree Required for Admission to PhD? | No, but Masters level requirements must be met.

Qualifying Exam Required | No

Preliminary Exam Required | Yes

Final Exam/Dissertation Defense Required | Yes

Dissertation Deposit Required | Yes

Minimum GPA: | 3.0

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1 For specific information, visit our Web site at mcb.illinois.edu/departments/microbiology/gradcurrent.html (http://mcb.illinois.edu/departments/microbiology/gradcurrent.html) and refer to the department’s Graduate Student Handbook and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook).