Biochemistry and Cell Biology (BCB) MS Program

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

Website
https://www.stonybrook.edu/commcms/biochem/education/graduate/biochemistry-and-cell-biology-ms

Application
The Graduate School (www.grad.sunysb.edu) requires on-line application submission (https://grad.stonybrook.edu/admissions/index.php) including letters of recommendation. At the Graduate School website you will find an Admissions link to the on-line Application form.

https://graduateadmissions.stonybrook.edu/apply/

Biochemistry and Cell Biology MS Program 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 full-time students in three semesters. The program includes faculty from the Departments of Biochemistry and Cell Biology, Chemistry, Physiology and Biophysics, and the Pharmacological Sciences.

For more detailed information, visit the BCB MS Web site at: https://www.stonybrook.edu/commcms/biochem/education/graduate/biochemistry-and-cell-biology-ms

Biochemistry and Cell Biology (BCB) MS Program Admissions

Application Deadline: April 15

Applications are considered from September until April 15 every year for admission in the Fall.

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:

- 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.

- **Personal Statement:** What would you consider your special qualifications to be? What do you propose to do with your advanced degree professionally? Discuss briefly your experience in biochemistry and cell biology outside the classroom.

- **Three letters of recommendation** from people who can evaluate the applicant's potential for graduate work and independent research.

- **International Students:** A proficiency in the English language is required. If your native or primary language is not English, you must take an English proficiency test. To be considered for admission, an applicant must present an acceptable score on the TOEFL or IELTS test. IELTS Overall score of 6.5 with no subsection below 6. TOEFL: Paper-based test: 550; computer based test: 213; or Internet-based test: 90. Under special circumstances, lower scores may be considered.

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**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 facilities that perform flow cytometry, mass
spectrometry, DNA synthesis and analyses, transgenic mice, microscopy and imaging. 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.

**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.

**Core Course Requirements (24 credits)**
- MCB 503 Molecular Genetics (Fall, 3 credits)
- MCB 520 Graduate Biochemistry I (Fall, 3 credits)
- MCB 656 Cell Biology (Spring, 4 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, Winter, Spring & Summer, 0-4 credits)
- BCB 599 MS Thesis in Biochemistry and Cell Biology (Fall, Winter, Spring & Summer, 3 – 6 credits)
- MCB 601 Colloquium in Molecular and Cellular Biology (Fall, 1 credit)
- MCB 602 Colloquium in Molecular and Cellular Biology (Spring, 1 credit)

**FACULTY OF BIOCHEMISTRY AND CELL BIOLOGY MASTERS OF SCIENCE PROGRAM**

**Department of Anesthesiology**
- Martin Kaczocha - Role of fatty acid binding proteins in pain, inflammation, and related pathophysiologies: Endocannabinoid pharmacology and development of novel therapeutics.

**Department of Biochemistry and Cell Biology**
- Michael Airola – Structural biology of lipid modifying enzymes
- Paul M. Bingham - Genetic control of development and gene expression in animals
- Vitaly Citovsky - Nuclear targeting and intercellular communication in plants
- Neta Dean - Glycosylation; fungal pathogenesis
- Peter Gergen - Gene expression and development in *Drosophila*
- Steven Glynn - Structure and mechanism of protein-unfolding machines in mitochondria
- Bernadette C. Holdener - Genetic regulation of early mammalian development
- Nancy Hollingsworth - Meiotic synapsis, recombination, and segregation in yeast
- Chi-Kuo Hu - Biology of dormancy during development and aging, with the African killifish as the main research organism.
- Wali Karzai - Structure and function of RNA-binding proteins and biochemical studies of the SmpB•tmRNA quality control system
- Ed Luk - Chromosome biology and genome regulation
- Benjamin Martin - Stem cell maintenance and differentiation, Developmental mechanisms of cancer pathogenesis
- David Q. Matus - Evolutionary, cell and developmental biological approaches to studying nematode uterine-vulval attachment and morphogenesis
- Aaron Neiman - Vesicle trafficking and membrane/cytoskeletal interactions
- Dada Pisconti - Muscle stem cells; muscle development, regeneration and aging; muscular dystrophy; extracellular matrix; biology of proteoglycans

*Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin*
Steven Smith - Structure and function of membrane proteins
Gerald H. Thomsen - Growth factors /signal transduction in early vertebrate development

**Department of Chemistry**

Elizabeth Boon - Nitric oxide regulation of quorum sensing and biofilm formation in bacteria
Isaac Carrico
David Green - Affiliated Assistant Professor. Computational biology of protein interactions.
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 Tongue - Spectroscopic insights into enzyme mechanisms and structure
Scott Laughlin - Chemical neuroscience. Design and application of optical probes for imaging neural circuitry.

**Department of Medicine**

Yusuf Hannun - Bioactive lipids in cancer pathogenesis and therapeutics
Richard Lin - Kinase signaling and cell proliferation
Cungui Mao - Bioactive sphingolipids in cell growth, differentiation, apoptosis, and autophagy
William Van Nostrand - Vascular functions of Alzheimer's disease amyloid beta-protein
Vincent Yang - Biology and pathobiology of intestinal epithelial stem cells and colorectal cancer.

**Department of Molecular Genetics & Microbiology**

Nicolas Carpino - Positive and Negative Regulation of T cell Receptor Signaling
Bruce Futcher - Cell cycle, cyclins, and yeast genetics
Patrick Hearing - Adenovirus regulation of cellular proliferation and gene expression; adenovirus vectors for human gene therapy
James Konopka - Signal transduction, morphogenesis and genetics of pathogenic fungi
Erich R. Mackow - Viral Pathogenesis, Regulation of Innate Immunity, Hantavirus, Dengue Virus and Rotavirus Regulation of Cell Signaling Responses, miRNAs and Endothelial cell functions.
Nancy Reich - Cytokine and Innate Immune Responses
Brian Sheridan - Mucosal Immunology, T cell memory, Vaccine design, Host-pathogen interactions
David Thanassi - Secretion of virulence factors by bacterial pathogens; pilus biogenesis by uropathogenic *Escherichia coli*
Adrianus. W.M. van der Velden - Infectious Diseases Immunology; Host Interactions with Bacterial Pathogens; Bacterial Immune Subversion

**Department of Neurobiology and Behavior**

Maurice Kernan - Molecular basis of mechanical senses
Howard Sirotkin - Genetic and molecular analysis of early vertebrate development
Lonnie Wollmuth - Molecular mechanisms of synaptic transmission

**Department of Oral Biology and Pathology**

Jiang Chen - Skin and hair follicle development, maintenance and malignancy
Jingfang Ju - Post-transcriptional control of non-coding RNAs and RNA binding proteins in cancer

**Department of Pathology**

Richard R. Kew - Leukocyte chemotaxis/inflammation
Yupo Ma - Stem cell reprogramming and therapy, genome engineering, blood and marrow transplantation
Kenneth Shroyer - Cancer biomarkers as diagnostic adjuncts in cervical pathology and cytopathology; cervical cancer and HPV

**Department of Pharmacological Sciences**
Adan Aguirre - Stem cell biology in the central nervous system and neurobiology in health and disease

Christopher Brownlee - (Aging, Cancer, Cardiovascular, Chemical Biology, Lipid Biology, Mitochondrial Biology, Neuropharmacology, Signaling, Stem Cells)

Molecular mechanisms of spindle orientation, ciologenesis, polarity, cytokinesis and axonogenesis.

Holly Colognato - Extracellular matrix in the brain; roles during development and during neurodegeneration.


Miguel Garcia-Diaz - Genetic Toxicology/Mechanisms of mitochondrial gene expression

Chioma Okeoma (Cancer, Infectious Diseases) Mechanisms of virus-host and tumor-host interactions

Jessica C. Seeliger - We are applying biochemical, microbiological and biophysical methods to fundamental questions in bacterial membrane biogenesis as they relate to *Mycobacterium tuberculosis*, the bacterium that causes tuberculosis, and to bacterial pathogenesis in general.

Markus Seeliger - Mechanism of Protein kinases and Ubiquitin Ligases in Cancer and Aging

Ken-Ichi Takemaru - Wnt Signaling in Development and Disease

Dongyan Tan (Cancer, DNA Damage Repair) Structure and function of macromolecules in epigenetic regulation

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

Todd Miller - Tyrosine phosphorylation and signal transduction

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.*