



**VILCEK INSTITUTE OF  
GRADUATE BIOMEDICAL SCIENCES**

# **PhD PROGRAM**



**NYU**

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## WELCOME TO THE VILCEK INSTITUTE OF GRADUATE BIOMEDICAL SCIENCES!

At the Vilcek Institute of Graduate Biomedical Sciences, we're dedicated to fostering the next generation of brilliant scientific minds. As part of the NYU Grossman School of Medicine and NYU Langone Health, our institute is home to a diverse community of aspiring scientists, each pursuing their academic passions and conducting groundbreaking research in the laboratories of our nationally and internationally recognized faculty members. Our faculty members are leaders in their respective areas of expertise and offer mentorship and guidance to our students as they pursue their research interests.

But it's not just about academics here at the Vilcek Institute. We're committed to creating an inclusive and supportive environment that encourages diversity and celebrates differences. Our students come from a variety of backgrounds and cultures, bringing a wealth of unique perspectives and experiences to our community. We believe that this diversity is a strength that allows us to approach scientific challenges from multiple angles and find innovative solutions to complex problems in a collaborative environment.

At the Vilcek Institute, we're not just training scientists; we're nurturing critical thinkers and problem solvers and equipping them with the skills necessary to succeed in any career. Whether our students choose to pursue careers in academia, industry, government, or beyond, they leave our program with the confidence and knowledge to excel in whatever they choose to do.

In short, the Vilcek Institute of Graduate Biomedical Sciences is more than just a graduate school; it's a community of passionate, driven individuals dedicated to advancing scientific knowledge and making a positive impact on the world.

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*Associate Dean for Research Training & Communications*  
*Research Assistant Professor,*  
*Department of Cell Biology*

**Fanta Sissoko, MS**  
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**Julia Gelman, PhD**  
*Assistant Director, Graduate Programs*

**Lisabeth Greene, MA**  
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**Kristina Diminich, MA**  
*Program Manager, MD/PhD Program*

**Sandra Squarcia, MA**  
*Program Manager, MS in Biomedical Informatics Program*

**Amanda Tufekcier**  
*Program Manager, Summer Undergraduate Research Program (SURP)*

# ACADEMICS AND CURRICULUM

We offer an Open Program model with six broad categories of training in biomedical sciences, shown in the beaker below. These categories span basic science and clinical departments, and institutes such as the Center for Advanced Imaging, Innovation, and Research and the Perlmutter Cancer Center. During the first academic year, students can perform three research rotations and select a thesis advisor and training track with the help of advisory faculty and elective courses.

Training tracks are listed below.

## Training Programs



### Typical Timeline

**Year 1:** Begin Open Program and complete rotations

**Year 2:** Complete coursework and begin research

**Year 3:** Complete qualifying exam and continue research

**Year 4:** Full-time research and schedule regular committee meetings

**Year 5:** Refine publication goals and prepare for thesis defense

We graduate ~45 PhD students and ~10 MD/PhD students per year.

To successfully obtain your PhD, we require one submitted peer-reviewed publication. Our average time to degree is 5.9 years.

# GENES, CELLS, & ORGANISMS

Genes, Cells, & Organisms encompasses Cell Biology, Developmental Genetics, and Stem Cell Biology.

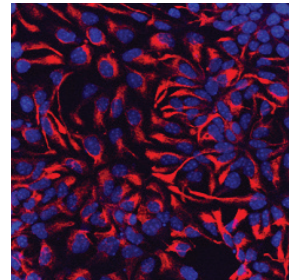
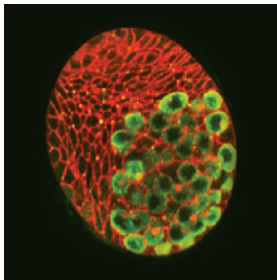
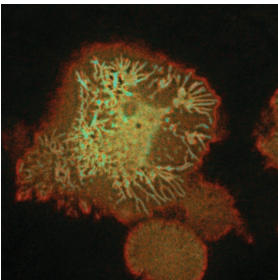
The research interests of faculty members in this broad category are directly relevant to solving major clinical problems, such as cancer, infectious diseases, diabetes, and connective tissue diseases, to name a few. Students train with an in-depth understanding of the molecular mechanisms of cell signaling, DNA damage detection, and maintenance of tissue homeostasis. Students have the opportunity to work with a wide variety of genetic systems, including *Drosophila*, *C. elegans*, mouse, bacteria, yeast, and zebrafish, among others.

## Recent Thesis Defenses:

- Molecular Mechanism of Human Evolution: Mutagenesis and its Impact on Phenotypic Innovation
- Establishment of Repressive Chromatin Domains by Polycomb Repressive Complex 2
- Generation of Traction Stress by a Migrating Tissue in the Zebrafish Embryo

## Sample Courses:

- Fundamental Discoveries in Biology
- Developmental Stem Cell Systems
- Genetics and Genomics: From Peas to People



# MECHANISMS OF DISEASE

Mechanisms of Disease includes Molecular Oncology & Tumor Immunology.

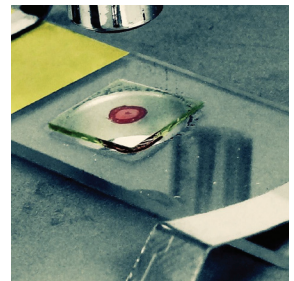
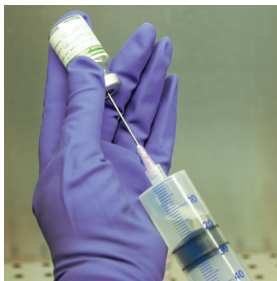
Faculty's research interests focus on translating discoveries to healthcare at the interface between biology and medicine. Laboratory research opportunities extend from basic cancer cell biology, functions of cancer stem cells, study of tumor cells in a wide range of cancer models, immunotherapies, diabetes, and more! Our faculty elucidate signaling pathways and targets, investigate structural biology in the context of drug design, and reveal receptor pharmacology for therapeutics.

## Recent Thesis Defenses:

- Exploration of Mechanisms that Govern Tumorigenesis and Anti-Tumor Immunity in Pancreatic Cancer: The Role of Aerobic Exercise
- Targeting Metabolic Dependencies in KRAS-driven Non-Small Cell Cancer
- The Impact of Stress Responses in Immune Function and Anti-Tumor Immunity

## Sample Courses:

- Translating Cancer Discovery
- Molecular Oncology
- Protein Modifications in Cell Signaling



# MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE

Interested in the immune system or the biology of bacteria, viruses, and parasites? Then choose the Microbiology, Immunology, & Infectious Disease path! Vilcek training faculty boast strengths in the areas of rheumatic diseases, lupus, neurodegenerative diseases, atherosclerosis, tuberculosis, inflammation, malaria, and COVID-19.

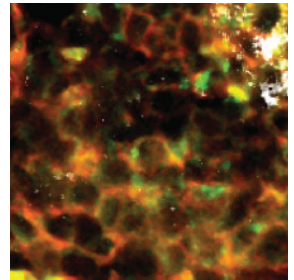
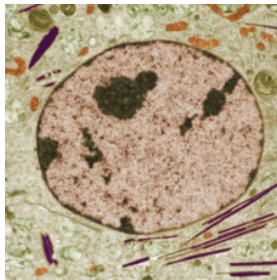
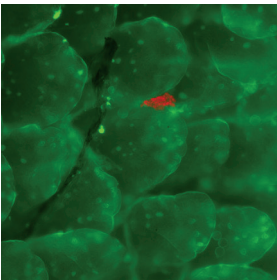
The curriculum emphasizes molecular aspects of microbial pathogenesis, with courses in cell and molecular biology, bacterial pathogenesis, virology, parasitology, medical microbiology, and immunology.

## Recent Thesis Defenses:

- Selective Inhibition of Virus Internal Ribosome Entry Sites as a Mechanism of Cellular Antiviral Defense
- Discerning the Mechanisms Involved in the Disruption of Endothelial Integrity During Cerebral Malaria
- Dissecting the Role of Secreted DNases in Protective and Autoreactive Immune Responses

## Sample Courses:

- Host-Pathogen Interactions
- Advanced Immunology
- Fundamentals of Microbiology



# NEUROSCIENCE & PHYSIOLOGY

The NYU Grossman School of Medicine Vilcek Training Program in Neuroscience & Physiology (Neuroscience Institute) is linked with the NYU Center for Neural Science (Graduate School of Arts and Science), with harmonized academic and research requirements. Our neuroscience graduate education provides integrated training that encompasses molecular, cellular, developmental, systems, cognitive, behavioral, and computational approaches.

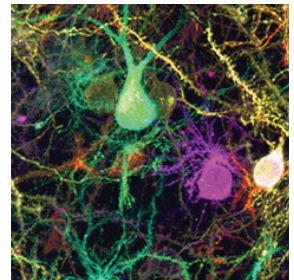
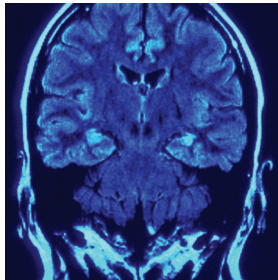
Students select one of two areas of specialization based on their research interests: Molecular, Cellular, and Translational (MCT) or Systems, Cognitive, and Computational (SCC). By specializing in one area, students are able to delve deeply into the subfields of neuroscience that most interest them. Additional advanced electives fill in areas or expand on topics directly related to the students' thesis work.

## Recent Thesis Defenses:

- The Role of Oligodendrocytes in Long-Term Memory Formation
- Identifying Determinants of Motor Neuron Functional Subtype Diversity
- The Neural Circuits that Support Wind-Guided Olfactory Navigation

## Sample Courses:

- Introduction to Cellular Neuroscience
- Molecular Mechanisms of Neurodegeneration
- Neuroanatomy



# QUANTITATIVE BIOLOGY

Quantitative Biology comprises Biochemistry & Molecular Biophysics, Biomedical Imaging & Technology, and Computational Biomedicine, all linked through their quantitative approaches and technologies to analyze and integrate biological systems.

## **Biochemistry & Molecular Biophysics:**

Training in this program, you will learn to use X-ray crystallography, nuclear magnetic resonance (NMR), cryoelectron microscopy, and other cutting-edge technologies to understand mechanisms of action of key macromolecules in biomedical research.

## **Biomedical Imaging & Technology:**

NYU Langone Health is at the forefront of magnetic resonance imaging (MRI). The program is designed for students with strong backgrounds in physics, chemistry, engineering, and a desire to apply their skills in the biological and biomedical sciences. Students have the opportunity to collaborate in cutting-edge research projects in various areas with an emphasis on MRI.

## **Computational Biomedicine:**

Students in this program will pursue studies in systems genetics, big data analytics, clinical informatics, evolutionary systems, and/or synthetic biology. The program's focus is on designing and deploying rigorous and high-impact methodological informatics innovations in translational or clinical medicine.

We are growing in the field of quantitative science—mining big data for medical breakthroughs.

## **Recent Thesis Defenses:**

- Machine Learning for Knowledge Discovery: Modeling and Explaining High-Dimensional Healthcare Data
- Quantifying Microstructural, Microvascular and Neuroinflammation Pathology in Psychotic Spectrum Disorders Using Multi-Modal MRI Neuroimaging Methods
- High-Valency anti-CD99 Antibodies Toward the Treatment of T cell Acute Lymphoblastic Leukemia

## **Sample Courses:**

- Methods in Quantitative Biology
- Fundamentals of MRI
- Machine Learning



# DATA, MEDICINE, AND HEALTH

The Data, Medicine, and Health cluster includes biostatistics, epidemiology, and population health. Students training in these programs often complete research in healthcare delivery, epidemiologic methods, health informatics, social determinants of health, high-dimensional analysis, and others.

## **Biostatistics:**

Research areas include design and analysis of clinical trials, longitudinal data analysis, meta-analysis, survival analysis, high dimensional data analysis, and disease screening. Students have the opportunity to participate in biomedical collaborations, from studies in basic biological systems to randomized clinical trials, from retrospective epidemiology studies to prospective longitudinal studies.

## **Epidemiology:**

The program offers interdisciplinary instruction with a focus on chronic disease epidemiology, designed to prepare individuals for careers in population health research and policy. The program has research strengths in environmental and behavioral epidemiology, genetics, and the human microbiome.

## **Population Health:**

Training in population health offers the opportunity to participate in ongoing studies focused on a variety of diseases, effects of drug use, as well as developing research design and causal inference methods and applications. Interdisciplinary instruction is provided to address the burden and determinants of health and health disparities in defined populations.

## **Recent Thesis Defenses:**

- Statistical Methods for Evaluating Treatments in Personalized Medicine
- Neighborhood Walkability and Obesity-related Mortality, Obesity-related Cancer Risk, and Potential Mechanisms in the NYU Women's Health Study
- Epidemiology of Vision in Multiple Sclerosis and the Role of Optic Nerve Lesions as Diagnostic Criteria

## **Sample Courses:**

- Advanced Regression Modelling
- Analytical Techniques for Healthcare Delivery Science
- Principles of Population Health Science

# SUPPORT

- Grant Incentive Program: \$2000 for each fellowship grant successfully awarded
- Travel Awards: up to \$700 per year to attend conferences
- Tutoring Program: receive free tutoring from another student or become a tutor for \$40 per hour
- Students Actively Recruiting (STAR): \$500 for students who speak at their alma mater about their science, graduate career, or both
- Computer/Housing Loans: low interest loans (4%) for financing computer purchases and housing costs based on student need and fund availability



*Washington Square Park Monument, New York University*

## **CAREER DEVELOPMENT**

Partnering with the NYU Wasserman Center for Career Development, we offer various workshops and seminars to help our graduate students with their career paths, such as Networking 101, virtual career fairs, industry job search, CV preparation, and 1:1 advising.

### **Alumni Networking Events**

We host career exploratory events to learn what types of jobs are out there for PhDs in different career paths. We invite our alumni and former NYU postdocs to return to their alma mater to share their experiences and answer questions. Careers in academia, industry, government, communications, and nonprofit are represented.

### **Biomedical Entrepreneurship Program**

The Biomedical Entrepreneurship Program helps accelerate the commercialization of biomedical discoveries and inventions made at NYU. Developed by Technology Opportunities & Ventures in collaboration with the NYU Entrepreneurial Institute, our program brings in world-class educators and entrepreneurs to train faculty, postdocs, graduate students, and clinicians to become successful entrepreneurs.

### **Science Training Enhancement Program (STEP)**

NYU Langone Health and New York University partnered to secure NIH funding for STEP, a program that was instituted to make our graduate students and postdoctoral scholars aware of the realities of the job market and to shorten and optimize time spent in training. STEP begins with career planning and exploration, following with skill building, and finally, job searching.

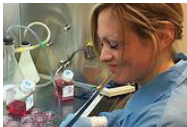
# DIVERSITY AT NYU LANGONE HEALTH

We foster an inclusive environment for our diverse students by administratively supporting student-led groups. These student-led groups host a mix of academic and social events, from inviting speakers for a research talk followed by a career discussion with students, to social events during orientation and throughout the year.



## Diversity Initiative

The Diversity Initiative hosts not only social events, but also brings in minority speakers through our Careers in STEM series to meet with students throughout the day to discuss career paths and experiences. This group also organizes forums and retreats to address events and/or issues facing underrepresented minorities more globally, creating a safe and open space for discussion.



## NYUrWiS (NYU are Women in STEM)

NYUrWiS supports women interested in pursuing careers in the fields of science, technology, engineering, and mathematics. Through their seminar series, mentorship program, and informal socials, they aspire to help women achieve their professional goals in the scientific realm.



## SQuAd (Student Queer Association)

The SQuAd hosts events for our LGBTQ+ students to socialize and network, which include happy hours, movie viewings, the Pride Run, and small group dinners. They aim to facilitate discussions around questions, concerns, challenges, and successes that members of the LGBTQ+ community face.

## Student Clubs

- BioTech Club
- Board Game Club
- Chinese Students and Scholars Association
- Committee for the Respectful and Ethical Advancement of Trainees and Educators (CREATE)
- Community Research Consulting Initiative
- Consulting Club
- Kick-starting Interest in Degrees in Science
- Neuroethics Club
- Neuroscience Outreach Group at NYU
- NeuWrite Downtown
- NYU Rugby Club
- Raíces (Latin American Student Association)
- SCI+FAI Club (Science and Faith Club)
- Science Communications (SciCom Club)
- Scigraphy

# HOUSING AND BENEFITS

## Stipend & Tuition

The annual stipend for all graduate students for the 2023-2024 academic year is \$45,890. Students are paid on the 1st day of each month (starting September 1st). NYU Grossman School of Medicine pays tuition for all PhD program courses.

## Housing

We offer subsidized housing to matriculated students in housing complexes within or near NYU Langone Health, located in the neighborhood of Murray Hill in Manhattan. Students are offered housing licenses (“leases”) for up to one year at a time.

## Medical Insurance

All incoming and continuing students are entitled to receive medical benefits by the NYU Langone Health. During orientation, students select healthcare coverage from the NYU UnitedHealthcare or Empire NYU Care and a comprehensive prescription plan. Dental and vision coverage are available for an additional cost.

## Mental Health Benefits

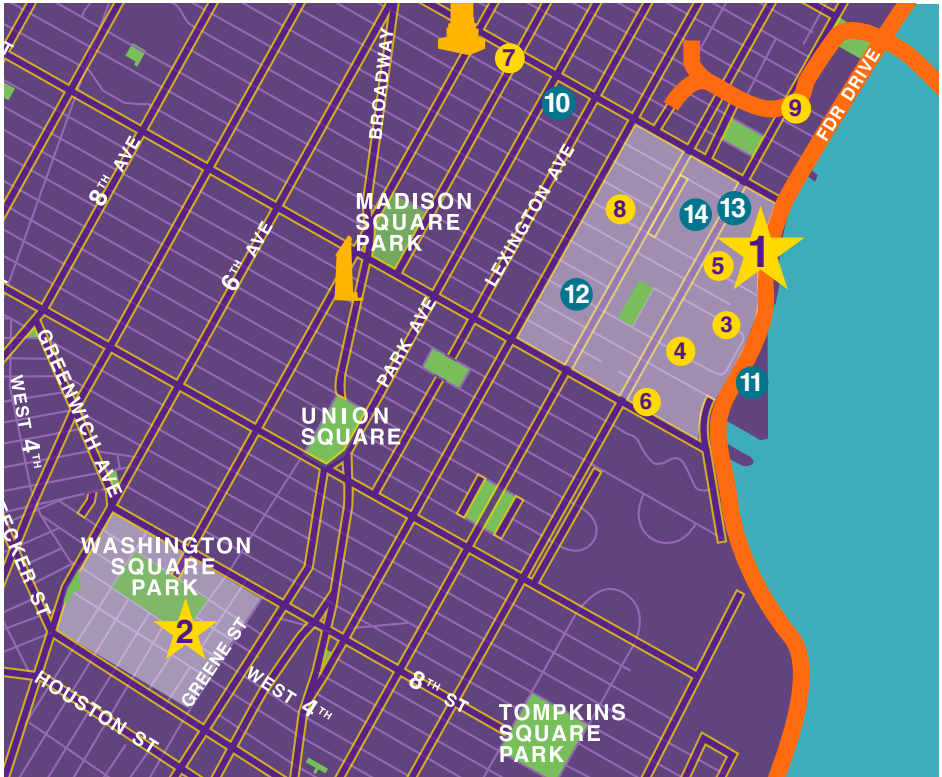
In addition to counseling services offered by Corporate Counseling Associates (CCA), PhD students have access to a dedicated and confidential counseling and referral service. This dedicated licensed psychologist will assess needs and refer you to care as needed, by someone in network who participates in your insurance plan.

## Commuter Benefit Program

PhD students are eligible to sign up for WageWorks, the commuter benefit program. This allows students to pay for their metro card, train ticket, or parking on a pre-tax basis to save money on transportation.



# MAP OF NYU LANGONE HEALTH, NEW YORK UNIVERSITY, AND STUDENT HOUSING



## NYU Langone Health & NYU

1. NYU Langone Health
2. NYU Washington Square Campus
3. Alexandria Center for Life Science
4. Bellevue Hospital
5. Graduate School Office
6. VA Hospital
7. 180 Madison Ave (Population Health)
8. Translational Research Building
9. 660 First Ave (Biomedical Imaging)

## Student Housing

10. Housing Services Office
11. Waterside Plaza LLC
12. Vilcek Hall, 334 E 26th St
13. Lipton Hall, 564 1st Ave
14. Greenberg Hall, 545 1st Ave

## OUR MISSION

**We are dedicated to the mission of training future scientists and critical thinkers by fostering an inclusive and collegial environment supportive of scientific discovery and professional growth.**

### **We do this by:**

- developing and managing high quality academic programs for our student scholars, including opportunities to engage in cutting-edge research at a world-renowned academic medical center.
- providing an environment in which students integrate with our research community to not only gain expertise and excel at original research in their fields, but also to develop skills spanning any career, i.e., critical thinking, problem solving, ethical training, and oral and written communication.
- working to advance the diversity of graduate education through recruitment, retention, and support of underrepresented groups.
- continually evaluating our academic programs and establishing initiatives to best fit the needs of our community in a changing research landscape.

Application opens August 1, 2023 - December 1, 2023 (5pm ET)

<https://apply.vilcek.med.nyu.edu/apply/>





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