

MICROBIOLOGY, PHD

for the degree of Doctor of Philosophy in Microbiology

The requirements for a PhD from the Department of Microbiology include successful completion of course work, teaching, one to two first-author manuscripts in peer-reviewed journals, passing a preliminary examination, and writing and depositing a research thesis.

Graduate Degree Program in Microbiology

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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 (PhD.) 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 (<http://catalog.illinois.edu/graduate/las/microbiology-phd/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 Carle Illinois College of Medicine, and the College of Veterinary Medicine.

Admission

Applicants interested in the Microbiology PhD program will need to apply directly to the School of Molecular and Cellular Biology (MCB) PhD program (<https://mcb.illinois.edu/graduate/gradprospect/>). The MCB PhD program is an umbrella program that requires admitted students to spend their first semester rotating among three different labs to explore their interests before joining one of our four departments.

MCB Admission requirements include a bachelor's degree in biological or physical sciences, a grade point average of a 3.0 or higher (A = 4.0), prior research experience and three letters of recommendation from individuals who can attest to the applicant's academic and research background. The Graduate Record Examination (GRE) is **not** required. Applicants interested in pursuing a PhD in Microbiology should have a total of at least 15 credit hours of physical or biology sciences, including general biology, or microbiology, chemistry through organic chemistry and biochemistry, and mathematics through calculus. In addition to these requirements, non-native English speaking applicants must attain a minimum Test of English as a Foreign Language (TOEFL) overall score

of 96, with at least a score of 22 on the speaking section. MCB does **not** accept the International English Language Testing System (IELTS) to show English proficiency. Graduate College requirements also apply.

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 PhD 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 include gene expression and regulation in bacteria, archaea, and eukaryotes; virus pathogenesis and host-cell interactions; viruses of bacteria and archaea; membrane biogenesis; lipid and polysaccharide synthesis in bacteria and yeast; cell wall biogenesis; bacterial pathogenesis and bacteria-host interactions; immunology; DNA replication, recombination, and repair; anaerobic microbiology; the biochemistry and physiology of methane formation; mechanisms of oxygen toxicity; bacterial and archaeal genomics, ecology, and evolution. For further details, please consult the Department of Microbiology's website (<http://catalog.illinois.edu/graduate/las/microbiology-phd/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, genomics, 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 Roy J. Carver Biotechnology Center (<http://biotech.illinois.edu/>) includes core research facilities supporting genomics, proteomics, metabolomics, flow cytometry, bioinformatics and translational medical research. The Center for Microscopic Imaging is a campus-wide service center for electron, confocal, and light microscopy.

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 on-line scientific journals. The Writers Workshop offers free, personal writing assistance for class assignments, scientific manuscripts, and theses. Please visit the [School of Molecular and Cellular Biology \(http://mcb.illinois.edu\)](http://mcb.illinois.edu) to learn about these and other resources available to graduate students.

Financial Aid

All students admitted into the PhD 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.

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examination and annual assessments of progress thereafter, and writing and depositing a research thesis.

For specific information, visit the Department's Graduate Student Handbook (https://mcb.illinois.edu/departments/microbiology/downloads/microbiology_graduate_student_handbook.pdf) and the Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Code	Title	Hours
Master's level requirements		32
Core coursework:		19
MCB 501	Advanced Biochemistry	
MCB 502	Advanced Molecular and Cell Biology	
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

Requirement	Description
Other requirements may overlap	
Two first-author manuscripts in peer-reviewed journals. At the time of graduation at least one of these manuscripts must be accepted.	
A minimum of two semesters as a teaching assistant	
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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Students graduating with a PhD in Microbiology will have:

1. Effective oral communication skills that are developed via one or more of the following tasks: group discussions in courses; presentations in departmental seminar courses; discussion of scientific topics in courses; defending their work in a preliminary exam; acting as a teaching assistant for at least 2 semesters; giving yearly student seminars.

2. Effective written communication skills that are developed via one or more of the following tasks: writing at least one original, full-length manuscript that has been accepted for publication in a refereed journal; writing a dissertation; writing an NIH-style grant for the preliminary exam.
3. A level of competency and research independence commensurate with the degree, such that they can obtain an initial science-related placement in a job that uses critical thinking components.
4. Demonstrated ability to organize and execute a research project that uses critical-thinking components and problem-solving expertise, hypothesis-driven, and fills a gap in knowledge.
5. Knowledge of the discipline and acquired technical skills in general Microbiology and in their specialized Microbiology research area.

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Department of Microbiology

Head of Department: James Slauch

Directors of Graduate Studies: Andrei Kuzminov, Cari Vanderpool, and Rachel Whitaker

Microbiology Department website (<https://mcb.illinois.edu/departments/microbiology/>)

B103 Chemical and Life Sciences Laboratory, 601 South Goodwin Avenue, Urbana, IL 61801

(217) 333-1736

MCB Graduate Admissions email (mcb-grad@illinois.edu)

College of Liberal Arts & Sciences

College of Liberal Arts & Sciences website (<https://las.illinois.edu/>)

School of Molecular & Cellular Biology

School of Molecular & Cellular Biology website (<http://mcb.illinois.edu/>)

Admissions

Overview of MCB Admissions Requirements (<https://mcb.illinois.edu/graduate/gradprospect/>)

Graduate College Admissions & Requirements (<https://grad.illinois.edu/admissions/apply/>)