The Graduate Program in Genetics at Stony Brook University 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. 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 dissertation 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 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 dissertation advisors also hold internal lab research seminars in which students present and discuss their latest findings.

Admission Requirements of Genetics Program

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 2014-2015 academic year is $27,680. 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 Program

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 the Departments of Medicine, Pathology, Pharmacological Sciences and Physiology and Biophysics. In addition, 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 three interdepartmental.
thematic research centers: The Centers for Developmental Genetics, Infectious Diseases, 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 among Stony Brook scientists with common interest in these areas of modern biology, irrespective of their departmental affiliation.

Cold Spring Harbor Laboratory 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 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 phenomena. 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 for the Ph.D. Degree in Genetics

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. Cell Biology (MCB 656)
4. Graduate Student Seminar in Genetics (BGE 531) must be taken each semester.

5. 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 dissertation 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.

6. 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.

7. Each student must take two or more elective courses, for a minimum total of 6 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).

8. 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.

9. 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 comprehensive (preliminary) examination covering diverse areas of genetics which tests each student’s ability to read and interpret primary scientific literature.

C. Dissertation Proposal Examination
After successful completion of the comprehensive (preliminary) examination, the student prepares a written proposal for the dissertation research project. This proposal has the format of a grant application, including information on 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 dissertation 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 dissertation proposal defense should occur during the fifth semester of graduate study. Generally, the faculty who participate in a student’s proposal examination committee then join with the advisor to form the student’s dissertation advisory committee.

D. Advancement to Candidacy
After successful completion of all required and elective courses, the comprehensive (preliminary) examination, and the dissertation proposal examination, the student will be recommended to the Graduate School for advancement to candidacy. Each student must meet with his/her dissertation 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 dissertation 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 audience. Subsequently, the candidate defends the dissertation to the examining committee in a closed session.

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 Graduate Program in Genetics

Distinguished Professors

Benach, Jorge, Ph.D., 1971, Rutgers University: Pathogenesis of and host responses to spirochetal infections.

Grollman, Arthur, M.D., Johns Hopkins University: DNA damage, mutagenesis and repair; chemical carcinogenesis.

Rubin, Clinton, Ph.D., 1983, Bristol University: Tissue adaptation; biophysical treatment of musculoskeletal disorders.

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.

Leading Professor

Malbon, Craig, Ph.D., 1976, Case Western Reserve University: Wnt-frizzled signaling via G-proteins in development; analysis of signaling complexes.

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 biology; ichthyology; paleobiology; geographic variation.

Bliska, James, Ph.D., 1988, University of California, Berkeley: Molecular and cellular basis of bacterial-host cell interactions.

Bogenhagen, Daniel, M.D., 1977, Stanford University: Replication, transcription, and repair of mammalian mitochondrial DNA; mitochondrial proteomics.


Carter, Carol, Ph.D., 1972, Yale University: HIV and retroviral assembly and replication.

Citovsky, Vitaly, Ph.D., 1987, Hebrew University, Jerusalem: Nuclear transport and intercellular communication in plants.

Del Poeta, Maurizio, M.D., 1992, University of Ancona, Italy: Role of sphingolipids in mediating signaling pathways and fungal pathogenesis.

Demple, Bruce, Ph.D., 1981, University of California, Berkeley: Mechanisms and roles of human enzymes that repair oxidative (free radical) damage in DNA.

Deutsch, Dale, Ph.D., 1972, Purdue University: Metabolism and uptake of the endocannabinoids (anandamide and 2-AG).


Frohman, Michael, M.D., Ph.D., 1985, University of Pennsylvania: Lipid signaling; vesicle trafficking and fusion; mitochondrial fusion; myogenesis.

Furie, Martha, Ph.D., 1980, Rockefeller University: Interactions among endothelial cells, leukocytes, and pathogenic bacteria.

Futcher, A. Bruce, D.Phil., 1981, University of Oxford: Cell cycle control, microarrays, genomics.


Ghebrehiwet, Berhane, D.V.M./D.Sc., 1974, University of Paris, France: Role of complement C1q receptors during infection and inflammation.


Hollingsworth, Nancy, Ph.D., 1988, University of Washington, Seattle: Regulation of meiotic recombination in yeast.
Kaushansky, Kenneth\textsuperscript{5}, M.D., M.A.C.P., 1979, University of California, Los Angeles: Molecular and cellular biology of thrombopoietin.

Konopka, James\textsuperscript{6}, Ph.D., 1985, University of California, Los Angeles: G-protein coupled receptor signal transduction; fungal pathogenesis (\textit{Candida albicans}).

Kritzer, Mary\textsuperscript{7}, Ph.D., 1989, Yale University: Sex differences in cortical microcircuitry.

Lin, Richard Z.\textsuperscript{10}, M.D., 1988, University of California, San Francisco: Physiology of phosphoinositide 3-kinase signaling.

Mackow, Erich R.\textsuperscript{6}, Ph.D., 1984, Temple University: Viral regulation of cell signaling responses; hantavirus, influenza, dengue and rotavirus pathogenesis.


Marshall, Nancy Reich, Ph.D.\textsuperscript{6}, 1983, Stony Brook University: Signal transduction and activation of gene expression by cytokines; cellular defense responses to viral infection.

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


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

Thanassi, David\textsuperscript{6}, Ph.D., 1995, University of California, Berkeley: Biogenesis of bacterial adhesion organelles.

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

Tsirka, Styliana-Anna\textsuperscript{9}, Ph.D., 1989, Aristotelian University of Thessaloniki, Greece: Neuronal-microglial interactions in the physiology and pathology of the central nervous system.

White, Thomas\textsuperscript{10}, Ph.D., 1994, Harvard Medical School: Gap junction functions defined by genetic diseases and gene knockouts.

Zong, Wei-Xing\textsuperscript{6}, Ph.D., 1999, UMDNJ - Robert Wood Johnson Medical School: Molecular regulation of apoptotic and necrotic cell death.

Associate Professors

Bingham, Paul\textsuperscript{2}, Ph.D., 1979, Harvard University: Regulation of differentiation; transposable elements; regulation of splicing.

Canli, Turhan\textsuperscript{11}, Ph.D., 1993, Yale University: Biopsychology; neural and genetic basis of emotion and cognition.

Cao, Jian\textsuperscript{5}, M.D., 1986, Zhengzhou University School of Medicine: M.S., 1992, Peking Union Medical College/Chinese Academy of MedicalSciences: Cancer invasion/metastasis and anti-cancer drug discovery.

Carpino, Nicholas\textsuperscript{6}, Ph.D., 1997, Stony Brook University: Positive and negative regulation of T cell receptor signaling.

Chen, Jiang\textsuperscript{8}, M.D., Ph.D., 1995, Henan Medical University, China; 2001, University of Heidelberg, Germany: Planar cell polarity and primary cilia in skin and hair follicle development and skin cancers.

Colognato, Holly\textsuperscript{9}, Ph.D., 1999, Rutgers University: Extracellular matrix in the brain: roles during development and neurodegeneration.

Czapinski, Kevin\textsuperscript{2}, Ph.D., 1999, UMDNJ-Robert Wood Johnson Medical School: Post-transcriptional control of gene expression in the nervous system.

Girnun, Geoffrey D.\textsuperscript{8}, Ph.D., 1999, University of Iowa: Cancer metabolism and transcriptional regulation.

Ju, Jingfang\textsuperscript{8}, Ph.D., 1996, University of Southern California: The mechanism of translational control mediated by non-coding RNAs in cancer.

Karzai, Wali\textsuperscript{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\textsuperscript{7}, Ph.D., 1990, University of Wisconsin: Genetics of touch and hearing in \textit{Drosophila}; ciliogenesis and ciliary signaling.

Leatherwood, Janet\textsuperscript{6}, Ph.D., 1993, Johns Hopkins University: Cell cycle control of DNA replication.
Neiman, Aaron², Ph.D., 1994, University of California, San Francisco: Vesicle trafficking and intracellular signaling in yeast.

Sirotkin, Howard⁷, Ph.D., 1996, Albert Einstein College of Medicine: Specification and patterning of the neural plate; vertebrate developmental genetics.

Takemaru, Ken-Ichi⁹, Ph.D., Graduate University for Advanced Studies, Japan: Cell signaling and ciliogenesis in mammalian development, health, and disease.

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

Assistant Professors

Acosta-Martinez, Maricedes¹⁰, Ph.D., 2002, Albert Einstein College of Medicine: Neuroendocrine regulation of the reproductive axis; signal transduction pathways and metabolic control.

Aguirre, Adan⁹, Ph.D., 2002, Centro de Investigacion y de Estudios Avanzados IPN, Mexico: Endogenous NG2 progenitor cells as cell-based replacement for a variety of brain pathologies.

Chan, Chia-Hsin⁹, Ph.D. 2007, National Taiwan University: Molecular mechanisms of cancer development; cancer metabolism and stemness.

Davalos, Liliana M.⁴, Ph.D., 2004, Columbia University: Conservation biology; climate change; phylogeny.

Ge, Shaoyu⁷, Ph.D., University of Science and Technology of China: Molecular mechanisms and function of new neurons in the brain.

Henn, Brenna⁴, Ph.D., 2009, Stanford University: Human evolutionary genetics; population genetics; genomics.

Krug, Laurie⁶, Ph.D., 2001, Emory University: Virus-host interactions during chronic gammaherpesvirus infection.

Levy, Sasha², Ph.D., 2005, University of California, Santa Barbara: Evolutionary dynamics; network dynamics; yeast genomics; high-throughput technology development.


MacCarthy, Thomas¹, Ph.D., 2005, University College London, United Kingdom: Computational immunology; evolutionary systems biology.

Martin, Benjamin L.², Ph.D., 2005, University of California, Berkeley: Stem cell maintenance and differentiation; developmental mechanisms of cancer pathogenesis.

Matus, David Q.², Ph.D., 2006, University of Hawaii: Evolutionary, cellular, and developmental approaches to studying nematode uterine-vulval morphogenesis.

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

Seeliger, Markus⁹, Ph.D., 2004, Cambridge University, United Kingdom: Molecular mechanisms of protein kinase and ubiquitin ligase signaling in cancer and aging.

Shelly, Maya⁷, Ph.D., 2004, Weizmann Institute of Science, Israel: Molecular mechanisms of embryonic brain development; axon regeneration; neurodegenerative disorders.

van der Velden, Adrianus⁶, Ph.D., 2000, Oregon Health and Science University: The mammalian T cell response to *Salmonella enterica* serovar Typhimurium.

Research Faculty

Luberto, Chiara¹⁰, Ph.D., 1997, Catholic University of Rome: Sphingolipid metabolism and signaling.

Zachar, Zuzana², Ph.D., 1992, Stony Brook University: Cancer chemotherapy and drug discovery.

Adjunct Faculty at Cold Spring Harbor Laboratory

Dubnau, Joshua, Associate Professor. Ph.D., 1995, Columbia University: Learning; memory; genetics; behavior.

Egeblad, Mikala, Associate Professor. Ph.D., 2000, University of Copenhagen and the Danish Cancer Society: Tumor microenvironment; intravital imaging; tumor-associated myeloid cells; breast cancer.

Enikolopov, Grigori, Associate Professor. Ph.D., 1978, Institute of Molecular Biology, Russian Academy of Sciences, Moscow: Stem cells; neurogenesis; imaging; signal transduction.


Huang, Z. Josh, Professor. Ph.D., 1994, Brandeis University: Development and function of the GABAergic inhibitory circuitry in neocortex; developmental plasticity; neurogenomics; autism.


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


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

Lyon, Gholson J., Assistant Professor. M.D., 2004, Ph.D., 2003, Weill Cornell Medical College, Rockefeller University: Amino-terminal acetylation of proteins; human genetics; neuropsychiatric diseases; whole genome sequencing.

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

McCombie, W. Richard, Professor. Ph.D., 1982, University of Michigan: Human genetics; human genome variation; personal genomics; genetics of psychiatric disorders; genetics of cancer, computational molecular biology.

Mills, Alea A., Professor. Ph.D., 1997, University of California, Irvine: Cancer; development; aging; senescence; epigenetics; autism.

Sordella, Raffaella, Associate Professor, Ph.D., 1998, University of Turin, Italy: Molecular therapeutics; signal transduction.

Spector, David L., Professor. Ph.D., 1980, Rutgers University: Cancer; development; aging; senescence; epigenetics; autism.

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

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

Tonks, Nicholas K., Professor. Ph.D., University of Dundee: Posttranslational modification; phosphorylation; phosphatases; signal transduction; protein structure and function.

Trotman, Lloyd C., Associate Professor, Ph.D., 2001, University of Zurich: Cancer modeling and treatment; senescence and tumor progression; cancer visualization; PTEN regulation.

Tuveson, David A., Professor. M.D., Ph.D., 1994, Johns Hopkins University: Pancreatic cancer; experimental therapeutics; diagnostics; mouse models; cancer genetics.

VanAelst, Linda, Professor. Ph.D., 1991, Catholic University of Leuven, Belgium: Signal transduction; Ras and Rho proteins; tumorigenesis; neuronal development and disorders.


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

Research Faculty at Brookhaven National Laboratory


Fu, Dax, Biochemist. Ph.D., 1996, Mayo Graduate School of Medicine: Biochemical and X-ray crystallographic studies of transmembrane active processes via membrane channels and transporters.

Number of teaching, graduate, and research assistants, Fall 2014: 41

1) Department of Applied Mathematics and Statistics

2) Department of Biochemistry and Cell Biology
3) Department of Biomedical Engineering
4) Department of Ecology and Evolution
5) Department of Medicine
6) Department of Molecular Genetics and Microbiology
7) Department of Neurobiology and Behavior
8) Department of Pathology
9) Department of Pharmacological Sciences
10) Department of Physiology and Biophysics
11) Department of Psychology

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