Biochemistry and Cell Biology (BCB) MS Program

Chairperson
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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 Department of Biochemistry and Cell Biology offers a graduate program for the Master of science degree. This ~1.5 year MS program is designed to prepare students for careers in research, teaching, biotechnology, or further advanced studies in health and life sciences. Our pool of faculty represents diverse research interests spanning biochemistry, genetics, cell, molecular, and structural biology.

To document our success, here are some numbers. In the eleven years since its inception, we’ve admitted 129 students (about 10-12 per year). 95% of those students graduated (122 out of the 129 who were admitted). Of these 122 graduates, 84% have continued in health science related careers. 43 students entered Ph.D. programs; 15 were admitted to medical, dental or veterinarian schools; the remainder obtained positions as Research technicians. Our graduates have gone on to Ph.D. programs at top-notch research institutes or medical schools, including NYU, Thomas Jefferson University, Albert Einstein, Cornell, Mt. Sinai, Rockefeller, Case Western, Stony Brook, Rutgers, Purdue, Imperial College (UK), Cold Spring Harbor, Scripps, Univ. Utah, Univ. Indiana, UC Santa Cruz. The private sector has also benefited from our graduates, who have obtained positions at Regeneron, Pfizer, Sloan Kettering, Pillar Biosciences, Nanoprobes to name just a few. One student is a regulatory lawyer for the FDA in Washington, DC.

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 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 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 551 Introduction to Research in Biochemistry and Cell Biology, Integrity in Science (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, Winter, Spring & Summer, 4 credits.) Note that one semester of BCB 559 is required for the MS but this course, in which students earn credit for their lab research, can be repeated for additional 0-4 elective credits/semester.
- BCB 599 MS Thesis in Biochemistry and Cell Biology (Fall, Winter, Spring & Summer, 3 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 pathophysiology: 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
- Erwin London - Membrane protein structure/translocation/folding
- 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

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 Tonge - 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

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, ciliogenesis, 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.