MESSAGE FROM THE DEAN

Dear Aspiring Students,

We are witnessing a golden age in the biomedical sciences. A limitless array of discoveries and technologies continues to advance our knowledge of the world. These innovations present new approaches to combat human diseases. The Vilcek Institute of Graduate Biomedical Sciences at NYU Grossman School of Medicine provides a solid path leading to a PhD or MD/PhD. Our mission is to train the next generation of researchers so that you too could contribute to breakthroughs and advance society at large in many ways.

Becoming an accomplished researcher requires an inquisitive mind and perseverance. It also calls for active mentorship and hands on research experience. Our students receive rigorous training to become independent scientists. They learn to hone innate curiosity, be critical thinkers, versatile problem solvers, team players, and future leaders.

I invite you to explore our website to learn more about our program. Please do not hesitate to contact us with any questions at vilcek info@nyulangone.org.

Sincerely,

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Associate Dean for Biomedical Sciences
Director, Vilcek Institute of Graduate Biomedical Sciences
Professor, Department of Microbiology

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The Vilcek Institute of Graduate Biomedical Sciences at NYU Grossman School of Medicine adheres to an Open Program model. Our training in the biomedical sciences can be broadly categorized into: Genes, Cells, & Organisms; Mechanisms of Disease; Microbiology, Immunology, & Infectious Disease; Neuroscience & Physiology; Quantitative Biology; and Data, Medicine, & Health. These broad categories span basic science and clinical departments, and institutes. Institutes include Center for Advanced Imaging, Innovation, and Research; Health Technology and Engineering Institute (Tech4Health); Center for Human Genetics & Genomics; Institute for Computational Medicine; Institute for Systems Genetics; Neuroscience Institute; Perlmutter Cancer Center; and Kimmel Center for Stem Cell Biology.

During their first academic year, students have the opportunity to perform three research rotations in the laboratory of any training faculty member. At the end of the year they select both a thesis advisor amongst their rotation mentors and a training track, illustrated below. This is accomplished with the help of advisory faculty, as well as participation in faculty/student seminars and elective courses in the various disciplines.

**Training Programs**

**GENES, CELLS, & ORGANISMS**
- Cell Biology
- Developmental Genetics
- Stem Cell Biology

**MECHANISMS OF DISEASE**
- Molecular Oncology & Tumor Immunology
- Molecular Pharmacology

**MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE**
- Immunology & Inflammation
- Microbiology

**NEUROSCIENCE & PHYSIOLOGY**
- Molecular, Cellular, & Translational Neuroscience
- Systems, Cognitive, & Computational Neuroscience

**QUANTITATIVE BIOLOGY**
- Biochemistry & Molecular Biophysics
- Biomedical Imaging & Technology
- Systems & Computational Biomedicine

**DATA, MEDICINE, & HEALTH**
- Biostatistics
- Epidemiology
- Population Health

**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 publication. Our average time to degree is 5.8 years.
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:**

- Persistent Telomere Cohesion Protects Aged Cells from Premature Senescence
- Lost and Found and Plexin A Contribute to Visual Circuit Development in Drosophila
- Alternative Splicing Is a Developmental Switch for hTERT Expression

**Sample Courses:**

- Cell Biology
- Developmental Stem Cell Systems
- Genome Integrity
MECHANISMS OF DISEASE

Mechanisms of Disease includes Molecular Oncology & Tumor Immunology and Molecular Pharmacology.

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, function of cancer stem cells, study of tumor cells in a wide range of cancer models, anti-tumor vaccine development, 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:

• Identification and Characterization of Circular RNAs in Metastatic Melanoma
• Molecular and Computational Examination of De Novo Protein Synthesis in Fragile X Syndrome
• Function and Perturbation of β-catenin in Prostate Cancer

Sample Courses:

• Drug Development and Pharmacology
• Molecular Oncology
• Protein Modifications in Cell Signaling
Interested in the immune system or in 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, 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:**
- The Roles of Autophagy and Atg16L1 During Enteric Bacterial Infections
- *Staphylococcus aureus* Leukocidins Target Endothelial DARC to Cause Lethality in Mice
- Long Non-Coding RNA CHROMR Regulates Immune Response Genes

**Sample Courses:**
- Host-Pathogen Interactions
- Advanced Immunology
- Fundamentals in Microbiology and Microbial Pathogenesis
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:**

- Growth Factor-Induced Plasticity in Development and Learning: Effects on Presynaptic and Postsynaptic Signaling
- Behavioral Readout of Spatio-temporal Codes in Olfaction
- Sleep Disturbance and Psychopathology Following Developmental Trauma

**Sample Courses:**

- Introduction to Cellular Neuroscience
- Molecular Mechanisms of Neurodegeneration
- Neuroanatomy
Quantitative Biology comprises Biochemistry & Molecular Biophysics, Biomedical Imaging & Technology, and Systems & 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.

Systems & 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:
• Structure-Activity-Relationships in Cav Voltage-Gated Calcium Channels
• Revealing Brain Microstructure with Time-Dependent Diffusion MRI
• Studying Cell Populations Structure in Complex and Dynamic Systems using High Throughput Single-Cell RNA-Seq

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 in 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.

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**Sample Courses:**

- Advanced Regression Modelling
- Healthcare Delivery Science
- Introduction to Health Informatics
- Molecular Epidemiology
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
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 maters 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 Ventures and Partnerships 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 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.

LGBTQ+ (Lesbian, Gay, Bisexual, Transgender, and Queer)

The LGBTQ+ 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
- Black Student Association
- Board Game Club
- Chinese Students and Scholars Association
- Coding Club
- Committee for the Respectful and Ethical Advancement of Trainees and Educators (CREATE)
- Consulting Club
- Kick-starting Interest in Degrees in Science
- Muslim Students Association (Ibn Sina)
- 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)
- Students Advocating for Science, Education, and Medicine (SASEM)
HOUSING AND BENEFITS

Stipend & Tuition
The annual stipend for all graduate students for the 2020-2021 academic year is $40,380. 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 is 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.
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
15. 323 E 14th St
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, 2020 - December 1, 2020 (5pm EST) https://apply.vilcek.med.nyu.edu/apply/