MICROBIOLOGY AND MOLECULAR GENETICS

OVERVIEW

https://www.med.uvm.edu/mmg/home

OVERVIEW

The goal of the Microbiology and Molecular Genetics Master's Programs is to prepare students for careers in science. The program provides an increased knowledge base in both microbiology and molecular genetics as well as the ability to think critically, communicate scientific knowledge clearly and perform independent scientific research. In addition to the Microbiology and Molecular Genetics M.S. and Accelerated Master's Pathway (AMP), the MMG faculty participate in the interdisciplinary doctoral program in Cellular, Molecular, and Biomedical Sciences.

DEGREES

Microbiology and Molecular Genetics AMP

Microbiology and Molecular Genetics M.S.

FACULTY

Brasino, Danielle; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, The University of Colorado at Boulder
Bruce, Emily; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, Cambridge University
Celli, Jean; Professor, Department of Microbiology and Molecular Genetics; PHD, Université Pierre & Marie Curie
Chatterjee, Nimrat; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, Baylor College of Medicine
Diehl, Sean; Associate Professor, Department of Microbiology and Molecular Genetics; PHD, University of Vermont
Doublié, Sylvie; Professor, Department of Microbiology and Molecular Genetics; PHD, University of North Carolina Chapel Hill
Dragon, Julie; Associate Professor, Department of Microbiology and Molecular Genetics; PHD, University of Vermont
Kirkpatrick, Beth Diane; Professor, Department of Microbiology and Molecular Genetics; MD, Albany Medical College
Knodler, Leigh; Associate Professor, Department of Microbiology and Molecular Genetics; PHD, University of New South Wales
Martorelli Di Genova, Bruno; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, Federal University of Sao Paulo
Roberts, Steven; Associate Professor, Department of Microbiology and Molecular Genetics; PHD, University of North Carolina
Symeonides, Menelaos; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, University of Vermont
Thali, Markus Josef; Professor, Department of Microbiology and Molecular Genetics; PHD, University of Zurich
Ward, Gary E.; Professor, Department of Microbiology and Molecular Genetics; PHD, University of California San Diego
Wargo, Matthew; Associate Professor, Department of Microbiology and Molecular Genetics; PHD, Dartmouth College

Courses

MMG 5210. Gr Medical Microbiology. 3 Credits.
Addresses the clinical importance of infectious diseases with emphasis on the appropriate collection, handling and identification of clinically relevant bacteria. Disease states, modes of transmission, prevention and antibiotic susceptibility testing will also be discussed. Credit not awarded for both MMG 5210 and MMG 3210. Prerequisite: Undergraduate course in microbiology recommended.

MMG 5220. Gr Medical Micro w/lab. 0 or 4 Credits.
Comprehensive study of human pathogenic bacteria and their disease states in humans. Laboratory sessions provide practical experience in handling and identifying these pathogens. Credit not awarded for both MMG 5220 and MMG 3220. Prerequisite: Undergraduate course in microbiology recommended.

MMG 5230. Immunology Concepts. 3 Credits.
Introduces the vast array of defenses that can be deployed by mammalian hosts to protect against infections. Explores how this powerful system can contribute to disease, but also be leveraged in vaccines and cancer immunotherapy. Covers innate and adaptive immunity and analyze the immune system in health and disease. Credit not awarded for both MMG 5230 and MMG 3230. Prerequisite: Recommended one semester of biochemistry and/or one semester of cell biology.

MMG 5270. Advanced Cancer Genetics. 3 Credits.
Focuses on genetic mechanisms that either protect us from cancer or increase our vulnerability to cancer. Discusses genetic methods that are being used to discover genes that influence cancer risk or may prove useful in diagnostics or cancer therapy. Credit not awarded for both MMG 5270 and MMG 3270. Prerequisites: An introductory courses in genetics and cell biology is recommended.

MMG 5310. Bioinformatics & Data Analysis. 3 Credits.
Designed to provide a broad overview of bioinformatics, emphasizing accessing and interpreting biological sequence data (DNA, RNA, protein) from various databases. Covers the following topics: data mining, DNA sequence alignment, genetic variation, next-generation sequencing (NGS), and transcriptomics. Highlights a direct, hands-on experience. Credit not awarded for both MMG 5310 and MMG 3310. Prerequisite: Instructor permission.

MMG 5320. Advanced Bioinformatics. 3 Credits.
Students will learn and execute each step in the bioinformatic workflow by processing a publicly available genomics dataset. By the end of the course, students will have accessed, processed, analyzed, visualized, and interpreted an NGS dataset of their choosing. Credit not awarded for both MMG 5320 and MMG 3320. Prerequisite: Instructor permission.

MMG 5990. Special Topics. 1-18 Credits.
Supervised investigations in microbiology or molecular genetics. Prerequisite: Instructor permission. Credit as arranged.

MMG 5994. Teaching Assistantship. 1-3 Credits.
Student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

MMG 6110. Adv Bacterial Genetics. 3 Credits.
Covers bacterial genetics and the biology of bacteria at an advanced level through a combination of lectures, primary literature discussions, and team-based learning exercises. Prerequisite: A foundational understanding of microbiology, genetics, molecular biology and biochemistry is assumed.

MMG 6200. Cellular Microbiology. 4 Credits.
Utilizes primary literature to explore the cellular and molecular basis of microbial pathogenesis caused by viruses, pathogenic bacteria and protozoan parasites.

MMG 6330. Adv Genetics and Genomics. 3 Credits.
Covers the topics of gene structure, expression, epigenetics and inheritance. These basics will form the foundation of discussions on functional genomics and genome engineering. Current approaches and methodologies to address scientific questions related to these topics will be emphasized. Consequently, recent reviews and primary research literature will be the main texts used in the course. Prerequisites: Understanding of basic genetics, molecular biology, and biochemistry concepts is assumed.

MMG 6391. Master's Thesis Research. 1-18 Credits.
Research for the Master's Thesis.

MMG 6890. Graduate Teaching Practicum. 3 Credits.
Required practicum for all Microbiology and Molecular Genetics Master's Students. Students will be exposed to and mentored in the fundamentals of undergraduate teaching and learning in the laboratory setting.

MMG 6990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

MMG 6991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

MMG 6995. Graduate Independent Research. 1-18 Credits.
Graduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

MMG 7491. Doctoral Dissertation Research. 1-18 Credits.
Research for the Doctoral Dissertation.

MMG 7990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

MMG 7991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion. Prerequisite: Instructor permission.

MMG 7995. Graduate Independent Research. 1-18 Credits.
Graduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion. Prerequisite: Instructor permission.