Biochemistry and Cell Biology (BCB) MS Program

**Chairperson**  
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**BCB MS Graduate Program Director**  
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Beverly Piazza, Life Sciences Building 338 (631) 632-8533

**Degree awarded**  
Master of Science (MS) in Biochemistry and Cell Biology

For information about the Department of Biochemistry and Cell Biology, please visit [www.stonybrook.edu/biochem](http://www.stonybrook.edu/biochem).

Biochemistry and Cell Biology Description

The graduate program leading to the MS degree in Biochemistry and Cell Biology is intended to provide a sound scientific foundation for those planning to pursue a career in research, teaching, entry into a career in biotechnology, or further graduate studies in the life sciences. In addition, for students interested in attending medical, dental, veterinary or other health-related schools, the MS degree program can complement and enhance their background in the biochemical sciences including biochemical, biomedical, and molecular biology research. Core concepts and skills are taught through a series of required core courses, with the remaining coursework consisting of advanced electives and special topics courses selected in consultation with the student's advisory committee. The curriculum is comprised of 24 credit hours earned in biochemistry, cellular biology and molecular genetics courses that are complemented by hands on laboratory research and exposure to advanced methods in biochemistry and cell biology. The remaining credits may be selected from elective courses, special seminar courses, and courses in experimental design, data analysis and laboratory techniques. Both research-based and literature-based thesis options are available and can be completed by fulltime students in three semesters. The program includes faculty from the Departments of Biochemistry and Cell Biology, Chemistry, Physiology and Biophysics, and the Pharmacological Sciences, as well as from Brookhaven National Laboratory.

For more detailed information, visit the BCB Web site at [http://www.stonybrook.edu/biochem/graduate/bcb.html](http://www.stonybrook.edu/biochem/graduate/bcb.html)

Biochemistry and Cell Biology (BCB) MS Program Admissions

In addition to the minimum requirements of the Graduate School, the following are suggested requirements:

A. BS or BA degree in a life science related field, with a minimum undergraduate grade point average of 3.00.

*Pre-requisites include mathematics through one year of calculus, chemistry (including organic chemistry and laboratory), general physics, and one year of biology (including laboratory). It is highly recommended that students will have taken two semesters of biochemistry, and one semester each of genetics, cell biology, physical chemistry, and English composition. Students accepted into the program without a pre-requisite may be asked to take the appropriate upper level undergraduate course prior to undertaking specific graduate level courses.

B. Three letters of recommendation.

C. Acceptance by the Graduate Program in Biochemistry and Cell Biology and by the Graduate School.

**FACILITIES**

The Biological Sciences Division and Health Sciences Center are well equipped for work in biochemistry and cellular biology. Individual faculty laboratories and central services provide a full array of state-of-the-art equipment. These include the Flow Cytometry Facility, the Cell Culture and Hybridoma Facility, the Transgenic Mouse Facility, the University Microscopy Imaging Center, and the Center for Analysis and Synthesis of Macromolecules. The Health Sciences Library contains a comprehensive collection of biomedical journals and books and is complemented by the Melville Library on the main campus.

Degree Requirements for Biochemistry and Cell Biology (BCB) MS Program

**Research-based thesis option (30 credits)**

The research-based thesis option requires 30 credits comprised of 24 credits in core courses, at least 2 credits of MS Thesis in Biochemistry and Cell Biology in addition to the Research Practicum course included in the core curriculum, and 6 elective credits. Thesis research can be conducted in the laboratory of Biochemistry and Cell Biology faculty, in the research laboratories of faculty from other Departments at Stony Brook, and at Brookhaven National Laboratory, or through research internships under the guidance of approved mentors at local biotechnology firms. This option requires completion of a written, research-based project and its oral defense.

**Literature-based thesis option (30 credits)**

The literature-based thesis option requires 30 credits comprised of 24 credits in core courses, including 4 credits of MS Research practicum, 2 credits of MS Thesis in Biochemistry and Cell Biology, and 6 elective credits. This option requires completion of a written, literature-based project and its oral defense.

**Core Course Requirements**

- MCB 503 Molecular Genetics (Fall, 3 credits)
• MCB 520 Graduate Biochemistry I (Fall, 3 credits)
• MCB 656 Cell Biology (Spring, 4 credits)
• BCB 551 Introduction to Research in Biochemistry and Cell Biology (Fall, 2 credits)
• BCB 552 Advanced Laboratory Methods in Biochemistry and Cell Biology (Fall, 3 credits)
• BCB 559 MS Research Practicum in Biochemistry and Cell Biology (Fall or Spring, 4 credits)
• BCB 599 MS Thesis in Biochemistry and Cell Biology (Fall, Spring & Summer, 1 – 6 credits)
• Integrity in Science (TBA, 1 credit)
• MCB 601 or 602 Colloquium in Molecular and Cellular Biology (Fall & Spring, 1 credit)

FACULTY

Department of Biochemistry

Paul M. Bingham Genetic control of development and gene expression in animals
Deborah Brown Cholesterol/sphingolipid-rich domains in membrane signaling
Kevin Czaplinski Post-transcriptional control of gene expression in the nervous system
Vitaly Citovsky Nuclear targeting and intercellular communication in plants
Neta Dean Glycosylation; fungal pathogenesis
Dale G. Deutsch Marijuana; molecular neurobiology of anandamide
J. Peter Gergen Gene expression and development in Drosophila
Robert Haltiwanger Glycobiology; biosynthesis, structure, and function
Bernadette C. Holdener Genetic regulation of early mammalian development
Nancy Hollingsworth Meiotic synapsis, recombination, and segregation in yeast
Wali Karzai Structure and function of RNA-binding proteins and biochemical studies of the SmpB•tmRNA quality control system
William J. Lennarz Biosynthesis and function of glycoproteins in cell-cell interactions
Erwin London Membrane protein structure/translocation/folding
Harvard Lyman Photocontrol of chloroplast development
Kenneth B. Marcu Antibody class switch mechanism; NFkB kinases; Myc gene control
Aaron Neiman Vesicle trafficking and membrane/cytoskeletal interactions
Nisson Schechter Homeobox and filament proteins in neuronal differentiation
Sanford Simon Extracellular degradation by neutrophil proteases
Steven Smith Structure and function of membrane proteins
Rolf Sternglanz Chromatin structure and function; gene expression; HATs
Gerald H. Thomsen Growth factors /signal transduction in early vertebrate development

Department of Chemistry

Elizabeth Boon Nitric oxide signaling in bacteria.
Isaac Carrico Site-specific protein labeling; glycoproteins.
Carlos Simmerling Development of tools for efficient and simulation of chemical systems and using them to study the structure and dynamics of molecules involved in biological processes.
Peter Tonge Spectroscopic insights into enzyme mechanisms and structure

Department of Medicine

Jian Cao, M.D. Biology and prevention of cancer metastasis
Wen-Tien Chen Proteases / integrins in cancer invasion, metastasis, angiogenesis
Jolyon Jesty Regulatory controls of blood coagulation
Erich R. Mackow Rotavirus and Hantavirus Pathogenesis
Richard Lin Kinase signaling and cell proliferation
Mario Rebicchi Phospholipases and signal transduction
Roy Steigbigel Immune dysfunction induced by HIV infection
William Van Nostrand Vascular functions of Alzheimer's disease amyloid beta-protein

Department of Oral Biology and Pathology
Soosan Ghazizadeh Epithelial stem cell biology; Skin bioengineering and gene therapy.

Department of Pathology
Fleit, Howard B. Leukocyte Fc receptors; macrophage differentiation
Martha Furie Interactions between leukocytes and endothelium
Richard R. Kew Leukocyte chemotaxis/inflammation
Ute Moll Tumor suppressor genes; mechanism of p53 inactivation
Kenneth Shroyer Cancer biomarkers as diagnostic adjuncts in cervical pathology and cytopathology; cervical cancer and HPV
Gary Zieve Assembly/transport of snRNP particles

Department of Pharmacological Sciences
Miguel Berrios Cell structure and function; the cell biology of DNA damage and repair.
Bogenhagen, Daniel Mitochondrial DNA; DNA repair
Emily Chen Breast Cancer Metastasis & Shotgun Proteomics
Holly Colognato Extracellular matrix in the brain; roles during development and during neurodegeneration.
Michael A. Frohman Early mammalian development; gene regulation
Miguel Garcia-Diaz Mechanisms of chemical mutagenesis/carcinogenesis
Masaaki Moriya Cellular responses to DNA damage.
Joav Prives Cytoskeletal membrane interactions in muscle cells
Markus Seeliger
Orlando Schärer Chemical Biology of DNA damage and repair.
Ken-Ichi Takemaru Wnt Signaling in Development and Disease
Styliani-Anna Tsirka Neuronal-microglial interactions in the central nervous system

Department of Physiology and Biophysics
Mark Bowen Single molecule spectroscopy; Coordination of post-synaptic glutamate receptor signaling by the MAGUK family of scaffolds
Roger A. Johnson Intercellular and intracellular signal transduction
Stuart McLaughlin Calcium/phospholipid second messenger system
W. Todd Miller Tyrosine phosphorylation and signal transduction
Suzanne Scarlata Structure/oligomerization of membrane proteins
Ilan Spector Neuronal differentiation and microfilaments
Hsien-yu Wang Signal transduction and development.
Thomas White Molecular biology and physiology of gap junction channels
NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.