At NYU, neuroscience graduate education provides integrated training that encompasses molecular, cellular, developmental, systems, cognitive, behavioral, and computational approaches to address the most important questions in the field. Doctoral training in neuroscience at NYU builds on the diversity and strength of research throughout many interrelated departments and multiple campuses, especially among those within the Center for Neural Science, the NYU Neuroscience Institute, and NYU Shanghai.

Students receive a comprehensive, interdisciplinary neuroscience education, and they have the opportunity to sample different research experiences before they commit to a topic area and laboratory. Training strongly emphasizes research at the highest level throughout graduate school. Students also benefit directly from an interactive, collegial community and become active participants in shaping the rich, intellectual environment that complements formal training.

This brochure will introduce you to NYU’s wide array of cutting-edge neuroscience research, our faculty and graduate students, and their most recent and exciting discoveries in the field.
Key Components and Timeline of Study

Year

1  2-3 Lab Rotations (Sept-July)
   Core Neuroscience Courses
   Track-Specialized Courses

2  Select Thesis Advisor & Committee
   First Year Talk
   Advanced Elective Courses
   Thesis Research
   Qualifying Examination

3  Thesis Research continues

4  Third Year Talk
   Annual Committee Meetings

5  Dissertation & Oral Defense
   PhD in Neuroscience
NYU Neuroscience - Research Areas

**Cellular and Molecular Neuroscience**
At NYU, researchers use cutting edge techniques, including two-photon microscopy, *in vivo* labeling of individual neurons, and microarray analysis, to investigate the electrical, biochemical, and genetic properties that underlie the function of the healthy and diseased brain at the cellular and molecular level.

**Developmental Neuroscience**
The formation and growth of the nervous system can be analyzed across many levels, from molecules to behavior. Developmental neuroscientists define patterns in the normal and abnormal maturation of the nervous system and seek to find the factors that govern these underlying processes.

**Systems Neuroscience**
Our neuroscientists investigate how small and large networks of neurons form and encode or decode information in the brain for a wide variety of behaviors, including sensory perception, motor control, memory, attention, and language. In addition, many labs are interested in how microcircuits and systems malfunction in neurological and psychiatric diseases.
Computational Neuroscience
Computational modeling can help us to understand and make predictions about molecules, cells, circuits systems, cognition, or behavior. Often working in parallel with experimentalists, computational neuroscientists continually refine their models and make testable predictions about how the brain works.

Cognitive and Behavioral Neuroscience
The brain gives rise to our thoughts, behaviors, emotions, even our sense of self. Cognitive and behavioral neuroscientists at NYU reveal the neural substrates that underlie the principles of human and animal behavior, including higher order mental processes, and investigate how such processes are disrupted in neurological disorders.

Simoncelli
Neuroscience Core Faculty

- Cristina Alberini: Molecular mechanisms of long-term memory
- Chiye Aoki: Neuronal plasticity in neocortex
- Jayeeta Basu: Circuit mechanisms underlying learning
- Steven Burden: Neuromuscular synapse formation
- Gyorgy Buzsaki: Rhythms in neural networks
- Thomas Carew: Architecture of memory formation
- Kenneth Carr: Neurobiology of feeding & drug addiction
- Adam Carter: Prefrontal cortex neurons & circuits
- F. Xavier Castellanos: Attention-Deficit Hyperactivity Disorder
- Moses Chao: Neurotrophin receptor signaling
- Mitchell Chesler: Regulation of pH in the nervous system
- Jeremy Dasen: Genetics of neural circuit formation & function
- Andre Fenton: Memory, from molecules to computation
- Gord Fishell: Genetic origin of interneuron diversity
- Robert Froemke: Synaptic & cortical plasticity
- Wen-Biao Gan: Imaging *in vivo* synaptic dynamics

![Behavior Firing Rate Maps](image_url)
Neuroscience Core Faculty

Esther Gardner  
Somatosensory & motor integration

Stephen Ginsberg  
Mechanisms of neuronal degeneration

Paul Glimcher  
Interdisciplinary study of decision making

Donald Goff  
Biological mechanisms of schizophrenia

Michael Halassa  
Regulation of information processing

Michael Hawken  
Neuronal mechanisms of visual perception

Biyu He  
Neural mechanisms of perceptual awareness

David Heeger  
Computational neuroimaging

Roozbeh Kiani  
Perceptual & mnemonic decision making

Lynne Kiorpes  
Development of visual function

Eric Klann  
Molecular basis of cognition & brain disorders

Eric Lang  
Neuronal basis of motor control

Joseph LeDoux  
Memory & emotion

Efrat Levy  
Neurodegenerative disease

Dayu Lin  
Neural circuits for social behaviors

Rodolfo Llinas  
Intrinsic properties of neurons
## Neuroscience Core Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Research Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Long</td>
<td>Complex, learned motor behaviors</td>
</tr>
<tr>
<td>Wei Ji Ma</td>
<td>Behavioral &amp; neural mechanisms of perception</td>
</tr>
<tr>
<td>Paul Mathews</td>
<td>Neuronal vulnerability in Alzheimer’s disease</td>
</tr>
<tr>
<td>Anthony Movshon</td>
<td>Visual neural science</td>
</tr>
<tr>
<td>Katherine Nagel</td>
<td>Biophysics of sensory processing</td>
</tr>
<tr>
<td>Ralph Nixon</td>
<td>Cellular basis of neurodegenerative diseases</td>
</tr>
<tr>
<td>Simon Peron</td>
<td>Neural basis of sensory decision making</td>
</tr>
<tr>
<td>Bijan Pesaran</td>
<td>Neuronal dynamics &amp; decision making</td>
</tr>
<tr>
<td>Dimitris Placantonakis</td>
<td>Neurogenesis &amp; gliomagenesis</td>
</tr>
<tr>
<td>Alex Reyes</td>
<td>Functional interactions in neural networks</td>
</tr>
<tr>
<td>Margaret Rice</td>
<td>Neurophysiology of dopaminergic neurons</td>
</tr>
<tr>
<td>Dmitry Rinberg</td>
<td>Olfactory information processing</td>
</tr>
<tr>
<td>Niels Ringstad</td>
<td>Signalling pathways that modulate behavior</td>
</tr>
<tr>
<td>John Rinzel</td>
<td>Biophysical &amp; theoretical neural computations</td>
</tr>
<tr>
<td>Bernardo Rudy</td>
<td>Molecular regulation of neuronal excitability</td>
</tr>
<tr>
<td>James Salzer</td>
<td>Myelinating axons &amp; demyelination</td>
</tr>
</tbody>
</table>
Neuroscience Core Faculty

Dan Sanes  Development & plasticity of audition
Helen Scharfman  Neuronal excitability & plasticity
David Schoppik  Principles of neural circuit function
Malcolm Semple  Neurobiology of hearing
Robert Shapley  Visual physiology & perception
Einar Sigurdsson  Age-related degenerative diseases
Eero Simoncelli  Computational vision
Nicholas Stavropoulos  Genetics & molecular mechanisms of sleep
Greg Suh  Neural circuits of innate behaviors
Regina Sullivan  Neurobiology of infant attachment
Wendy Suzuki  Memory, learning & cognition
Nicolas Tritsch  Synaptic modulation of motor circuits
Richard Tsien  Activity driven signaling to the nucleus
Xiao-Jing Wang  Dynamical behavior of neural circuits
Donald Wilson  Neurobiology of memory & perception
Thomas Wisniewski  Pathogenesis of Alzheimer’s disease
Edward Ziff  Synaptic trafficking & neurological disease
# Neuroscience Associate Faculty

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Research Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen Adolph</td>
<td>Behavioral flexibility in children &amp; adults</td>
</tr>
<tr>
<td>Justin Blau</td>
<td>Behavioral genetics &amp; circadian rhythms</td>
</tr>
<tr>
<td>Richard Bonneau</td>
<td>Computational biology of protein structures</td>
</tr>
<tr>
<td>David Cai</td>
<td>Computational tools for neuroscience</td>
</tr>
<tr>
<td>Marisa Carrasco</td>
<td>Visual perception &amp; attention</td>
</tr>
<tr>
<td>Clayton Curtis</td>
<td>Prefrontal cortex, memory, &amp; action control</td>
</tr>
<tr>
<td>Lila Davachi</td>
<td>Medial temporal lobe in memory formation</td>
</tr>
<tr>
<td>Claude Desplan</td>
<td>Pattern formation &amp; development of vision</td>
</tr>
<tr>
<td>David Geiger</td>
<td>Computational vison and learning</td>
</tr>
<tr>
<td>Jorge Ghiso</td>
<td>Pathogenesis of protein folding disorders</td>
</tr>
<tr>
<td>Brice Kuhl</td>
<td>Cognitive and neural basis of memory</td>
</tr>
<tr>
<td>Michael Landy</td>
<td>Visual perception &amp; visual control of action</td>
</tr>
<tr>
<td>Yann Andre LeCun</td>
<td>Machine learning, computational neuroscience</td>
</tr>
<tr>
<td>Larry Maloney</td>
<td>Visual perception &amp; decision making</td>
</tr>
</tbody>
</table>

*Schoppik* and *Carter* images represent microscopic views of neural tissue.
Neuroscience Associate Faculty

Denis Pelli  
Charles Peskin  
Elizabeth Phelps  
David Poeppel  
Maarten Reith  
Daniel Trachina  
Daniel Turnbull  
Jonathan Winawer  

Object recognition & sensitivity  
Computational analysis of molecular dynamics  
Emotion, learning, and memory  
Neural & cognitive basis of speech perception  
Neurotransmitters, transporters, & addiction  
Statistical problems in neuroscience  
Ultrasound and MRI imaging of transgenic mice  
Mechanisms for representation of visual motion

Neuroscience Shanghai Faculty

Xingying Cai  
Jeffrey Erlich  
Li Li  
Sukbin Lim  
Xing Tian  
Xiao-Jing Wang  

Valuation, rewards, and decision making  
Learning & decision making  
Human perception of self- and object motion  
Modeling and analysis of neural systems  
Relationship between action and perception  
Dynamical behavior of neural circuits


A Selection of Recent Faculty Publications


Shapley Lab (2014). Cortical brightness adaptation when darkness and brightness produce different dynamical states in the visual cortex. *PNAS*.


Tsien Lab (2014). γCaMKII shuttles Ca2+/CaM to the nucleus to trigger CREB phosphorylation and gene expression. *Cell*.

The NYU Neuroscience Community

The NYU Neuroscience community comes together for weekly seminars and a wealth of additional scientific events that encourage interdisciplinary and cross-campus interactions to ensure a stimulating intellectual environment for graduate training.

**Joint Neuroscience Colloquia** are a fundamental component of the neuroscience community at NYU, featuring esteemed neuroscientists from around the world. Students and postdocs have the opportunity to meet with invited speakers informally to discuss their research.

The **Swartz Seminar Series** promotes the theoretical neuroscience community at NYU by inviting distinguished computational and theoretical neuroscientists to speak about their research.

**Annual Neuroscience Retreats** are held in a picturesque, upstate New York resort and bring together faculty and students for a 3-day scientific meeting focused on fostering new collaborations.

Numerous additional events - **Weekly Group Meeting, Fellows’ Seminars, SPiNES**, etc. - highlight our graduate students’ research in progress, giving them an opportunity to develop presentation skills as
The NYU Neuroscience Community

NOGN: The Neuroscience Outreach Group at NYU brings the brain to the city by visiting classrooms, hosting public events, and partnering with local educational and cultural institutions.

NeuWrite integrates the Scientific and Science Communication communities through events, talks, and a monthly workshop in order to create excellent and compelling science journalism and art.

The NYU Biotech Association hosts events that focus on applications of biomedical science in industry, business, law, and translational research.

The NYU STEP program is an NIH-funded series that helps graduate student and postdoc trainees identify career goals and provides resources needed to pursue them.
A Selection of Current NYU Neuroscience Students

Lauren Bayer Horowitz (BS, Cooper Union) is a 3rd year student in the Ringstad Lab discovering the genetic pathways that specify chemosensory neurons in *C. elegans*.

Will Adler (BA, Carleton College) is a 3rd year student in the Ma Lab, and is interested in the computations that underlie our sense of confidence in a percept.

Qiuling Li (BA, Mount Holyoke) is a 3rd year student in the Stavropoulos Lab, and is investigating the neuronal role of protein ubiquitination in regulating sleep.

Alex Berardino (BA, Boston University) is a 4th year student in the Simoncelli Lab, using computational models to reveal how the brain's architecture limits our perceptual abilities.

Andra Mihali (BA, Columbia University) is a 4th year student in the Ma Lab, and is investigating the role of microsaccades in visual short term memory.

Christopher Wilson (BA, Claremont McKenna College) is a 4th year student in the Rinberg Lab searching for the neural code that underlies concentration invariance in olfaction.

Caitlin Mullins (BA, Columbia University) is a 4th year student with the Tsien Lab, and she is interested in how neuromodulators regulate synapses, circuits, and behavior.

Ryan Shewcraft (BA, Brown University) is a 5th year student with the Pesaran Lab, and he is applying optogenetics to probe neocortical circuit dynamics in primates.
NYU Neuroscience Students By the Numbers

Training Grants

- Neuroscience Program: 8 Slots
- Visual: 4 Slots
- Molecular, Cellular & Translational: 4 Slots
- Learning, Memory, Development & Plasticity: 4 Slots

Student Fellowships, 2011-2015

- NSF
- NRSA
- Other

Alumni Placements

- Academia
- Other
- Science
- Industry
- Biotech/Pharma
- Medicine

Graduate Student Averages:

- 2.0 first author papers
- 3.6 publications
- 5.5 years to degree
A Selection of NYU Neuroscience Alumni

**Emre Aksay**, PhD ’01, is an Assistant Professor at Weill Cornell Medical College, and he investigates the molecular, cellular, and circuit mechanisms of temporal integration in neurons.

**Nicole Rust**, PhD ’04, is an Assistant Professor at the University of Pennsylvania studying how the brain stores visual memories and recognizes objects.

**Alexander Jaworski**, PhD ’06, is an Assistant Professor at Brown University studying how the complex wiring pattern of the brain is established during embryonic development.

**Wei Lu**, PhD ’06, is an Investigator at the National Institutes of Health (NINDS), where his group focuses on unraveling the molecular mechanisms of synaptic plasticity.

**Mehrdad Jazayeri**, PhD ’07, is an Assistant Professor at MIT. He is interested in the neural bases of complex behaviors such as flexible timing and sensorimotor integration.

**Anne Takesian**, PhD ’10, is a postdoctoral fellow in Takao Hensch’s lab at Harvard University and is focused on experience-dependent plasticity during critical periods.

**Jeremy Freeman**, PhD ’12, is a Group Leader at Janelia Research Campus studying how neural circuits encode and transform sensory information in order to guide behavior.

**Bianca Jones Marlin**, PhD ’14, is a postdoctoral fellow with Richard Axel at Columbia University, where she investigates the role of cognitive flexibility in innate behaviors.
NYU Neuroscience Alumni
Neuroscience faculty can be found in more than a dozen academic departments at NYU. Labs are located on both the NYU School of Medicine campus and the Washington Square campus (see the map below) as well as at the nearby Nathan S. Kline Institute for Psychiatric Research. Free shuttles provide easy access to both campuses and other areas of the city. NYC public transportation is also very convenient, and new Citibikes are easy to find on both campuses.

Labs working in all areas of neuroscience are well-equipped with state-of-the-art research facilities that support basic, translational, and clinical neuroscience.
Students receive full support throughout their tenure in graduate school so that they can devote themselves full time to their studies. Support comes from the University, a number of training grants, as well as research grants. The program also trains students in the art of grant writing, and many successfully secure fellowships from the NIH, NSF, and other sources.

To assist students, NYU provides housing benefits that offset the cost of living in New York City. Neuroscience students have access to subsidized apartments, either through the School of Medicine’s Housing Services or through the MacCracken program.
Apply to NYU Neuroscience

Applications for the Neural Science graduate program (based in the Graduate School of Arts and Science’s Center for Neural Science, and NYU Shanghai’s Institute of Brain and Cognitive Science) and the Neuroscience & Physiology graduate program (based in the School of Medicine’s Sackler Institute) jointly review applications. To learn more about the NYU Neuroscience and to access our application, visit us online.

To apply, visit neuroscience.nyu.edu.

The application deadline for Fall 2016 is December 1, 2015.

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