Biochemistry and Cell Biology (BCB) MS Program

Chairperson
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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.

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

Biochemistry and Cell Biology (BCB) MS Program Admissions

Application Deadline: April 15

Applications are considered from September until April 15 every year.

Applicants do not need to send their official transcripts until they are offered admission into the program.

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, 2 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 Rebecchi  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.