

Microbiology

Microbiology is an integral part of the life science and biotechnology disciplines across the North Carolina State University campus. The Microbiology Graduate Program involves research and education in laboratories and departments that form inter-disciplinary teams to address critical, global challenges for science and society. The MGP (<https://units.cals.ncsu.edu/microbiology-graduate-program/>) offers courses of study and research leading to the Ph.D., M.S., Master of Microbiology (M.M.) and Master of Microbial Biotechnology (M.M.B.) degrees.

The research-based degrees (M.S. and Ph.D.) offered by the program are designed to prepare students for careers in academic, industrial or research institute settings. Course offerings for Microbiology research students focus on microbial genetics and physiology, bioprocessing and fermentation, biotechnology, virology, immunology and host-pathogen interactions. Research throughout the program is diverse, emphasizing most areas where microbes, viruses and systems biology have relevance to basic science and biotechnology. Research opportunities for students involve many areas of specialization including biofuels, bioremediation, environmental microbiology, antibiotic resistance, extremophiles, bacterial pathogens, probiotics, developmental epigenetics, bacteriophages, inflammation modulation and viral pathogenesis; the list is long and broad. Financial support for study towards Ph.D. and M.S. degrees is limited, but can be available in the form of teaching/research assistantships and competitive fellowships.

The non-research-based Masters of Microbial Biotechnology (MMB) is a Professional Science Masters degree that combines concentrations in Microbiology, Business and Biotechnology. This degree is specifically designed to prepare students for positions in the biotechnology, biopharmaceutical and agrobusiness industries. The program includes courses that involve semester-long interactions with local biotechnology companies as well as foundational courses in microbiology, business management and molecular biology. The M.M. degree is a rigorous non-thesis degree that is designed for students who want a higher degree in microbiology but do not want to conduct research or are unable to commit to the time demands of a research degree. Many students in the M.M. program either work for local employers or are interested in subsequent applications to professional schools. Financial support is extremely limited for either M.M.B or M. M. students.

Master's Degree Requirements

The Master of Science (M.S.; <https://units.cals.ncsu.edu/microbiology-graduate-program/degree-programs/master-of-science/>) requires 30 credit hours, of which 18 must be graded, a written thesis and at least one semester of laboratory teaching experience. The Master of Microbial Biotechnology (M.M.B.; <https://units.cals.ncsu.edu/master-of-microbial-biotechnology/>) degree requires 40 credit hours and four semesters involvement in an Industry Case Studies course, as well as a summer industry internship. This program also can be combined with a Master of Business Administration (M.B.A.) offered through the College of Management. The Master of Microbiology (M.M.) requires 30 credit hours, of which 18 must be graded, but has no requirement for a written thesis or laboratory instruction).

Doctoral Degree Requirements

The Ph.D. program (<https://units.cals.ncsu.edu/microbiology-graduate-program/degree-programs/phd/>) is designed for individuals desiring to

pursue careers in research and/or teaching. Prospective Ph.D. and M.S. students should become aware of departmental research programs and faculty so that an area of specialization is indicated in the application materials (personal statement). A faculty dissertation advisor and laboratory research program are confirmed at admission or by the end of the first semester. In conjunction with the advisor, the student establishes a four-member faculty advisory committee to guide the research and academic program. At least one semester of teaching assistance / experience is required. A preliminary examination is held soon after completing the second year of study, and the final examination includes a seminar presented by the candidate that is open to the university community.

Student Financial Support

All Ph.D. and M.S. applications to the Microbiology Graduate Program are considered for available assistantships. For highly qualified students, supplemental funds are frequently available. There is limited funding available for international students given the structure of the NC State University Graduate Student Support Plan.

More Information

Microbiology Program Website (<https://units.cals.ncsu.edu/microbiology-graduate-program/>)

Admission Requirements

Applications are invited from individuals holding B.S. or M.S. degrees in the physical and life sciences. Applications should be received in the department before December 1st to be considered for Fall semester admission. Requirements include all relevant transcripts, three letters of recommendation and a personal statement that describes the applicant's academic and career goals as well as their area of interest.

Applicant Information

- **Delivery Method:** On-Campus
- **Entrance Exam:** None
- **Interview Required:** Yes

Application Deadlines

- **Fall:** December 1
- **Spring:** Exceptions apply; please contact program

More Information

MB admissions page (<https://units.cals.ncsu.edu/microbiology-graduate-program/degree-programs/admissions/>)

Degrees

- Microbiology (MR) (<http://catalog.ncsu.edu/graduate/agriculture-life-sciences/microbiology/microbiology-mr/>)
- Microbiology (MS) (<http://catalog.ncsu.edu/graduate/agriculture-life-sciences/microbiology/microbiology-ms/>)
- Microbiology (PhD) (<http://catalog.ncsu.edu/graduate/agriculture-life-sciences/microbiology/microbiology-phd/>)
- Microbiology (Minor) (<http://catalog.ncsu.edu/graduate/agriculture-life-sciences/microbiology/microbiology-minor/>)

Faculty

Full Professors

Prema Arasu

Rodolphe Barrangou

Frederick Breidt

Dennis T. Brown

Jose Manuel Bruno-Barcena

Susan B. Carson

Mari S. Chinn

Marc A. Cubeta

Francis De Los Reyes

Robert R. Dunn

Frederick J. Fuller

Amy Michele Grunden

Hosni Moustafa Hassan

Christine Veronica Hawkes

Shuijin Hu

Michael Hyman

Lee-Ann Jaykus

Sophia Kathariou

Robert M. Kelly

Matthew D. Koci

Scott M. Laster

Hsiao-Ching Liu

John M. Mackenzie Jr.

Eric S. Miller

Ian T. Petty

Barbara Sherry

Siddhartha Thakur

Jeffrey A. Yoder

Reza A. Ghiladi

Megan E. Jacob

Cristina Lanzas

Jonathan W. Olson

Joshua Glenn Pierce

Frank Scholle

Michael L. Sikes

Robert G. Upchurch

Gavin John Williams

Assistant Professors

Oliver Baars

Louis-Marie Bobay

Benjamin John Callahan

Wei-Chen Chang

Mallory Choudoir

Nathan Crook

Kevin Garcia

Angela Rose Harris

Manuel Kleiner

Reid Longley

Zhe Lyu

Erin Alison McKenney

Aram Arshak Mikaelyan

Ryan William Paerl

Ilenys Muniz Perez Diaz

William Kevin Petry

Kasie Raymann

Casey Michelle Theriot

Acer VanWallendael

Associate Professors

Nicolas Emile Buchler

Douglas Franklin Call

Jonathan E. Fogle

Emeritus Faculty

Paul Edward Bishop

James W. Brown

Walter J. Dobrogosz

Gerald Hugh Elkan

Michael Carl Flickinger

Todd Robert Klaenhammer

Wesley Edwin Kloos

Geraldine Luginbuhl

Paul E. Orndorff

Leo W. Parks

Jason C. Shih

Adjunct Faculty

James M. Ligon

Maria Andrea Azcarate Peril

Scott Harold Shore

Daniel van der Lelie