DEPARTMENT OF PHYSIOLOGY & PHARMACOLOGY

Bina Joe, Ph.D., chair
Ritu Chakraborti, Ph.D., track director

The Molecular Medicine (MOME) track (formerly Cardiovascular and Metabolic Diseases) track in the Biomedical Sciences Graduate program at The University of Toledo College of Medicine & Life Sciences on the Health Science Campus nurtures students and provides them with the necessary tools to pursue an independent career in biomedical sciences. The program encompasses a unique interdisciplinary approach to train students to conduct research in the underlying molecular mechanisms of diseases that have profound impact on human health.

The program draws on faculty research strengths in signal transduction, genetics, molecular and cellular biology, gene microarrays, genomics, proteomics, gene knockout and transgenics, tissue culture, and protein and carbohydrate biochemistry. The MOME faculty members are not only drawn from its associated department, the Department of Physiology and Pharmacology, and from the Center for Diabetes and Endocrine Research (CeDER), but also from other departments including the Departments of Medicine, and, Orthopedic Surgery. Modern, well-equipped research facilities are available through the participating departments. The MOME program offers degrees of Doctor of Philosophy (PhD) and Masters in biomedical sciences (MSBS). The program also offers these graduate degrees in combination with the Medical Degree (MD) that is offered by the medical school. Students from the four programs, PhD, MSBS, MD/PhD and MD/MSBS, follow a well-defined program that includes core courses, journal clubs, seminars, laboratory rotations, independent research, and electives in the area of interest. Students select faculty advisors and begin their independent dissertation research following the laboratory rotations in the biomedical science core curriculum. The curriculum is designed to enable students, guided by their advisors, to develop the expertise that prepares them for a successful career in research and education.

Degrees Offered

- MSBS in Molecular Medicine (http://utoledo-public.courseleaf.com/graduate/medicine-life-sciences/departments-divisions/physiology-pharmacology/msbs-molecular-medicine/)
- Ph.D in Biomedical Science - Molecular Medicine (http://utoledo-public.courseleaf.com/graduate/medicine-life-sciences/departments-divisions/physiology-pharmacology/phd-biomedical-science-molecular-medicine/)

BMSP 5320 Statistical Methods I
[3 credit hours]
Introduction to statistical methods with emphasis on problems in the biomedical sciences. Included are descriptive statistics, probability theory, statistical inference, experimental design and simple statistical tests.
Term Offered: Summer

BMSP 6250 Grant Writing Workshop
[2 credit hours]
This is an interdisciplinary course designed to teach students skills in developing a research plan in the form of a grant proposal.
Term Offered: Spring

BMSP 6310 Systems Pathophysiology I
[2.5 credit hours]
The course will cover the fundamentals and current research efforts in biomedical sciences, emphasizing diseases of the cardiovascular, immune, and nervous systems, as well as metabolic and infectious diseases.
Term Offered: Spring

BMSP 6320 Systems Pathophysiology II
[2.5 credit hours]
The course will cover the fundamentals and current research efforts in biomedical sciences, emphasizing diseases of the cardiovascular, immune, and nervous systems, as well as metabolic and infectious diseases.
Term Offered: Spring

BMSP 6330 Current Problems and Research Approaches in Proteins
[2 credit hours]
The course will cover principles of protein structural organization, basics of protein chemistry and structure/function relationships in proteins. Special emphasis will be given to the modern trends in protein science including research in proteomic aspects of system biology and biomedical applications of proteomics.
Term Offered: Fall

BMSP 6340 Curr Prob Res App Genes/Genom
[2 credit hours]
This course provides an introduction to major areas of current research in genetics and molecular biology. Topics include gene structure and regulation, DNA replication, recombination, repair, mutation, and quantitative genetics.
Term Offered: Fall

BMSP 6350 Cell Biology & Signaling
[3 credit hours]
The content of this course will encompass didactic lectures on current knowledge and methodological approaches in the area of fundamental cellular processes and cell communication.
Term Offered: Spring

BMSP 6360 Current Problems and Research Approaches in Cell Membranes
[2 credit hours]
This course will explore vital roles played by plasma and intracellular membranes in communication and homeostasis, and by membrane lipid/protein interactions in defining cytoarchitecture, protein sorting, excitability and synaptic transmission.
Term Offered: Fall

BMSP 6370 Recent Advances in NND Journal
[1 credit hour]
Forum for the presentation,critique, and discussion of recent primary literature important to the development of the field of biomedical science.
Term Offered: Spring

BMSP 6380 Methods in Biomedical Sciences
[2 credit hours]
This course will cover the basic principles and applications, of state-of-the-art technology in molecular biology, protein chemistry, and studies with culture cells, tissue explants and transgenic animal models.
Term Offered: Fall

BMSP 6390 Mentored Research
[1-15 credit hours]
Students will be mentored in biomedical research and will gain familiarity with research projects ongoing in graduate laboratories. May be repeated for credit.
Term Offered: Spring, Summer, Fall

BMSP 6400 BPG Intro to Mthds in Bio Sci
[1 credit hour]
Introduction to biomedical methods. Required for Bioinformatics, Proteomics and Genomics (BPG) MSBS (but not certificate) students. An abbreviated version of BMSP 638, BMSP 640 runs for first 8 weeks of Fall semester.
Term Offered: Fall

BMSP 6470 System Pathophysiology
[4 credit hours]
This course provides an understanding of fundamental processes underlying pathophysiology, which occur at the cellular and organ level and lead to impairment of physiology processes. The course is organized into 6 blocks providing knowledge on the malfunctions of physiological systems, including cardiovascular, renal, skeletal, endocrinology, immunology, neural system, and cancer, and an introduction to pharmacology and applied bioinformatics.
Term Offered: Spring

BMSP 7320 Statistical Methods I
[3 credit hours]
Introduction to statistical methods with emphasis on problems in the biomedical sciences. Included are descriptive statistics, probability theory, statistical inference, experimental design and simple statistical tests.
Term Offered: Summer

BMSP 8250 Grant Writing Workshop
[2 credit hours]
This is an interdisciplinary course designed to teach students skills in developing a research plan in the form of a grant proposal.
Term Offered: Spring

BMSP 8310 Systems Pathophysiology I
[2.5 credit hours]
The course will cover the fundamentals and current research efforts in biomedical sciences, emphasizing diseases of the cardiovascular, immune, and nervous systems, as well as metabolic and infectious diseases.
Term Offered: Spring

BMSP 8320 Systems Pathophysiology II
[2.5 credit hours]
The course will cover the fundamentals and current research efforts in biomedical sciences, emphasizing diseases of the cardiovascular, immune, and nervous systems, as well as metabolic and infectious diseases.
Term Offered: Spring

BMSP 8330 Curr Prob Res App Protein Str
[2.5 credit hours]
The course will cover principles of protein structure/function relationships in proteins, protein folding, ligand-protein interactions and mechanisms of enzyme-catalyzed reactions. Special emphasis will be given to the present-day research.
Term Offered: Fall

BMSP 8340 Curr Prob Res App Genes/Genome
[2 credit hours]
This course provides an introduction to major areas of current research in genetics and molecular biology. Topics include gene structure and regulation, DNA replication, recombination, repair, mutation, and quantitative genetics.
Term Offered: Fall

BMSP 8350 Cell Biology & Signaling
[3 credit hours]
The content of this course will encompass didactic lectures on current knowledge and methodological approaches in the area of fundamental cellular processes and cell communication.
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Term Offered: Spring