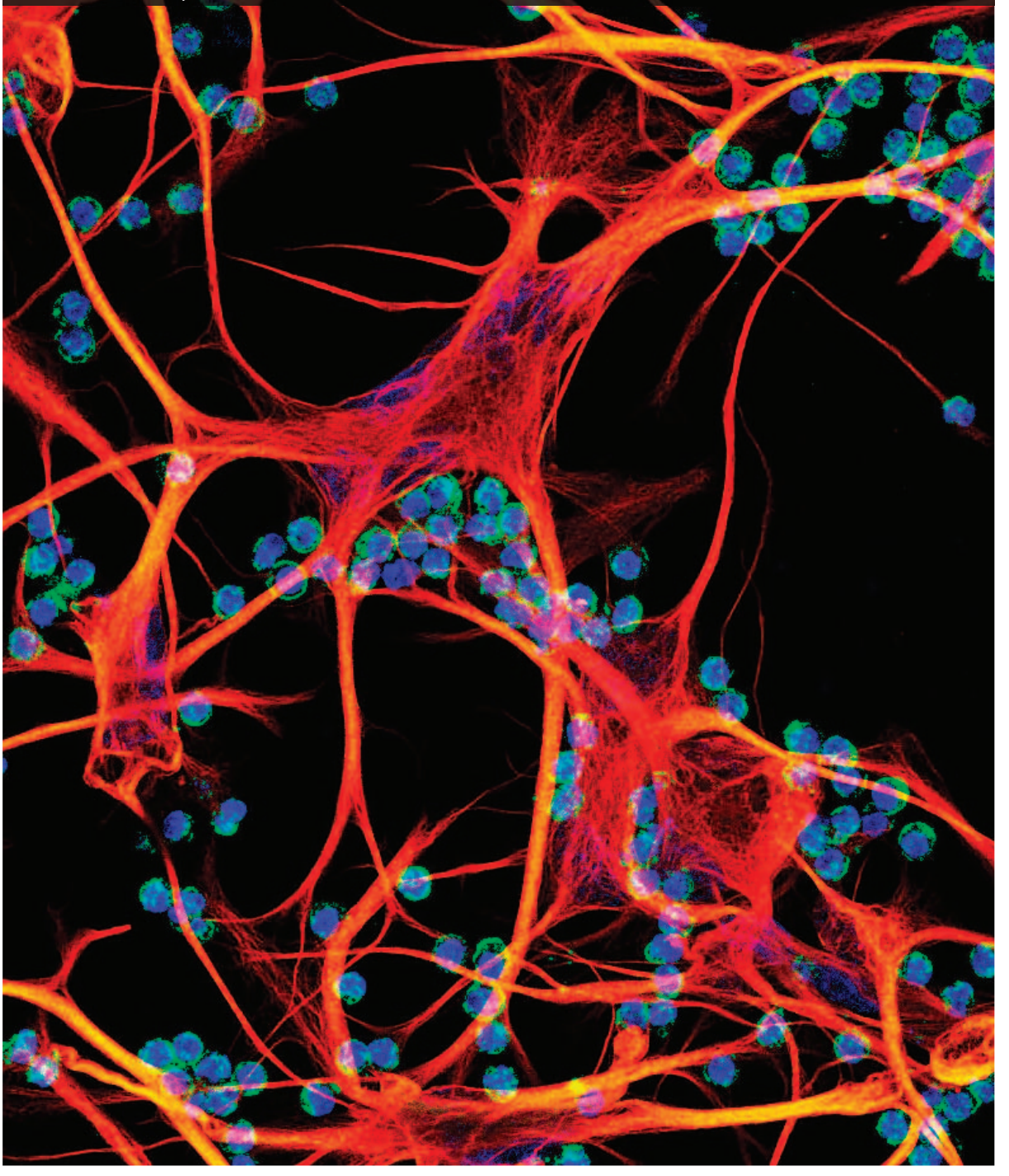
LEON LEVY FELLOWS IN NEUROSCIENCE

FIFTH ANNUAL SYMPOSIUM
MAY 4, 2016



ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI

LEON LEVY FELLOWSHIP PROGRAM

The Leon Levy Foundation (LLF) continues to advance Leon Levy's interest in neuroscience by identifying and supporting the most exceptional individuals as they begin their research careers in studies of the mind, brain, and behavior. The foundation decided to pursue this core interest by establishing Leon Levy Fellowships in neuroscience at select New York institutions. Our goal is to advance the careers of the most outstanding young neuroscientists and to encourage them to pursue risk-taking research ideas that would not find support from other sources.

Our interest is in fundamental research to increase our understanding of the brain with particular emphasis on the relationship between brain function and its impact on human behavior. Although the LLF will not fund clinical trials, diseases of the brain- particularly those that affect behavior- are of interest to the foundation. All fellowship program affiliates benefit from participation in our annual symposium which is intended to foster connections and collaborations between researchers and across institutions.

Our hope is that these neuroscientists, along with their mentors, will raise the level of neuroscience research in New York and throughout the world.

The Overarching Goals of the Leon Levy Fellowship in Neuroscience Program

- To support and nurture exceptional young researchers in the field.
- To support these researchers in their pursuit of innovative, risk-taking investigations.
- To support research that will make a meaningful contribution to our understanding in the basic and clinical neurosciences.
- To help the best young researchers advance their careers toward independent research.
- To promote synergies and collaborations among individuals across the grantee institutions.
- To use LLF grant funds as efficiently as possible
- To create a fitting legacy to honor Leon Levy's interest in neuroscience

Leon Levy had a passion for expanding knowledge and believed in the power of ideas and a just and equitable society. This broad humanism also defined his philanthropy.

The LLF, founded in 2004, is a private not-for-profit foundation created from his estate. The foundation endeavors to continue Leon Levy's philanthropic legacy and to build on his vision, encouraging and supporting excellence in six broad areas: Understanding the Ancient World; Arts and Humanities; Preservation of Nature and Gardens; Neuroscience Research; Human Rights; and Jewish Culture.

LEON LEVY FOUNDATION

COLUMBIA UNIVERSITY
MEDICAL CENTER

The Rockefeller University 1901

SCIENCE FOR THE BENEFIT OF HUMANITY

Weill Cornell Medicine

NYU School of Medicine
NYU LANGONE MEDICAL CENTER

Icahn
School of
Medicine at
Mount
Sinai

DEAR FRIENDS,

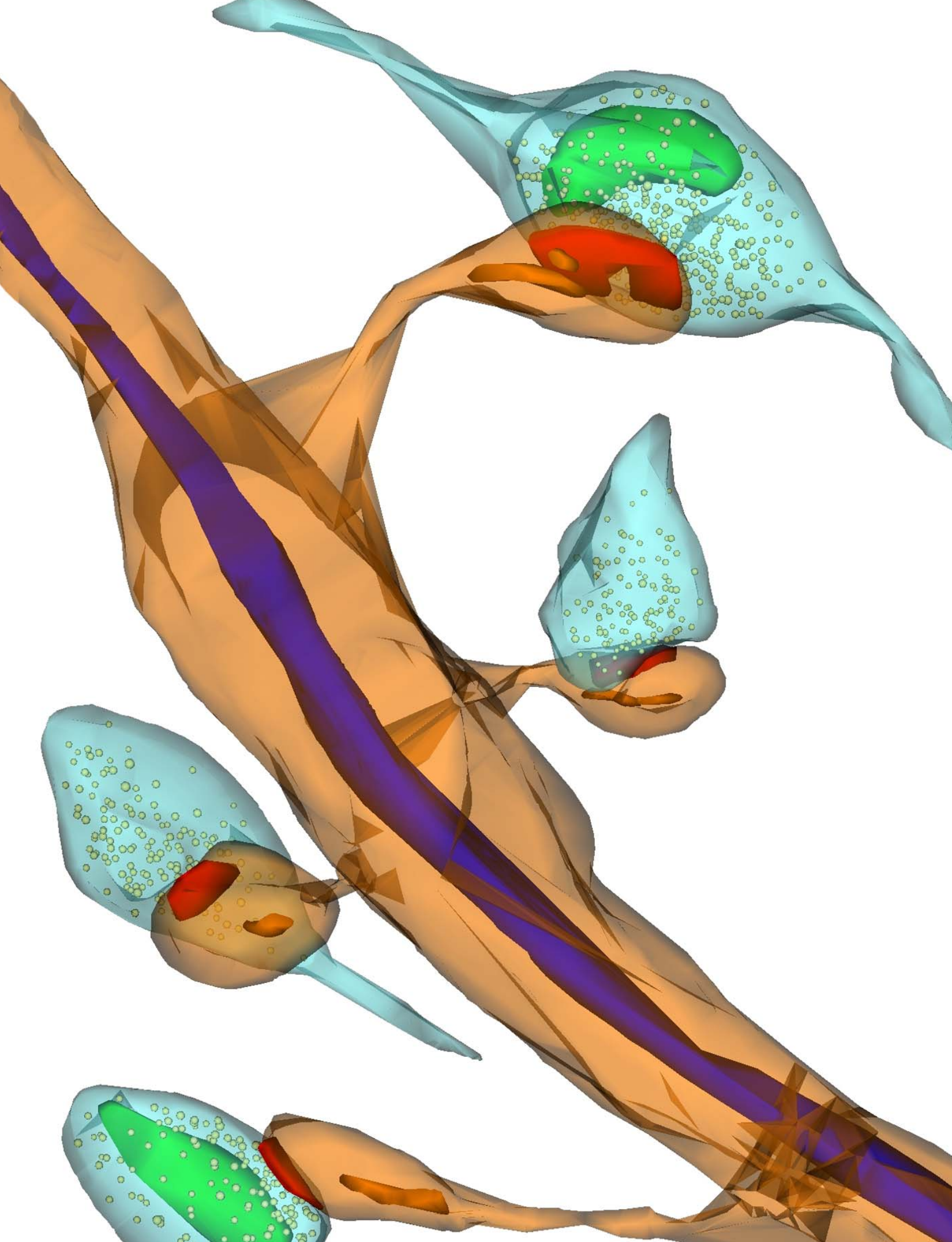
Leon Levy was a brilliant financier on Wall Street but in college he majored in psychology, not economics. He had a curiosity about why people acted as they did. As an investor, he said, “intuition and analysis are inextricably bound together.” One needed an idea, but then one needed to do the research, which, in fact, is also true of the scientific process. This led to his interest in neuroscience as a way of learning more about how the brain functions and impacts behavior. It is not a coincidence that he wrote a book entitled The Mind of Wall Street.

He engaged in discussions with eminent scientists such as Torsten Wiesel and Paul Greengard among others about new developments in neuroscience. This led to his decision to create The Shelby White and Leon Levy Center for Mind, Brain and Behavior at Rockefeller University with Torsten as its first director.

He would have been delighted that with the Foundation’s support young researchers are free to undertake cutting-edge research. He would have enjoyed meeting the Leon Levy Fellows in their laboratories and at these symposiums to discover more about their work.

We thank Dr. Eric Nestler for hosting our Fifth Annual Symposium here at Icahn School of Medicine at Mount Sinai.

Shelby White
Founding Trustee
Leon Levy Foundation



SESSION ONE

REGISTRATION and BOX LUNCH

11:45 – 12:30 p.m.

Davis Auditorium, Hess Building
1470 Madison Avenue
(between 101st & 102nd), 2nd Floor

INTRODUCTION and WELCOMING REMARKS

12:30 p.m.

Eric Nestler, MD, PhD
Nash Family Professor
Dean for Academic and Scientific Affairs
Director, Friedman Brain Institute
Icahn School of Medicine at Mount Sinai

Yasmin Hurd, PhD (Symposium Emcee)
Professor, Department of Psychiatry and Neuroscience
Director of the Center for Addictive Disorders
Icahn School of Medicine at Mount Sinai

LEON LEVY FELLOWS

12:40 p.m.

Atheir Abbas, MD, PhD
Columbia University Medical Center
The role of prefrontal interneuron subtypes in working memory
Introduction by Joshua Gordon, MD, PhD

1:20 p.m.

Jayeeta Basu, PhD
NYU Langone Medical Center
Reciprocal interactions between the hippocampus and entorhinal cortex memory circuit
Introduction by György Buzsáki, MD, PhD

2:00 p.m.

Sam Horng, MD, PhD
Icahn School of Medicine at Mount Sinai
Claudin-4 is required for astrocytic tight junction formation and protects against inflammatory lesion size and severity in the central nervous system
Introduction by Gareth John, MD, PhD

COFFEE BREAK

2:40 p.m.

COFFEE BREAK

SESSION TWO

LEON LEVY FELLOWS

3:10 p.m.

Dilek Colak, PhD
Weill Cornell Medicine
The role of local RNA degradation in synaptic plasticity and cognitive function
Introduction by M. Elizabeth Ross, MD, PhD

3:50 p.m.

Nicolas Renier, PhD
The Rockefeller University
Complete mapping of cellular brain activity and axonal projections by tissue clearing and automated volume analysis
Introduction by Cori Bargmann, PhD

REMARKS

4:35 p.m.

Shelby White
Founding Trustee
Leon Levy Foundation

PLENARY TALK

4:45 p.m.

Pamela Sklar, MD, PhD
Chief, Division of Psychiatric Genomics
Department of Psychiatry
Professor of Psychiatry, Neuroscience, Genetics and Genomics
Icahn School of Medicine at Mount Sinai
Using genomics to change our understanding of mental illness

RECEPTION and POSTER SESSION

5:30 – 7:00 p.m.

RECEPTION and POSTER SESSION

LEON LEVY FELLOWS
Speaker Abstracts

Atheir Abbas, MD, PhD
Columbia University Medical Center

The role of prefrontal interneuron subtypes in working memory

Schizophrenia has previously been hypothesized to result from synaptic disease that leads to failure of functional integration in the brain – "a disconnection syndrome." Accumulating evidence supports this view, though the cellular mediators of connectivity within the brain are not well understood. Given data showing that two classes of inhibitory neurons, parvalbumin and somatostatin interneurons, are abnormal in individuals with schizophrenia, I hypothesize that prefrontal cortical interneurons support working memory by maintaining connectivity. To test this hypothesis, I selectively silenced prefrontal parvalbumin and somatostatin interneurons in mice during performance of a spatial working memory task while simultaneously recording brain activity in the prefrontal cortex and other brain areas known to be involved in working memory. I have found that silencing somatostatin interneurons is associated with an impairment in both connectivity and spatial working memory. Silencing parvalbumin interneurons has no effect on either connectivity or working memory. These findings suggest that interneuron dysfunction may contribute to cognitive deficits in schizophrenia.

Jayeeta Basu, PhD
NYU Langone Medical Center

Reciprocal interactions between the hippocampus and entorhinal cortex memory circuit

Our research examines the dynamic interactions between the hippocampus and the entorhinal cortex in the mouse to understand sensory integration and the formation of long-term memories. Learning and memory formation are necessary for our sense of self and individuality. These brain functions are crucial in our ability to adapt to changing environments and alter behavior in a contextually appropriate manner.

The entorhinal cortex routes sensory and associational inputs from many brain regions to the hippocampus for mnemonic processing. Despite a great deal of research into how excitatory inputs from entorhinal cortex regulate hippocampal dependent activity, learning and memory, little is known about the role of long-range inhibitory connections between these areas. I will first present results of a recently published study (Basu et al., Science 2016), where we have functionally characterized a 'disinhibitory' GABAergic long-range projection circuit from the lateral entorhinal cortex to the hippocampus. We find that these inputs gate dendritic spikes and induce long-term plasticity by suppressing local feed-forward inhibition. Using two-photon imaging and genetic silencing approaches in vivo during sensory experiences and learning behavior, we found that the GABAergic projections are important for contextual and object recognition memory.

Next, I will present exciting preliminary data describing the functional connectivity of the largely unexplored feed-back projection circuit from the hippocampus to the entorhinal cortex. Does the hippocampus modulate the integration of sensory information in the entorhinal cortex, thereby providing a mechanism for previous memories seated within the hippocampus to shape the future processing of new experiences?

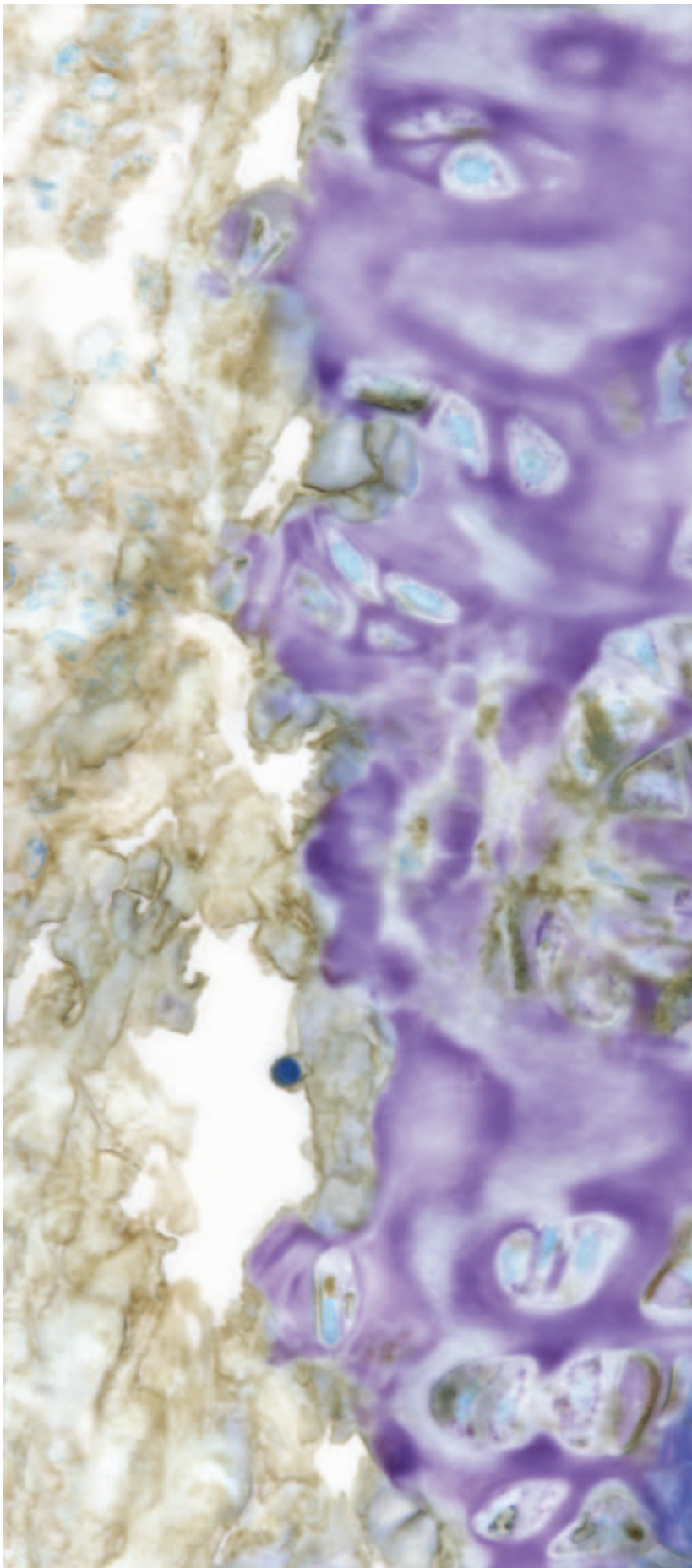
Sam Horng, MD, PhD
Icahn School of Medicine at Mount Sinai

Claudin-4 is required for astrocytic tight junction formation and protects against inflammatory lesion size and severity in the central nervous system

Background: A protective barrier restricts the passage of lymphocytes and soluble proteins from the bloodstream into the CNS parenchyma. Termed the blood brain barrier, this structure was traditionally characterized as a single layer of tight-junction bonds between CNS blood vessel cells. Recent work has revealed that eliminating a layer of supportive cells called astrocytes, which encircles the endothelial blood brain barrier, exacerbates lesion size and severity in inflammatory conditions of the CNS. We hypothesized that astrocytes form protective tight junction bonds themselves in response to inflammation, and constitute a second barrier distal to the traditional blood brain barrier.

Results: Upregulation of tight junction molecules was found in primary human astrocyte cultures exposed to inflammatory stimuli. Specifically, the proinflammatory cytokine Interleukin-1β induced expression of Claudin-1, Claudin-4 and JAM-A, the same pattern of tight junction proteins found in tightly-sealed skin and bladder epithelia. Immunohistochemistry and electron microscopy revealed that all three proteins localize to tight junctions between astrocytic endfeet surrounding blood vessels in inflammatory CNS lesions. Reactive human astrocytes subjected to siRNA silencing of these genes and co-cultured with CD3+ T cells demonstrated that all three proteins limit the dispersion of lymphocytes. An astrocyte-specific claudin-4 knock-out mouse showed increased CNS lesion size and severity in two models of inflammatory CNS disease, and exacerbated clinical disability in a rodent model of multiple sclerosis.

Conclusions: We report the presence of a second tight junction barrier expressed by reactive astrocytes between the blood and the CNS. Astrocytic tight junctions are dynamically upregulated in response to inflammation, and protect against lesion size, severity and clinical disability.



LEON LEVY FELLOWS

Speaker Abstracts

Dilek Colak, PhD

Weill Cornell Medicine

The role of local RNA degradation in synaptic plasticity and cognitive function

Altered synaptic activity seems to account for most of the abnormalities seen in neurocognitive diseases. Cortical functioning relies on synaptic activity, most of which occurs in dendrites. Dendrites are the major sites for local mRNA translation in neurons. Neurons use local mRNA translation at synapses to regulate levels of a lot of proteins in a spatially restricted and nucleus independent manner. Therefore, dysregulation of dendritic mRNA pools may give rise to some of the synapse phenotypes associated with neurocognitive diseases. Although recent evidence suggests that local mRNA degradation might regulate synaptic function, it has not been demonstrated if dendritic mRNA is regulated at the level of degradation. My proposed project addresses the local role of nonsense-mediated mRNA decay (NMD) pathway in synaptic plasticity by using mouse model, human induced pluripotent stem cell technology and deep sequencing method. The mRNA degradation pathway NMD can function locally in axons and regulates mRNA quantity during axon guidance. NMD proteins are localized to dendrites in mammals suggesting a potential function for local NMD in the regulation of various mRNAs that are present in dendrites. Defects in NMD have been recently described as a potential cause of mental retardation, autism, childhood-onset schizophrenia, bipolar disorder and attention-deficit hyperactivity disorder in several families. Although NMD is the only RNA regulatory pathway that is linked to so many mental illnesses, it represents a relatively unexplored mechanism for regulating mRNA stability in neurons. The objective of the proposed research is to determine the role of NMD in synaptic plasticity and to identify NMD-target mRNAs in human dendrites. The advent of human induced pluripotent stem cell technology and the novel methods for compartmentalizing neurons now allow us to study the role of RNA regulatory pathways exclusively in human dendrites. Findings in our study might lead to conceptual and generalizable implications for the role of mRNA degradation in dendrites and synaptic function.

Nicolas Renier, PhD

The Rockefeller University

Complete mapping of cellular brain activity and axonal projections by tissue clearing and automated volume analysis

Understanding how neural information is processed in physiological and pathological states would benefit from a precise detection, localization and quantification of the activity of all neurons across the entire intact brain, which has not to date been achieved in the mammalian brain. I previously developed iDISCO, a method to immunolabel and image intact mouse brains. Here, I will first present the method and its main applications, and then introduce how I'm using it as a way to perform high speed acquisition of brain activity at cellular resolution in fixed samples. This pipeline uses profiling of immediate early gene expression using immunostaining and light-sheet fluorescence imaging, followed by automated mapping and analysis of activity by open-source software. With my colleagues, we first validated this pipeline by doing a comprehensive analysis of pharmacologically-activated brain regions in response to an acute Haloperidol injection in the mouse. We then moved to apply our technique to uncover new brain regions differentially activated during parenting behavior. We studied whole brain activity of parenting females and infanticidal males, and characterized behavior or gender-driven differences in activity patterns. We then combined activity mapping with axon tracing to look for correlations between active brain regions and their projections. The combination of volume imaging and automated quantification of 3D datasets may be a powerful tool in the future to generate hypothesis about the function of neuronal circuits.

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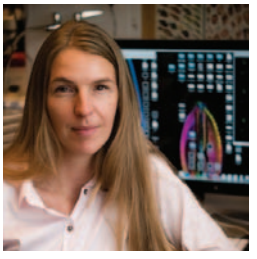
Sara Abrahamsson, PhD
The Rockefeller University



Dr. Abrahamsson earned her M.S. in Engineering Physics: Laser Physics and Quantum Optics, KTH from the Royal Institute of Technology, Stockholm and her Ph.D. in Bioengineering , USCF/UC Berkeley Graduate Program in Bioengineering. She was awarded a MBL Woods Hole, Whitman Summer Investigator Fellowship and a HHMI Janelia Farm Visiting Graduate Student Researcher. Dr. Abrahamsson holds a patent, Multi-Color Three Dimensional Imaging using Multi-Focus Microscopy. As a post-doctoral fellow at Rockefeller she will be working on applying Multi-Focus Microscopy (MFM) for functional neuronal imaging to study animal behaviors (leaning and memory) and exploring other advanced 3D imaging approaches for increased contrast and resolution in live imaging.

Leandro Alonso, PhD
The Rockefeller University

Dr. Alonso received his doctoral training in physics from the University of Buenos Aires, Argentina. As a graduate student, financed by a fellowship awarded by the Argentine Council of Science and Technology (CONICET), Dr. Alonso worked on the mathematical modeling of respiratory activity of songbirds at the Dynamical Systems Lab under the direction of Prof. G.B. Mindlin. In early 2012, Dr. Alonso joined the Laboratory of Mathematical Physics at The Rockefeller University as a postdoctoral associate under the direction of Prof. M.O. Magnasco. His main research interests include neural dynamics, the emergence of complex spatio-temporal patterns in brain activity, and more recently, the operational characterization of consciousness via electrophysiological recordings. For the past three years, together with colleagues, Dr. Alonso has been exploring the connection between consciousness and the dynamical stability of neural recordings. The main results of this research have recently been published in the Journal of Neuroscience. With the support of the Leon Levy Fellowship, Dr. Alonso will further explore this connection and the possibility of translational implications.

Guadalupe Astorga, PhD
The Rockefeller University

Dr. Astorga received her PhD in neuroscience from the University of Chile, where she studied a novel role of TRP channels in synaptic transmission in the fly visual system. Her research interest was later focused on the function of neuronal circuits in behaving animals. During her first postdoc in Paris Descartes, she developed an in vivo preparation to perform two-photon calcium imaging of cerebellar cortex interneurons in behaving mice. She found a GABA loop that ensures interneuron activation and also a novel role for these neurons during orofacial motor behaviors. Currently, in the laboratory of Dr. Charles Gilbert at Rockefeller University, she is studying a new model of visual processing, where top-down cortical signaling can shape the activity of lower order visual areas with the cognitive influences of attention, expectation, and perceptual discrimination.

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Jayeeta Basu, PhD
NYU Langone Medical Center

Dr. Basu is an Assistant Professor in the Neuroscience Institute at the New York University Langone Medical Center. Dr. Basu earned her bachelors degree in Physiology (B.Sc. Hon.'s) from Presidency College in Calcutta, India. In 2002, Jayeeta received a Masters degree in Neuroscience at the International Max Planck Research School, Georg August University in Göttingen, Germany for her research with Dr. Christian Rosenmund and Dr. Erwin Neher on the kinetics of neurotransmitter release. She then completed her Ph.D. at Baylor College of Medicine, where her thesis focused on molecular mechanisms of synaptic vesicle release and short-term plasticity in hippocampal cultured neurons. In 2007, Dr. Basu joined Dr. Steven Siegelbaum's laboratory at Columbia University for her post-doctoral training. She examined how excitatory and inhibitory circuits interact to shape dendritic integration, timing-dependent plasticity, and learning behavior in the hippocampus. In her own lab, Dr. Basu aims to identify synaptic and behavioral correlates of learning-related activity in genetically defined circuits of the mammalian hippocampus and entorhinal cortex. Her research combines mouse genetics with electrophysiology, two-photon imaging, and behavior to parse out the synaptic, cellular, and circuit mechanisms of learning.

Wei-li Chang, MD, PhD
Columbia University Medical Center

Dr. Chang is originally from Houston, Texas, a few miles down the road from NASA's Mission Control. She attended Stanford University, where she earned a degree in Human Biology, with a Concentration in Neurobiology and Psychobiology. From there, she was awarded an NIH Post-Baccalaureate Intramural Research Training Award, and under the mentorship of Dr. Karen Berman, studied schizophrenia and related disorders in the NIMH Section on Integrative Neuroimaging. After two years at the NIH, she matriculated into the MD/PhD program at the University of California San Diego. Within the Neurosciences Graduate Program there, she worked with Dr. Neal Swerdlow for her dissertation research on Dopamine D3 Regulation of Sensorimotor Gating, which is relevant to several neuropsychiatric disorders. Wei-li also managed the psychiatry clinic at the UCSD Student Run Free Clinic and served as the UCSD Chapter President of the American Medical Student Association. During residency, she will continue to study animal models of schizophrenia in the laboratory of Joshua Gordon.

Ivan Chavarria-Siles, MD
Icahn School of Medicine at Mount Sinai

Originally from San José, Costa Rica, Dr. Chavarria-Siles received his medical degree from University of Costa Rica. He completed his MSc in biochemical science at Francisco de Vitoria University in Madrid, Spain before starting an NIMH/Fogarty founded fellowship in psychiatric genetics research at UT San Antonio. He continued his research career at the Center for Neurogenomics and Cognitive Research at the VU University in Amsterdam, where his research work focused on understanding how genetic variations can produce structural and functional changes in the brains of patients with psychiatric disorders. After several years doing basic and clinical research, he decided to translate some of his research knowledge into clinical care of patients with psychiatric disorders. In 2012 he joined the Psychiatry Residency Program (Research Track) at Mount Sinai, where he has been able to get clinical training as well as protected time to continue his research in brain imaging genetics of schizophrenia under the supervision of Dr. Pamela Sklar. More recently he started working in a functional Neuroimaging study of Borderline Personality Disorder under the supervision of Dr. Harold Koenigsberg. In 2014 he received the NIMH Outstanding Resident Award.

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Dilek Colak, PhD
Weill Cornell Medicine

Dr. Colak is an assistant professor of neuroscience in the Brain and Mind Research Institute at Weill Cornell Medicine, where she studies the role of RNA regulation in neurodevelopmental and neuropsychiatric diseases. She earned her bachelors degree in biology from Hacettepe University, Ankara, Turkey. She then enrolled in the PhD program at the Ludwig Maximilian University in Munich, Germany. During her doctoral thesis, Dr. Colak focused on the extracellular signaling molecules that regulate cellular fate in the adult neural stem cells. Her PhD studies showed that neurogenesis can be initiated upon inhibition of the apparent default pathway in the adult-brain progenitors that is oligodendrogenesis. During her postdoctoral studies in Dr. Samie Jaffrey's laboratory at Weill Cornell, she explored the physiological role of local RNA translation and the mechanisms that regulate it. During her postdoc, she also became interested in the mechanism of FMR1 gene silencing in Fragile X Syndrome (FXS), which is a trinucleotide repeat expansion disease and the most common monogenic cause of autism. Using FXS human embryonic stem cells, she discovered that the expanded repeats of the FMR1 mRNA interacts with the genomic DNA that then triggers FMR1 promoter repression. Her studies showed for the first time that a coding RNA could bind DNA to induce epigenetic silencing.

Christopher Cselenyi, MD, PhD
Columbia University Medical Center

Dr. Cselenyi earned his B.A. from the University of Miami with majors in English and Biochemistry. He wrote his thesis on epic simile and developed biophysical methods to study an enzyme involved in DNA damage and repair. Christopher then enrolled in the Medical Scientist Training Program at Vanderbilt University where he earned his Ph.D. and M.D. degrees. In his doctoral research, he studied Wnt signaling using biochemically amenable Xenopus egg extracts. Christopher used egg extracts to address several problems in the field: receptor-mediated signal transduction, G proteins in Wnt signaling, and pharmacological modulators of Wnt signaling. After working with child and adolescent patients suffering from psychiatric diseases, Christopher decided to devote his career to understanding neurodevelopmental origins of psychiatric diseases as a child psychiatrist and developmental neurobiologist. At Vanderbilt, Christopher won awards for "most outstanding Ph.D. training accomplishments" and "most progress in clinical psychiatry." Through the Levy fellowship, he will address the role of nervous system development on behavior.

Natalia De Marco Garcia, PhD
Weill Cornell Medicine

Dr. De Marco is an assistant professor of neuroscience in the Brain and Mind Research Institute at Weill Cornell Medical College. She earned her B.S. in molecular genetics and biotechnology from the University of Buenos Aires and her Ph.D. in neurobiology and behavior at Columbia University. Her thesis, which she completed under the guidance of Dr. Jessell, focused on transcriptional programs controlling motor neuron development and muscle-nerve connectivity. During her postdoctoral studies in the Fishell lab at NYU Langone School of Medicine, she examined activity-dependent programs of brain development. As principal investigator of her own lab, she continues to focus on interneuron development in the mammalian brain. She has published articles in Cell, Nature, Neuron, and Nature Neuroscience. She is the recipient of NIH Pathway to Independence, NARSAD Young Investigator and CURE Epilepsy Awards. In addition, she has received a Patterson Trust fellowship.

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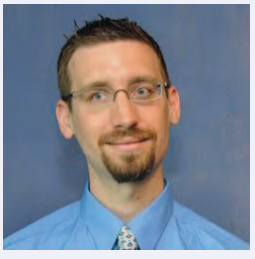
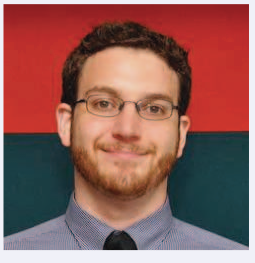
Anthony Deo, MD, PhD
Columbia University Medical Center



Dr. Deo attended Boston College as an undergraduate receiving a BS in Biology. He subsequently earned a PhD in biology from New York University developing techniques to identify genes associated with subsets of symptoms in psychiatric disorders supported by an NSF Doctoral Dissertation Improvement Grant. Tony then completed his MD and a Certificate in Clinical Research at the University of Pittsburgh School of Medicine's five year Physician Scientist Training Program which included an additional year dedicated to research. His research, supported by a Doris Duke Foundation Fellowship, focused on signaling pathways that contribute to the disruption of auditory sensory processing in schizophrenia. Tony's current research involves examining the mechanisms of clozapine response in cases of childhood onset schizophrenia using neurons created from induced pluripotent stem cells collected from patients suffering from schizophrenia.

Daniel Eskenazi, MD, PhD
Columbia University Medical Center



Dr. Eskenazi obtained his BS in Animal Physiology and Neuroscience from the University of California, San Diego, before matriculating at the University of Washington Medical Scientist Training Program (MD/PhD). His dissertation research, conducted under the direction of Dr. John Neumaier, addressed the role of serotonin 5-HT6 receptors and striatal circuitry in habitual behaviors, with relevance for substance abuse, obsessive compulsive disorder and Tourette syndrome. Daniel is also dedicated to education, having acted as instructor and teaching assistant for numerous courses (including biochemistry, cell physiology, general biology and neuroscience) and contributed work to the AAMC's MedEd portal. He has written several papers and presented at both national and international conferences (including Society for Neuroscience, International Behavioral Neuroscience Society and Cold Spring Harbor Asia). He continues to pursue basic neuroscience research relevant to translational psychiatry.

Lisa Fenk, PhD
The Rockefeller University

Dr. Fenk earned her master's degree in physics and French with honors from the University of Vienna, Austria, where she also completed a doctorate. For her master's thesis in physics, she measured the aerodynamic properties of urticating caterpillar hairs. Having switched to sensory physiology for her Ph.D., her doctoral thesis dealt with the performance of spider eyes and was financed by a fellowship of the Austrian Academy of Sciences. She then continued as a postdoc at the Research Institute of Molecular Pathology (IMP), where she worked on neural circuits underlying visually guided behavior in flies. In early 2015, Dr. Fenk joined the Laboratory of Integrative Brain Function at The Rockefeller University as a postdoctoral associate. Her project aims to unravel circuit motifs by which motor systems and sensory systems interact.

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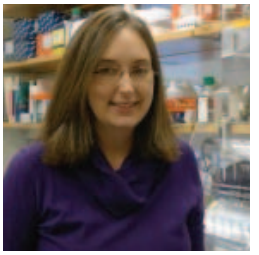
Silvia Fossati, PhD
NYU Langone Medical Center

Dr. Fossati is an Assistant Professor of Neurology and Psychiatry at the New York University Langone Medical Center. She earned a B.S. Magna cum Laude in Molecular Biology at the University of Florence, Italy, where she later obtained a PhD in Pharmacology. She joined NYU Langone in 2007 as a postdoctoral fellow in the Department of Pathology. Her research focuses on identifying common pathways of cell stress in brain endothelial, neuronal and glial cells in Alzheimer's disease, unveiling new targets for drug discovery and compounds able to rescue neurovascular cells from mitochondrial-mediated cell death. She is the recipient of numerous awards including the Alzheimer's Association New Investigator Research Award, the Blas Frangione Foundation New Investigator Award, and the American Heart Association Scientist Development Award, and was nominated Director of the Blood Biomarker core of the NYU Cohen Veteran Center. Profiting from her background in molecular neuroscience and her experience in ultra-sensitive biomarker studies, she aims to investigate transcriptional and miRNA changes in neurovascular cells as therapeutic targets and biomarkers for the development of much needed strategies in Alzheimer's disease, Traumatic Brain Injury and Post Traumatic Stress.

Caryn Ratcliff Hale, PhD
The Rockefeller University



Dr. Hale earned her BA in Liberal Arts from the Louisiana Scholar's College and her PhD in Biochemistry and Molecular Biology from the University of Georgia. Her dissertation was the identification and characterization of RNA-protein complexes involved in a novel RNA-based prokaryotic immune system. She will be a post-doctoral Research Associate at Rockefeller working on investigating dysregulation of RNA binding proteins in neurological disorders. Dr. Hale has been a member of RNA Society since 2008 and is a co-inventor on a patent involving Cmr-guided cleavage of desired target RNAs.

Alison Hanson, MD, PhD
Columbia University Medical Center

Dr. Hanson received her undergraduate degree from Colgate University where she played Division I varsity women's basketball and earned a Bachelor of Arts in Molecular Biology. She then completed her MD/PhD training at Vanderbilt University School of Medicine where she studied the mechanism of Wnt signal transduction in the laboratory of Dr. Ethan Lee. During medical school, she also spent two years studying classical oil painting and drawing in the studio of Anthony Ryder in Santa Fe, New Mexico. Now a resident in psychiatry, Dr. Hanson is most interested in basic neuroscience research, psychosis, and integrative psychiatry. She lives in Washington Heights and enjoys the outdoors, working out, painting, drawing, cooking, and attending the myriad museums and shows New York City has to offer.

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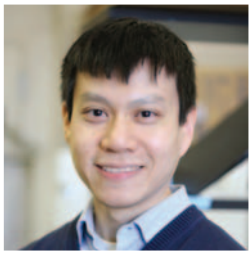
Biyu He, PhD
NYU Langone Medical Center

Dr. He is an Assistant Professor in the Departments of Neurology, Neuroscience and Physiology, and Radiology at NYU Langone Medical Center. She obtained her B.S. in Biology from Tsinghua University and her Ph.D. in Neuroscience from Washington University in St. Louis. Prior to joining NYU Langone, she led her own independent research group in the intramural research program of the National Institute of Neurological Disorders and Stroke, with an intramural equivalent of the NIH Director's Early Independence Award. Her research uses a combination of invasive and non-invasive multimodal human brain imaging, brain stimulation, and computational and theoretical approaches to investigate the neural bases of conscious vs. unconscious processing in the human brain. Other research interests include spontaneous brain activity, arrhythmic brain activity, and nonlinear brain dynamics. She has delivered keynote lectures at multiple international conferences and is currently a deputy editor of Neuroscience of Consciousness. Her work has received coverage by media such as Discover Magazine and Yahoo!News.

Sam Horng, MD, PhD
Icahn School of Medicine at Mount Sinai



Dr. Horng received his BA in Biology, summa cum laude, from Columbia University. He pursued pre-doctoral training in clinical bioethics at the National Institutes of Health then completed his MD-PhD degrees at Harvard Medical School and the Massachusetts Institute of Technology Department of Brain and Cognitive Sciences. His graduate work with Mriganka Sur focused on mechanisms of visual map formation in the developing mouse. Currently, he is a resident in the Neurology residency at Mount Sinai Medical Center. He has joined the laboratory of Gareth John, where he studies mechanisms of blood brain barrier breakdown in inflammatory brain disease. As a Leon Levy fellow, he will focus on the role of reactive astrocytes in modulating soluble factor and leukocyte entry into the brain.

Rebecca Jones, PhD
Weill Cornell Medicine

Dr. Jones is fascinated by how the human brain is different in individuals with autism. She graduated magna cum laude from Princeton University with a B.A. in psychology and neuroscience and was awarded the neuroscience thesis prize for her undergraduate dissertation on abnormal face processing in adults with autism. She was a Gates Scholar at the University of Cambridge in the UK where she completed an M.Phil. under the supervision of Dr. Simon Baron-Cohen, studying hormone influences in autism. Dr. Jones received her Ph.D. in neuroscience from Weill Cornell Graduate School of Medical Sciences where she published multiple papers in journals such as Science, Journal of Neuroscience, and Journal of the American Academy of Child and Adolescent Psychiatry. She worked with Dr. BJ Casey studying neural trajectories of social behavior across typical development. Dr. Jones completed a postdoctoral fellowship with Dr. Catherine Lord at Weill Cornell, studying clinical and diagnostic assessments of autism, supported by an Autism Speaks Fellowship. In 2014, Dr. Jones was a Mirzayan Fellow at the National Academies of Science, studying the intersection of public policy and scientific research on neurodevelopmental disorders. Dr. Jones's current focus is studying how underlying neural circuitry changes across age and its effect on behavior in autism compared to typical development in order to better understand mechanisms to improve treatment outcomes in autism.

LEON LEVY FELLOWS IN NEUROSCIENCE
2016

Daniel Landay Kimmel, MD, PhD
Columbia University Medical Center

After graduating with honors from Oberlin College with a BA and double majors in Neuroscience and Biology, Daniel Kimmel matriculated in the MD/PhD program at Stanford University. His thesis, entitled "Neural basis of valued-based decision making," was completed under the direction of Dr. William T. Newsome. He has written and presented extensively at international meetings. He is also an accomplished jazz musician, performing internationally and leading a quintet.

Drew Kiraly, MD, PhD
Icahn School of Medicine at Mount Sinai

Dr. Kiraly received his bachelor's degree in Neurobiology and Biochemistry from Drew University where he graduated magna cum laude and was selected to Phi Beta Kappa. After two years working in the lab of Dr. Jane Taylor at Yale University, he went on to enroll in the MD-PhD program at the University of Connecticut. His PhD thesis in the lab of Dr. Betty Eipper examined the role of postsynaptic protein Kalirin-7 in behavioral response to cocaine and NMDA receptor localization at the synapse. His thesis work was published in the Journal of Neuroscience and Biological Psychiatry among others, and he was awarded the Bloomberg Prize as the top clinical student in psychiatry. Dr. Kiraly is currently a psychiatry resident at the Icahn School of Medicine at Mount Sinai and serves as the Chief Resident for Research. He is currently working with Drs. Eric Nestler and Scott Russo on projects examining the role of inflammatory signaling and the gut microbiota on the development of psychostimulant addiction.

Lee Lovejoy, MD, PhD
Columbia University Medical Center

Dr. Lovejoy, originally from New Orleans, attended Tulane University and received his bachelors and masters degrees in Biomedical Engineering. At Tulane he studied chaotic and nonlinear dynamics in dopaminergic neurons of the substantia nigra in an effort to understand the extent to which seemingly random activity of neurons was a reflection of internal dynamics versus external input. He then joined the medical scientist training program at the University of California, San Diego. There he received his MD and PhD in neurosciences. In his dissertation work, published in Nature Neuroscience, he showed that neural circuitry in the superior colliculus, a brainstem structure normally associated with eye movement control, was necessary for selecting visual information that gave rise to perception. Now at Columbia, Dr. Lovejoy has joined the laboratory of Dr. Dan Salzman where he plans to continue his work on primate decision-making. He plans to investigate how patterns of decision making, which we often associate with personality, are embodied in neural circuitry of the amygdala and frontal cortex.

Pedro Olivetti, MD, PhD
Columbia University Medical Center

Dr. Olivetti is originally from São Paulo, Brazil and earned his BS in Applied Biology from the Georgia Institute of Technology prior to matriculating as an MD/PhD student at Baylor College of Medicine. He completed his doctoral thesis on Infantile Spasms Syndrome under the direction of Dr. Jeffrey L. Noebels. He has published extensively, presented at international conferences, and earned numerous awards for his work in translational neuroscience. Currently, he is a research track Psychiatry intern at Columbia University. He is the father of a beautiful little girl and plays blues harmonica on his free time.

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Alejandro Ramirez, MD, PhD
Columbia University Medical Center

Dr. Ramirez obtained a Bachelors Degree in Biochemistry, summa cum laude, from the University of Colorado and an M.Phil in Biological Sciences from the University of Cambridge prior to enrolling in the MD/PhD program at Columbia University. His PhD thesis with Dr. Randy Bruno investigated mechanisms of neural plasticity and sensory coding in the rodent somatosensory system. His dissertation work was published in the journals Neuron and Nature Neuroscience and awarded the Andrew Mark Lippard Memorial Research Award in Neuroscience.

Nicolas Renier, PhD
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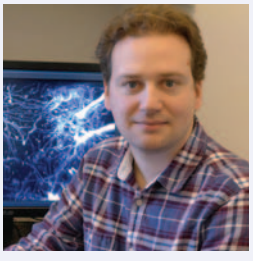

Dr. Renier received his bachelor's degree from the Ecole Normale Supérieure de la rue d'Ulm in Paris, and his Ph.D. from the Université Pierre et Marie Curie. His doctoral work focused on the function and development of crossed projections in the brain and spinal cord. He received a Ph.D. award from the French Neuroscience Society and an EMBO postdoctoral fellowship. Working in the laboratory headed by Dr. Marc Tessier-Lavigne at The Rockefeller University, he co-developed a method for imaging in 3-D the molecular content of organs, such as the brain, by using immuno-labeling, optical clearing, and light-sheet microscopy techniques. This method enables the 3-D mapping of specific neuronal projections and circuits in the developing and adult brain in mice. As a Leon Levy Fellow, he plans to use this technique to study the molecular pathway regulating neuronal circuit rearrangements triggered by learning and sensory experiences.

Ilaria Sani, PhD
The Rockefeller University

Dr. Sani received her undergraduate degree from the University of Florence, where she earned a bachelor of science degree in biology and a master's in biomedical sciences. She then completed her PhD training in neuroscience at the University of Verona, studying the interplay between attention and stimulus salience at the single neuron level. Dr. Sani was partially funded by the National Institute of Neuroscience, and she received the Valentino Braitenberg Award for her PhD thesis. Now, as a postdoctoral fellow in the Laboratory of Systems Neuroscience at The Rockefeller University, Dr. Sani is studying the neural mechanism of attentional reorienting, using a multimodal approach. She is applying functional and structural whole brain imaging, in combination with electrophysiological recordings of single neuron activity, with the goal of bridging the gap between the different spatial and temporal scales of the brain.

LEON LEVY FELLOWS IN NEUROSCIENCE
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Louisa Steinberg, MD, PhD
Columbia University Medical Center

Dr. Steinberg graduated with honors from Vassar College with a BA in Neuroscience and Behavior. She went on to pursue her MD/PhD at the Albert Einstein College of Medicine where she worked in the laboratory of Dr. Jose Luis Pena in the Department of Neuroscience. During her PhD, Dr. Steinberg studied neural coding and signal processing in the brain stem. She has presented many posters and has published several papers, including two first author of papers published in the Journal of Neuroscience. Going forward, Dr. Steinberg plans to study biomarkers and novel treatment protocols for major depressive disorder.

Nicolas Tritsch, PhD
NYU Langone Medical Center

Dr. Tritsch is an Assistant Professor in the Neuroscience Institute at the NYU Langone Medical Center, where he studies the functional organization of neural circuits that orchestrate voluntary motor actions. He obtained his B.S. in immunology and M.S. in neuroscience from McGill University before earning his Ph.D. in neuroscience from Johns Hopkins University under the mentorship of Dr. Dwight Bergles. He recently completed a postdoctoral fellowship in the laboratory of Dr. Bernardo Sabatini at Harvard Medical School. Dr. Tritsch is the recipient of several awards, including a National Institutes of Health Pathway to Independence Award and a Society for Neuroscience Peter and Patricia Gruber International Research Award. As a Leon Levy Fellow, he aims to identify the synaptic mechanisms that enable the nervous system to promote the execution of movements expected to bring about desired outcomes.

James Young, MD, PhD
Icahn School of Medicine at Mount Sinai

Dr. Young received his BS and MS in Biology from Stanford University. He pursued a combined MD-PhD degree at Icahn School of Medicine at Mount Sinai. His doctoral thesis in the lab of Dr. Matthew Shapiro focused on in behavioral flexibility in rats. He performed single unit recordings in the orbitofrontal cortex to study neural encoding during reversal learning. Currently, he is one of the chief residents in Neurology at Mount Sinai Hospital. His current research performs behavioral testing on human subjects while they undergo electrocorticography (ECOG) for surgical management of epilepsy. As a Leon Levy fellow, his research will focus on the role of intrinsic oscillatory activity in supporting decision-making and memory.

Yihong Zhao, PhD
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Dr. Zhao is an Assistant Professor in the Department of Child and Adolescent Psychiatry at NYU Langone Medical Center. She obtained her B.S. in Statistics from the University of California at Riverside with high honor and received her Ph.D. in Biostatistics from Columbia University. Prior to joining NYU, she worked as an Assistant Professor of Clinical Behavioral Medicine in the Department of Psychiatry, Columbia University. She is currently the PI of an NIH supported project on finding links among DNA methylation, neurophenotypes, and alcohol use disorders. Her research focuses on developing statistical and machine learning methods useful for identifying and characterizing the relationships between genetic factors, neurophenotypes, and psychiatric behaviors.

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PREVIOUS LEON LEVY FELLOWS IN NEUROSCIENCE SYMPOSIA

2012 - FIRST ANNUAL SYMPOSIUM

The Shelby White and Leon Levy Center for Mind, Brain and Behavior at Rockefeller University was created during Leon Levy's lifetime. It was only fitting that the inaugural Symposium was held at Rockefeller University on May 12, 2012. Dr. Cori Bargmann, Torsten N. Wiesel Professor, delivered the plenary talk, *"Using Fixed Circuits to Build Flexible Behaviors."* We were honored that Dr. Wiesel was in attendance and delivered the concluding remarks at dinner.

2013 - SECOND ANNUAL SYMPOSIUM

The second annual Symposium, hosted by Dr. Jeffrey A. Lieberman, was held at Columbia University Medical Center on April 29, 2013. The plenary talk, *"Order from Disorder: Internal Representations of the Olfactory World"* was delivered by Dr. Richard Axel, Nobel Laureate and University Professor, Columbia University. The addition of a poster session at the end of the day was another opportunity for participants and fellows to interact.

2014 - THIRD ANNUAL SYMPOSIUM

The third annual Symposium was jointly hosted by Dr. Costantino Iadecola and Dr. Norman R. Relkin of Weill Cornell Medical College and held in their newly opened Belfer Research Building on April 30, 2014. Laurie H. Glimcher, MD, the Steven and Suzanne Weiss Dean of Weill Cornell Medical College welcomed the guests. The plenary talk,*"Targeting Protein Trafficking: A New Approach to the Treatment of Alzheimer's and Parkinson's Diseases"* was delivered by Dr. Gregory A. Petsko, Director, Helen and Robert Appel Alzheimer's Disease Research Institute, and Arthur J. Mahon Professor of Neurology and Neuroscience, Weill Cornell Medical College.

2015 - FOURTH ANNUAL SYMPOSIUM

The fourth annual Symposium, hosted by Dr. Richard Tsien and Dr. Glenn Saxe, was held at NYU Langone Medical Center on April 30, 2015. Robert I. Grossman, MD, the Saul J. Farber Dean and CEO, and Dafna Bar-Sagi, PhD, Senior Vice President and Vice Dean for Science, welcomed the guests. The plenary talk, *"Linking Synapse to Nucleus and Basic Mechanisms to Disease"* was delivered by Richard Tsien, DPhil, Druckenmiller Professor and Chair of Neuroscience & Physiology, and Director of the Neuroscience Institute, NYU Langone Medical Center.

Drs. Torsten N. Wiesel and
Michael Young

Elizabeth Moynihan and
Dr. Cori Bargmann

Dr. Richard Axel

Shelby White and
Dr. Jeffrey A. Lieberman

John W. Bernstein and
Dr. Costantino Iadecola

Dr. Gregory Petsko

Dr. Richard Tsien and Dr. Glenn Saxe

(From left) Dr. Bar-Sagi, Dr. Marmar,
Dr. Grossman, Dr. Tsien, Shelby White,
Dr. Bargmann, Dr. Buzsáki & Dr. Saxe

Notes

We hope
you will
join us in
2017 for
the **Sixth**
Annual
Symposium