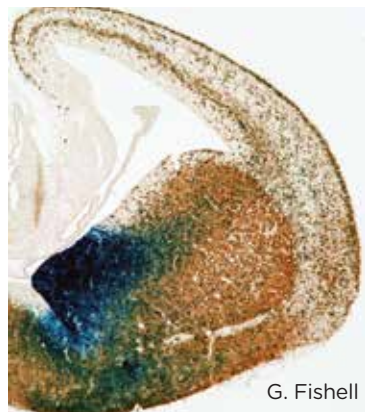
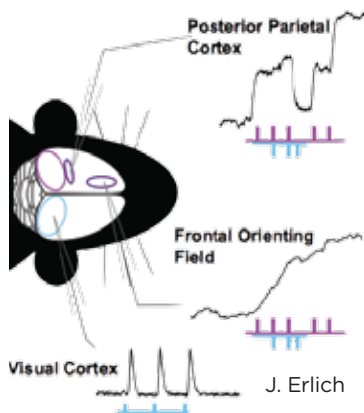
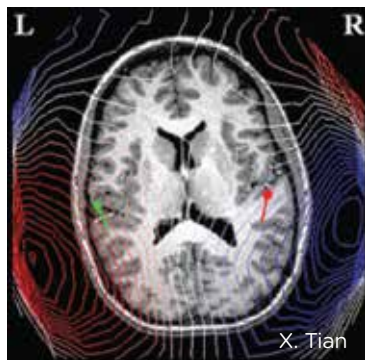
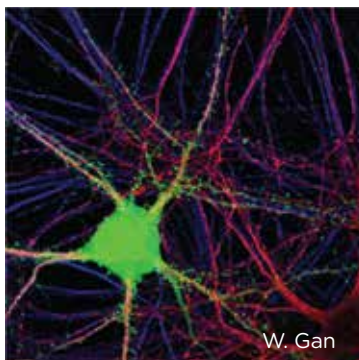


**New York University
Doctoral Program in Neural Science**

Shanghai Track



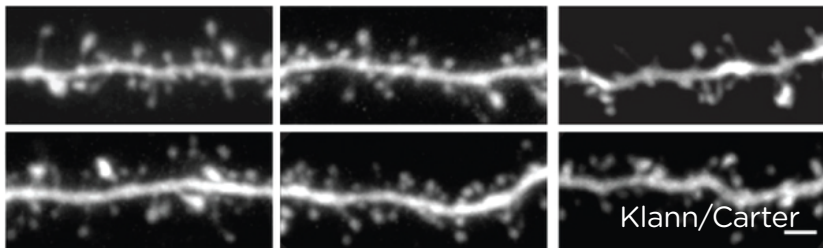


Cover image: B. Rudy

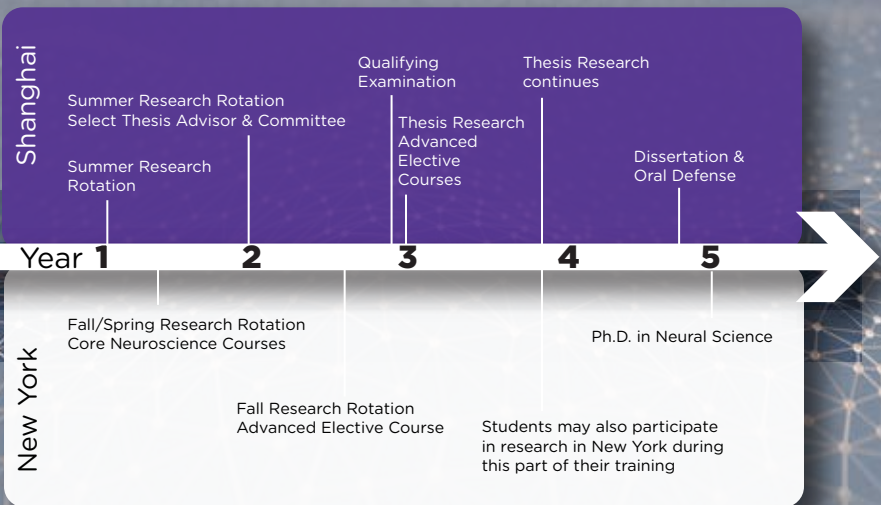
NYU Neuroscience Doctoral Education

At NYU, neuroscience graduate education provides integrated training that encompasses molecular, developmental, cellular, systems, cognitive, behavioral, and computational approaches to address the most important questions in the field. Our doctoral training program in neural science builds on the diversity and strength of research across many interrelated departments and multiple campuses, especially among the Center for Neural Science, the NYU Neuroscience Institute, and the Institute of Brain and Cognitive Science in Shanghai.

This brochure will introduce you to the *Shanghai Track* of the NYU Doctoral Program in Neural Science, including the cutting-edge neuroscience research conducted by our faculty and their most recent discoveries in the field. The *Shanghai Track* is a specialized track combining the long-standing strength of NYU's neural science program based in New York with the unique environment for research and training at the newly established NYU Shanghai, and the NYU-ECNU Institute of Brain and Cognitive Science at NYU Shanghai. Students who participate in the track will benefit from NYU's global vision of transformative teaching and innovative research. Interested students should apply to the NYU Doctoral Program in Neural Science and select Shanghai on their application.



Key Components and Timeline of Study



Students in the Shanghai track of the Doctoral Program in Neural Science will spend one and a half years at NYU in New York for course- work and laboratory rotations, before joining a laboratory in Shanghai for thesis research. They will maintain a close tie with New York, and they will receive an NYU Ph.D., typically within 6 years.

NYU Shanghai Core Faculty



Xiao-Jing Wang
Professor

Dynamical Behavior of Neural Circuits

Wang is an expert on the neurobiology of executive and cognitive functions. His group has pioneered neural circuit models of the prefrontal cortex, often called the “CEO of the brain.” From cellular mechanisms to large-scale brain circuit models, Wang is well-known for his work on memory, decision-making, communication, and other cognitively-controlled, flexible behaviors.

Before joining NYU in 2012, Wang was Professor of Neurobiology, Physics, Applied Mathematics, and Psychology at Yale University and Director of the Swartz Center for Theoretical Neuroscience.



Xinying Cai
Assistant Professor

Valuation, Rewards, and Decision Making

Cai’s research focuses on elucidating the neural underpinnings of economic decision-making. He has studied the encoding of economic value in various brain areas, most recently focusing on how abstract choice outcome is transformed into a suitable action plan.

Cai holds a Ph.D. in Bioengineering from Arizona State University and was a postdoctoral fellow at Yale University and Washington University in St Louis.

NYU Shanghai Core Faculty



Jeffrey Erlich
Assistant Professor

Competition, Stress, and Attention on Decision Making

Erlich's research interests include the neural mechanisms of decision-making, attention and emotion. His lab investigates how coherent behaviors and decisions emerge from chaotic neural activity that is driven by a combination of internal dynamics and external sensory input.

Erlich received his Ph.D. from NYU's Center for Neural Science in 2006 and completed his postdoctoral training at Princeton University.



Li Li
Associate Professor

Human Perception of Self- and Object Motion

Li's lab uses approaches from psychology, computer science, and engineering to examine how visual information affects perception and motor control of self- and object motion to understand the integration of motion perception and motor control processes.

Li has a PhD from Brown University and was a postdoctoral fellow at Harvard Medical School. Prior to joining NYU Shanghai, Li was a faculty member at the University of Hong Kong.

NYU Shanghai Core Faculty



Sukbin Lim
Assistant Professor

Modeling and Analysis of Neural Systems

Lim's research group uses a broad spectrum of dynamical systems theories, the theory of stochastic processes, and information and control theories to develop and analyze neural network models and synaptic plasticity rules for learning and memory.

Lim received her Ph.D. from NYU's Courant Institute of Mathematical Sciences in 2006 and completed her postdoctoral training at the University of Chicago.



Xing Tian
Assistant Professor

The Relationship between Action and Perception

Using electrophysiological (MEG/EEG), neuroimaging (fMRI) techniques, and behavioral, computational approaches, Tian investigates motor-sensory interactions, mental imagery, and speech and language.

Tian has a Ph.D. from the University of Maryland and, prior to joining NYU Shanghai, he was a postdoctoral fellow in the Department of Psychology at NYU.

Recent Publications from NYU Shanghai Faculty

Cai X, Padoa-Schioppa C (2014) Contributions of orbitofrontal and lateral prefrontal cortices to economic choice and the good-to-action transformation. *Neuron*.

Engel TA, Chaisangmongkon W, Freedman DJ, **Wang X-J** (2015) Choice-correlated activity fluctuations underlie learning of neuronal category representation. *Nature Communications*.

Erllich JC, Brunton BW, Duan CA, Hanks TD, Brody CD (2015) Distinct effects of prefrontal and parietal cortex inactivations on an accumulation of evidence task in the rat. *Elife*.

Li L and Niehorster DC. (2014) Influence of optic flow on the control of heading and target egocentric direction during steering toward a goal. *Journal of Neurophysiology*.

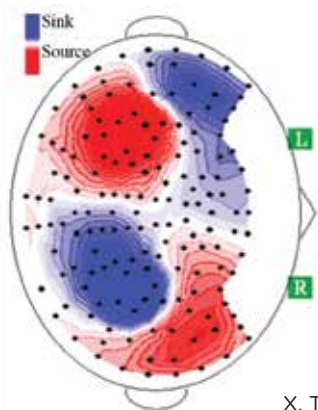
Lim S, Goldman MS. (2013) Balanced cortical microcircuitry for maintaining information in working memory. *Nature Neuroscience*.

Niehorster DC, Peli E, Haun A, and **Li L**. (2013). Influence of hemianopic visual field loss on active control of object motion. *PLoS ONE*.

Song HF, Kennedy H, **Wang X-J** (2014) Spatial embedding of structural similarity in the cerebral cortex. *Proc. Natl. Acad. Sci. USA*.

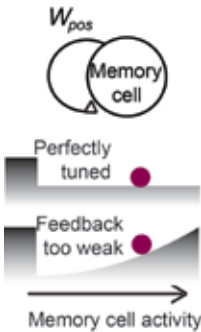
Tian X, Poeppel D (2014) Dynamics of Self-monitoring and Error Detection in Speech Production: Evidence from Mental Imagery and MEG. *Journal of Cognitive Neuroscience*.

Tian X, Poeppel D (2015) Dynamics of self-monitoring and error detection in speech production: evidence from mental imagery and MEG. *Journal of Cognitive Neuroscience*.

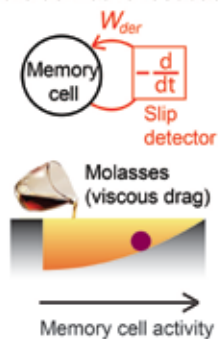


X. Tian

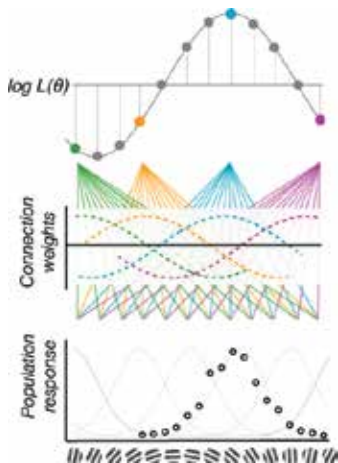
Positive feedback



Pure derivative feedback



S. Lim



J. Movshon



J. Erlich

Other NYU Neuroscience Faculty

Cristina Alberini	Molecular mechanisms of long-term memory
Chiye Aoki	Neuronal plasticity in neocortex
Jayeeta Basu	Circuits 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
Clayton Curtis*	Neural basis of spatial cognition
Moses Chao	Neurotrophin receptor signaling
Mitchell Chesler	Regulation of pH in the nervous system
Jeremy Dasen	Genetics of neural circuit formation & function
Nathaniel Daw	Decision making & neuromodulation
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
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
David Heeger	Computational neuroimaging

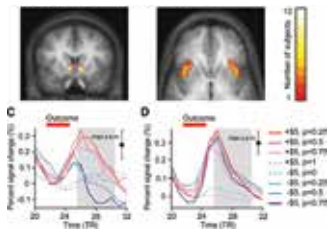
Other NYU Neuroscience Faculty

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
Michael Long	Complex, learned motor behaviors
Wei Ji Ma	Behavioral & neural mechanisms of perception
Laurence Maloney*	Math approaches to psychology & neuroscience
Paul Mathews	Neuronal vulnerability in Alzheimer's disease
David McLaughlin	Visual neural science
Anthony Movshon*	Vision & visual development
Katherine Nagel	Biophysics of sensory processing
Ralph Nixon	Cellular basis of neurodegenerative diseases
Bijan Pesaran*	Neuronal dynamics and decision making
Elizabeth Phelps*	Cognitive neuroscience of emotion, learning and memory
Dimitris Placantonakis	Neurogenesis & gliomagenesis
Alex Reyes	Functional interactions in neural networks
Margaret Rice	Neurophysiology of dopaminergic neurons
Dmitry Rinberg	Olfactory information processing
Niels Ringstad	Signalling pathways that modulate behavior
John Rinzel*	Biophysical & theoretical neural computations
Bernardo Rudy	Molecular regulation of neuronal excitability

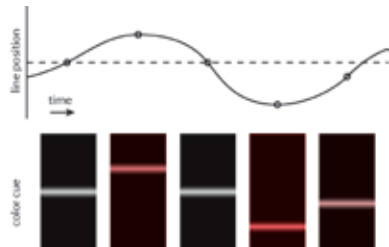
Other NYU Neuroscience Faculty

James Salzer	Myelinating axons and demyelination
Dan Sanes	Development & plasticity of audition
Helen Scharfman	Neuronal excitability and 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
Richard Tsien*	Activity driven signaling to the nucleus
Donald Wilson	Neurobiology of memory & perception
Thomas Wisniewski	Pathogenesis of Alzheimer's disease
Edward Ziff	Synaptic trafficking & neurological disease

* denotes Collaborating Faculty in the NYU-ECNU Institute of Brain and Cognitive Science at NYU Shanghai



P. Glimcher



L. Li

Recent Publications from Other NYU Faculty

Cichon J, **Gan WB** (2015) Branch-specific dendritic Ca(2+) spikes cause persistent synaptic plasticity. *Nature*.

Cogan GB, Thesen T, Carlson C, Doyle W, Devinsky O, **Pesaran B** (2014) Sensory-motor transformations for speech occur bilaterally. *Nature*.

Goldwyn JH, Mc Laughlin M, Verschooten E, Joris PX, Rinzel J (2014) A model of the medial superior olive explains spatiotemporal features of local field potentials. *Journal of Neuroscience*.

Goris RL, **Movshon JA**, **Simoncelli EP** (2014) Partitioning neuronal variability. *Nature Neuroscience*.

Johansen JP, Diaz-Mataix L, Hamanaka H, Ozawa T, Ycu E, Koivumaa J, Kumar A, Hou M, Deisseroth K, Boyden ES, **LeDoux JE** (2014) Hebbian and neuromodulatory mechanisms interact to trigger associative memory formation. *Proc. Natl. Acad. Sci. USA*.

Kiani R, Corthell L, Shadlen MN (2014) Choice certainty is informed by both evidence and decision time. *Neuron*.

Kopec AM, Philips GT, **Carew TJ** (2015) Distinct growth factor families are recruited in unique spatiotemporal domains during long-term memory formation in *Aplysia californica*. *Neuron*.

Louie K, LoFaro T, Webb R, **Glimcher PW** (2014) Dynamic divisive normalization predicts time-varying value coding in decision-related circuits. *Journal of Neuroscience*.

Ma H, Groth RD, Cohen SM, Emery JF, Li B, Hoedt E, Zhang G, Neubert TA, **Tsien RW** (2014) γ CaMKII shuttles Ca²⁺/CaM to the nucleus to trigger CREB phosphorylation and gene expression. *Cell*.

Recent Publications from Other NYU Faculty

MacAskill AF, Cassel JM, **Carter AG** (2014) Cocaine exposure reorganizes cell type- and input-specific connectivity in the nucleus accumbens. *Nature Neuroscience*.

Marlin BJ, Mitre M, D'amour JA, Chao MV, **Froemke RC** (2015) Oxytocin enables maternal behaviour by balancing cortical inhibition. *Nature*.

Peyrache A, Lacroix MM, Petersen PC, **Buzsáki G** (2015) Internally organized mechanisms of the head direction sense. *Nature Neuroscience*.

Sakon JJ, Naya Y, Wirth S, **Suzuki WA** (2014) Context-dependent incremental timing cells in the primate hippocampus. *Proc. Natl. Acad. Sci. USA*.

Sarro EC, von Trapp G, Mowery TM, Kotak VC, **Sanes DH** (2015) Cortical Synaptic Inhibition Declines during Auditory Learning. *Journal of Neuroscience*.

Vallentin D, **Long MA** (2015) Motor origin of precise synaptic inputs onto forebrain neurons driving a skilled behavior. *Journal of Neuroscience*.

Wang L, Chen IZ, **Lin D** (2015) Collateral pathways from the ventromedial hypothalamus mediate defensive behaviors. *Neuron*.

Xing D, Yeh CI, Gordon J, **Shapley RM** (2014) Cortical brightness adaptation when darkness and brightness produce different dynamical states in the visual cortex. *Proc Natl Acad Sci USA*.

Xuval-Greenberg S, Merriam EP, **Heeger DJ** (2014) Spontaneous microsaccades reflect shifts in covert attention. *Journal of Neuroscience*.

Current NYU Neuroscience Students

Shanghai Track Students

In summer 2015, three students began studies in this new program.



Xingyu Ding received his B.S. in Physics from Peking University. During his first summer in Shanghai, he rotated with Xiao-Jing Wang.



Joshua Moller-Mara majored in Cognitive Science, Computer Science and Statistics at University of California, Berkeley. He chose Jeff Erlich's lab for his first rotation.



Chengze Xu received a B.S. and M.S. in Biomedical Engineering from Shanghai Jiao Tony University. His first summer was spent working with Xingying Cai's lab.

A Selection of NYC Track Students



Mel Khaw (B.A., University of Arizona), a 3rd year student in the Glimcher Lab, is interested in how preferences emerge from neural activity and modeling decision making.



Andra Mihali (B.A., Columbia University), a 3rd year student in the Ma Lab, studies the role of microsaccades in visual short term memory.



Caitlin Mullins (B.A., Columbia University) is a 3rd year student with the Tsien Lab, and she is interested in how neuromodulators regulate synapses, circuits, and behavior.



Ryan Shewcraft (B.A., Brown University) is a 4th year student with the Pesaran Lab, who is applying optogenetics to probe neocortical circuit dynamics in primates.

A Selection of NYU Neuroscience Alumni

Kevin LaBar, Ph.D. '96, is a Professor at Duke University. His lab examines how emotions modify cognition in healthy adults and in psychiatric patients.



Emre Aksay, Ph.D. '01, is an Assistant Professor at Weill Cornell Medical College, who investigates molecular, cellular and circuit mechanisms of neural temporal integration.



Nicole Rust, Ph.D. '04, is an Assistant Professor at the University of Pennsylvania studying how the brain stores visual memories and recognizes objects.



Wei Lu, Ph.D. '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, Ph.D. '07, is an Assistant Professor at MIT. He is interested in the neural bases of complex behaviors such as flexible timing and sensorimotor integration.



Edward Zagha, Ph.D. '08, is a postdoctoral fellow with David McCormick at Yale University and studies sensory processing between cortical brain regions.



Anne Takesian, Ph.D. '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, Ph.D. '12, is a Group Leader at Janelia Research Campus studying how neural circuits encode and transform sensory information in order to guide behavior.



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.

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, Uptown/Downtown, etc. - highlight our graduate students' research in progress, giving them an opportunity to develop presentation skills as well as receive valuable input from their colleagues.



NYU and New York City

While in New York, students have the opportunity to work with neuroscience faculty from more than a dozen academic departments from the NYU Washington Square and School of Medicine 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.

NYU provides housing benefits to assist doctoral students while they reside in New York City. The school also provides free shuttles to each campus and other areas of the city, and the city's public transportation is also very convenient, with extensive subways, buses, and a new bike sharing system.

New York City is a thriving, lively backdrop for our doctoral students, who benefit from its diversity of cultures, cuisines, art, and entertainment.

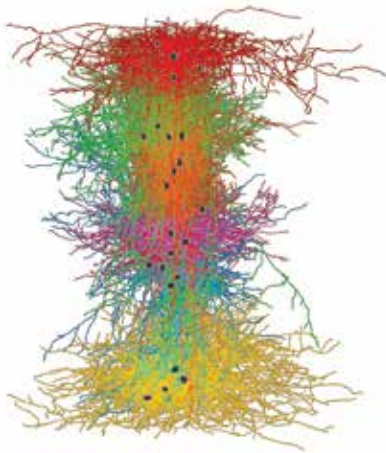


NYU Shanghai

NYU Shanghai, part of New York University's Global Network University, is the first Sino-US higher education joint venture. The NYU-ECNU Institute of Brain and Cognitive Science at NYU Shanghai seeks to advance our understanding of brain function with the primary goal of understanding the neural circuits in the brain that generate higher cognition and flexible behavior and how their impairments are associated with brain diseases.

The Institute leverages our existing significant strength of neuroscience research in systems and cognitive neuroscience, using a range of tools including the development of transgenic primates, molecular and physiological studies of neural circuits, experimental analysis of behavior, microcircuit and large-scale neural circuit modeling, and human brain imaging. The Institute will have more than twenty, collaborating research groups and bring together faculty from New York, Shanghai, and the world.





Graduate Program Director

Michael Hawken
Center for Neural Science
mjh2@nyu.edu

To apply to the Doctoral Program in Neural Science *Shanghai Track*, visit:
neuroscience.nyu.edu/graduate-programs

Academic Administrator

Jess Holman
Center for Neural Science
jess.holman@nyu.edu

To learn more about the Neural Science at NYU Shanghai, please visit:
neuro.shanghai.nyu.edu

