Genetics Department

Graduate Program Director
Turhan Canli, (631) 632-7803

Graduate Program Coordinator
Kathryn Bell, Life Sciences Building, Room 130 (631) 632-8812

Degree Awarded
Ph.D. in Genetics

Genetics Department

The Graduate Program in Genetics was created as an inter-institutional program, focusing and combining the strengths in genetics at Stony Brook University, Cold Spring Harbor Laboratory, and Brookhaven National Laboratory. With the resources and faculty drawn from all three institutions, the program offers an exceptional variety of research topics and experimental systems for graduate study. The curriculum is designed to expose students to many different areas of specialization within the broad field of genetics including, but not limited to, molecular genetics, developmental genetics, genomics and bioinformatics, evolutionary genetics, and human genetics. This experience ensures that the student will be prepared to take maximum advantage of the broad range of challenges that may be encountered after graduation. The breadth of the Graduate Program in Genetics draws entering pre-doctoral trainees from throughout the world, with varied backgrounds and many different research interests. This enriches the Genetics Program as a whole and enhances student peer interactions.

The first year student experience includes several core courses that provide a foundation for further study. In addition, each student conducts three or four laboratory rotations selected by the student from nearly 100 different faculty labs. These rotations allow the student to gain firsthand knowledge of the methods and approaches taken by each laboratory and provide a basis for selecting a thesis research advisor. Students are expected to join a laboratory within their first year so they may begin to develop their own research project during their second year of study.

All Genetics students further broaden their knowledge by participating in journal clubs on thematic topics that are offered by faculty, and by taking elective courses from offerings both within and outside the Genetics Program. The specific elective course or courses taken by a student are determined in conjunction with a faculty advisor to best meet the student’s particular needs. Trainees participate in two ongoing research seminar series throughout their graduate studies. A student research seminar provides each trainee with a regular opportunity to present his or her work to colleagues and to faculty. Students also attend research seminars given by internal and visiting faculty in order to keep abreast of the latest developments and potential areas of future excitement in the field of genetics. Students are encouraged to attend and participate in research seminars at all three institutions, to take full advantage of the diverse interests and opportunities for collaboration within the program. Most thesis advisors also hold internal lab research seminars in which students present and discuss their latest findings.

Admission requirements of Genetics Department

The Graduate Program in Genetics requires the following in addition to the minimum Graduate School admission requirements:

A. Superior undergraduate performance, which should include some formal training in genetics.

B. Graduate Record Examination (GRE) General Test scores. Note that subject-specific tests (i.e., Biology) are not required, but are helpful when available.

C. Three letters of recommendation, ideally from previous research mentors and faculty.

The program does not require, but prefers to see, evidence of research activity as an undergraduate. Whenever possible, prospective students are invited to visit for interviews with program faculty.

D. Acceptance by the Graduate Program in Genetics and by the Graduate School.

All students accepted into the program receive full support in the form of a tuition scholarship, stipend and subsidized health insurance. The annual stipend for the 2010-2011 academic year is $26,500. Although future stipend increases cannot be guaranteed, it is reasonable to expect periodic increases. Students who remain in good standing with both the Genetics Program and the Graduate School receive full tuition scholarships, health insurance benefits and stipend support throughout their graduate careers.

Facilities of Genetics Department

The primary training facilities are Stony Brook University, Cold Spring Harbor Laboratory and Brookhaven National Laboratory. Program faculty at Stony Brook are drawn primarily from departments within the College of Arts and Sciences or the School of Medicine. The Life Sciences Building, which houses the Genetics Program office, is home of the Departments of Molecular Genetics and Microbiology, Biochemistry and Cell Biology, Neurobiology and Behavior, and Ecology and Evolution, all of which are represented in the Genetics Program. The University Health Sciences Center, located across the street from the Life Sciences Building, is the primary home for Departments in the School of Medicine, including faculty in the Departments of Medicine, Molecular Pathology and Immunology, and Pharmaceutical Sciences and Physiology and Biophysics. In addition to the Departments, the Program also includes faculty in the Departments of Applied Mathematics and Statistics, Biomedical Engineering, Psychology and others. The Centers for Molecular Medicine, a state-of-the-art research building adjacent to the Life Sciences Building, houses four interdepartmental thematic research centers: The Centers for Developmental Genetics, Infectious Diseases, Brain and Spinal Cord Research, and Structural Biology. Each of these Centers include Genetics Program faculty. The Centers for Molecular Medicine provide both an intellectual and a physical catalyst for facilitating interactions between Stony Brook scientists with common interest in these areas of modern biology, irrespective of their departmental affiliation.

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
Cold Spring Harbor is a modern, world-renowned research institute that provides numerous unique opportunities for trainees. Although the faculty at Cold Spring Harbor are not organized into departments, there is internationally recognized strength in the areas of Cancer Biology, Neurobiology, Plant Genetics, Structural Biology, and Bioinformatics. The world-class facilities that are available at Brookhaven National Laboratory provide additional unique resources for trainees in the Genetics Program, including the National Synchrotron Light Source, one of the most unique instruments in the world for probing biological phenomenon. Research faculty at Brookhaven have widely recognized programs in the molecular biology of microbial, plant and animal systems, and have a leading role in the fields of proteomics, structural biology and imaging.

Requirements of Genetics Department

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

A. Course Requirements
1. Molecular Genetics (MCB 503)
2. Graduate Genetics (BGE 510)
3. Graduate Biochemistry (MCB 520)
4. Cell Biology (MCB 656)
5. Graduate Student Seminar in Genetics (BGE 531) must be taken each semester.
6. During their first year, Genetics students rotate in the laboratories of three or four different faculty members, with the goal of selecting a mentor and environment for their thesis research. The specific laboratories are selected by students based on their interactions with individual faculty. Rotation selections must be approved by the Graduate Program Director.
7. Three semesters of Readings in Genetics (BGE 691) are required. These “Journal Clubs” are typically taken during the first and second years of study. Students select from thematic journal club topics that are organized each semester by faculty at the different institutions. This exercise provides important training in critical analysis of the literature while also allowing students to broaden their knowledge base on selected topics of interest.
8. Each student must take one or more elective courses, for a minimum total of 3 credits. Electives must be approved by the Program Director. Typically these courses are in the Biological Sciences (e.g., Developmental Biology, MCB 657; Immunology, HBP 533; Microbiology, HBM 640; or Molecular Evolution, BEE 565), but courses may also be taken in other relevant areas (e.g., Computer Sciences, Bioengineering).
9. Integrity in Science (GRD 500) is required of all Life Science graduate students. This half-semester course on ethics is typically taken in the Spring semester of the student’s first year.
10. Requirements for any specific student, in addition to those enumerated above, that will be beneficial due to a student’s prior training and/or area of specialization will be determined by the program director and executive committee in conjunction with the student and appropriate advisory committee.

B. Comprehensive (Preliminary) Qualifying Examination
At the beginning of the fourth semester, students will take a written comprehensive (preliminary) examination covering diverse areas of genetics which tests each student’s ability to read and interpret primary scientific literature.

C. Thesis Proposal Examination
After successful completion of the comprehensive (preliminary) examination, the student prepares a written proposal for the thesis research project. This proposal has a format of a grant application, including information of the background and significance of the project, a detailed research plan, and any preliminary results that the student has generated that indicate the feasibility of the project. This written proposal is orally defended before a thesis proposal examination committee. This committee does not include the student’s thesis advisor, but is selected by the student in conjunction with his or her advisor and program director. The thesis proposal defense should occur during the fifth semester of graduate study. Generally, the faculty who participate in a student’s thesis proposal examination committee then join with the thesis advisor to form the student’s thesis advisory committee.

D. Advancement to Candidacy
After successful completion of all required and elective courses, the comprehensive (preliminary) examination, and the thesis proposal examination, the student will be recommended to the Graduate School for advancement to candidacy. Each student must meet with his/her Thesis Advisory Committee at least once a year to inform the members of his/her progress and solicit the members’ advice.

E. Ph.D. Dissertation
The research for the Ph.D. dissertation is conducted under the supervision of the thesis advisory committee. Upon approval of the completed dissertation by this committee, a formal public oral defense of the dissertation is scheduled, at which the student presents his or her findings and is questioned by members of the examining committee and by other members of the audience.

F. Teaching Requirement
It is expected that each graduate student completing a doctoral degree will have functioned as a teaching assistant during at least two semesters of his or her graduate career (BIO 600).

G. Residence Requirement
The University requires at least two consecutive semesters of full-time graduate study. The demands of the course of study necessitate a longer period of residence.

Faculty of Genetics Department

Distinguished Professors
Benach, Jorge, Ph.D., 1971, Rutgers University: Host response to bacterial infections.
Grollman, Arthur, M.D., Johns Hopkins University: DNA damage, mutagenesis and repair; chemical carcinogenesis.
Lennarz, William, Ph.D., 1959, University of Illinois: Biosynthesis and function of glycoproteins in cell-cell interactions.
Rubin, Clinton, Ph.D., 1983, Bristol University: Physical factors influencing bone, cell, and tissue kinetics; treatments.
Sternglanz, Rolf, Ph.D., 1967, Harvard University: Chromatin structure and function in yeast; histone modifying enzymes.
Wimmer, Eckard, Dr.rer.nat., 1962, Gottingen, Germany: RNA virus genetics, replication and pathogenicity; cellular virus receptors; whole viral genome synthesis; development of novel vaccines.

Professors
Bahou, Wadie, M.D., 1980, Massachusetts Medical Center: Human genetics; gene therapy; genetic disorders of hemostasis and thrombosis.
Bell, Michael, Ph.D., 1976, University of California, Los Angeles: Evolutionary genetics.
Bingham, Paul, Ph.D., 1979, Harvard University: Regulation of differentiation; transposable elements; regulation of splicing.
Bliska, James, Ph.D., 1988, University of California, Berkeley: Molecular and cellular basis of bacterial-host cell interactions.
Carter, Carol, Ph.D., 1972, Yale University: HIV and retroviral assembly and replication.
Chen, Wen-Tien, Ph.D., 1979, Yale University: Proteases and integrins in cancer invasion, metastasis and angiogenesis.
Citovsky, Vitaly, Ph.D., 1987, Hebrew University, Jerusalem: Nuclear transport and intercellular communication in plants.
Dean, Neta, Ph.D., 1988, University of California, Los Angeles: Protein glycosylation, fungal cell wall biosynthesis; fungal pathogenesis.
Deutsch, Dale, Ph.D., 1972, Purdue University: Metabolism and uptake of the endocannabinoids (anandamide and 2-AG).
Eanes, Walter, Ph.D., 1976, University at Stony Brook: Molecular evolution, phylogenetic analysis, population genetics.
Frohman, Michael, M.D., Ph.D., 1985, University of Pennsylvania: Lipid signaling; vesicle trafficking and fusion; mitochondrial fusion, myogenesis.
Furie, Martha B., Ph.D., 1980, Rockefeller University: Interactions among endothelial cells, leukocytes, and pathogenic bacteria.
Futcher, A. Bruce, Ph.D., 1981, University of Oxford: Cell cycle control, microarrays, genomics.
Ghebrehiwet, Berhan, D.V.M./D.Sc., 1974, University of Paris, France: Biochemistry; role of complement C1q receptors during infection and inflammation.
Hearing, Patrick, Ph.D., 1980, Northwestern University: Viral molecular genetics; eukaryotic transcriptional regulation; gene therapy.
Konopka, James, Ph.D., 1985, University of California, Los Angeles: G-protein coupled receptor signal transduction; fungal pathogenesis (Candida albicans).
Kritzer, Mary, Ph.D., 1989, Yale University: Sex differences in cortical microcircuitry.
Mackow, Erich, Ph.D., 1984, Temple University: Viral regulation of cell signaling responses; Hantavirus, Influenza, Dengue and Rotavirus pathogenesis.
Malbon, Craig 6, Ph.D., 1976, Case Western Reserve University: Signal transduction and gene regulation in differentiation and development; Roles of G proteins.

Marcu, Kenneth B. 2, Ph.D., 1975, University at Stony Brook: NF-kappaB kinase signaling in stress, immunity and cancer; Mechanisms of action of AID in adaptive immune responses.

Marshall, Nancy Reich, Ph.D., 1983, University at Stony Brook: Signal transduction and activation of gene expression by cytokines; cellular defense responses to viral infection.

Mendell, Nancy, 11, Ph.D., 1972, University of North Carolina at Chapel Hill: Biostatistics.

Moll, Ute 8, M.D., 1985, University of Ulm: Tumor suppressor genes; role of p53 in human cancer.

Reinitz, John 11, Ph.D., 1988, Yale University: Computational biology; modeling of gene regulatory networks.

Smith, Steven O. 2, Ph.D., 1985, University of California, Berkeley: Structure and function of membrane proteins.

Thomsen, Gerald 2, Ph.D., 1988, Rockefeller University: Embryonic developmental mechanisms, regeneration, stem cells and the evolution of developmental processes.

Associate Professors

Canli, Turhan 13, Ph.D., 1993, Yale University: Biopsychology, Neural and genetic basis of emotion and cognition.

Crawford, Howard 6, Ph.D.: University of Texas Southwestern Medical Center at Dallas: Pancreatic cancer.

Hadjiargyrou, Michael 9, Ph.D., 1992, City University of New York: Human molecular genetics; functional genomics; molecular mechanisms of bone development and regeneration.


Holdener, Bernadette 2, Ph.D., 1990, University of Illinois: The role of protein folding and O-fucosylation during embryonic development and stem cell differentiation.

Hollingsworth, Nancy 2, Ph.D., 1988, University of Washington, Seattle: Regulation of meiotic recombination in yeast.

Karzai, Wali 2, Ph.D., 1995, Johns Hopkins University: Structure and function of RNA-binding proteins and biochemical studies of the SmpB-SsrA quality control system

Kernan, Maurice 1, Ph.D., 1990, University of Wisconsin: Genetics of touch and hearing in Drosophila; ciliogenesis and ciliarysignaling.

Leatherwood, Janet 3, Ph.D., 1993, Johns Hopkins University: Cell cycle control of DNA replication.

Neiman, Aaron 2, Ph.D., 1994, University of California, San Francisco: Vesicle trafficking and intracellular signaling in yeast.

Sirotkin, Howard 1, Ph.D., 1996, Albert Einstein: Specification and patterning of the neural plate; vertebrate developmental genetics.

Thanassi, David 3, Ph.D., 1995, University of California, Berkeley: Biogenesis of bacterial adhesion organelles.

True, John R. 4, Ph.D., 1995, Duke University; Evolutionary and developmental genetics of color patterning in Drosophila.

Tsirka, Stella 6, Ph.D., 1989, Aristotelian University of Thessaloniki, Greece: Tissue plasminogen activator in the mammalian hippocampus; neuronal-microglial interactions.

White, Thomas 12, Ph.D., 1994, Harvard Medical School: Gap junction functions defined by genetic diseases and gene knockouts.

Assistant Professors

Carpino, Nicholas 6, Ph.D., 1997, Stony Brook University: Positive and Negative Regulation of T Cell Receptor Signaling

Cohen, J. Craig 14, Ph.D., 1976, University of Mississippi Medical Center: Molecular genetics and physiology, gene therapy.

Colognato, Holly 6, Ph.D., 1999, Rutgers University: Extracellular matrix in the brain: roles during development and during neurodegeneration.
Czaplinski, Kevin², Ph.D., 1999, UMDNJ-Robert Wood Johnson Medical School; Post transcriptional control of gene expression in the nervous system.


Ge, Shaoyu¹, Ph.D., University of Science and Technology of China: Molecular mechanisms and function of new neurons in the brain.

Hsieh, Jen-Chih², Ph.D., 1994, Duke University: The molecular mechanism of Wnt signaling

Krug, Laurie, Ph.D., 2001, Emory University: Virus-host interactions during chronic gammaherpesvirus infection.

Rest, Joshua S.⁴, Ph.D. 2004, University of Michigan: Regulatory evolution; protein network evolution; bioinformatics.

Takemaru, Ken-Ichi⁶, Ph.D. Graduate University for Advanced Studies, Japan: Wnt Signaling in Development and Disease.

van der Velden, Adrianus³, Ph.D., 2000, Oregon Health and Science University: Salmonella pathogenesis.

Zong, Wei-Xing³, Ph.D., 1999, UMDNJ - Robert Wood Johnson Medical School, New Jersey: Molecular regulation of apoptotic and necrotic cell death.

Adjunct Faculty at Cold Spring Harbor Laboratory

Dubnau, Josh, Assistant Professor. Ph.D., 1995 Columbia University, Learning, memory, genetics, behavior.

Enikolopov, Grigori, Associate Professor. Ph.D., 1978, USSR Academy of Sciences: Stem cell; neurogenesis; development; signal transduction.


Huang, Z. Josh, Professor. Ph.D., 1994, Brandeis University: Neuroscience; experience-dependent development of the neocortex; mouse genetics; neurotrophins.


Joshua-Tor, Leemor, Professor. Ph.D., 1990, Weizmann: Structural biology; nucleic acid regulation; RNAi; molecular recognition; X-ray crystallography.

Kraimer, Adrian R., Professor. Ph.D., 1986, Harvard University: Posttranscriptional control of gene expression; pre-mRNA splicing mechanisms, fidelity and genetic diseases; alternative splicing; RNA-protein interactions; cell-free systems

Lazebnik, Yuri, Professor. Ph.D., 1986, St. Petersburg State University: Apoptosis; caspases; cancer chemotherapy; proteases

Li, Bo, Assistant Professor, Ph.D., 2003, The University of British Columbia: neuroscience; glutamatergic synapse; synaptic plasticity; schizophrenia; depression; rodent models of psychiatric disorders.

Lowe, Scott, Professor. Ph.D., 1994, Massachusetts Institute of Technology: Modulation of apoptosis; chemosensitivity; senescence by cancer genes.

Lucito, Robert, Assistant Professor, Ph.D., 1993, New York University: Genome microarrays; copy number fluctuation; cancer genomics; amplification; deletion; oncogene; tumor suppressor.

Martienssen, Robert, Professor. Ph.D., 1986, University of Cambridge: Plant genetics; transposons; development; gene regulation; DNA methylation.

McCombie, W. Richard, Professor. Ph.D., 1982, University of Michigan: Genome structure; DNA sequencing; computational molecular biology; Human Genome Project.

Mills, Alea, Associate Professor. Ph.D., 1997, University of California, Irvine: Functional genomics; tumorigenesis; development.

Muthuswamy, Senthil, Associate Professor. Ph.D., 1995, McMaster University: Understanding cancer initiation using 3-D epithelial structures.

Powers, Scott, Associate Professor, Ph.D., 1983, Columbia University: Cancer gene discovery; cancer diagnostics and therapeutics; cancer biology

Sebat, Jonathan, Assistant Professor, Ph.D., 2002, University of Idaho: Copy number variation; segmental duplication; genetics; neurogenetics; ROMA; microarray
Sordella, Raffaella, Assistant Professor, Ph.D., 1998, University of Turin: Molecular therapeutics, signal transduction.

Spector, David L., Professor. Ph.D., 1980, Rutgers University: Cell biology; gene expression; nuclear structure; microscopy; non-coding RNAs.

Stenlund, Arne, Associate Professor. Ph.D., 1984, Uppsala, Sweden: Papillomavirus; cancer; DNA replication.

Stillman, Bruce, Professor. Ph.D., 1979, Australian National University: DNA replication; chromatin assembly; biochemistry; yeast genetics; cancer; cell cycle.

Timmermans, Marja, Professor. Ph.D., 1996, Rutgers University: Small RNA regulation, pattern formation, stem cell function, plant development.

Trotman, Lloyd, Assistant Professor, Ph.D., 2001, University of Zurich: Molecular mechanisms of tumor suppression; cancer modeling and treatment; molecular cancer visualization; PTEN regulation.


Wigler, Michael H., Professor. Ph.D., 1978, Columbia University: Genomics; cancer genes; signal transduction; yeast genetics; bioinformatics.

Zhang, Michael Q., Professor. Ph.D., 1987, Rutgers University: Computational genomics; statistical pattern recognition; gene expression and regulation.

Zhong, Yi, Professor. Ph.D., 1991, University of Iowa: Neurophysiology; Drosophila; learning and memory; neurofibromatosis; signal transduction.

Research Faculty at Brookhaven National Laboratory


Dunn, John J., Senior Microbiologist. Ph.D., 1970, Rutgers University: Transcription, processing, and translation of RNA.

Freimuth, Paul I., Scientist, Ph.D. 1986, Columbia University: Mechanism of adenovirus entry into cells; role of cell adhesion molecules.

Fu, Dax, Biochemist, Ph.D., 1996, Mayo Graduate School of Medicine: Structures of representative channel and transporter proteins.

Henn, Fritz A., Senior Scientist and Associate Laboratory Director for Life Sciences, Ph.D., 1967. The Johns Hopkins University School of Medicine, M.D., 1971, University of Virginia: Cell circuits and genes, pathology of depression.

Number of teaching, graduate, and research assistants, Fall 2009: 50

1) Department of Neurobiology and Behavior
2) Department of Biochemistry and Cell Biology
3) Department of Molecular Genetics and Microbiology
4) Department of Ecology and Evolution
5) Department of Medicine
6) Department of Pharmacological Sciences
7) Department of Oral Biology and Pathology
8) Department of Pathology
9) Department of Orthopaedics
10) Department of Computer Sciences
11) Department of Applied Mathematics and Statistics
12) Department of Biophysics and Physiology
13) Department of Psychology
14) Department of Pediatrics, Neonatology

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.