Psychiatric Residency + PhD Track

The Department of Psychiatry at Mount Sinai has been awarded NIMH support for an extraordinary program that offers a second path to MD/PhD training. This is an integration of PhD training with psychiatry residency training, over seven years. We plan to offer two places in this track each year. It is designed for those who are committed to psychiatry, and also committed to becoming trained at the PhD level in genetics or neuroscience, which will equip them to do sophisticated academic work in those disciplines. This opportunity is unique in the nation, and also offers substantial financial advantages through the NIH’s Loan Repayment Program.

The 2008 National Advisory Mental Health Council Workgroup on Research Training Report stated “It is widely believed that MD/PhD investigators bring a unique perspective to their research programs because of the blend of clinical and research perspectives honed through graduate and medical education, residency and fellowship. In addition, MD/PhD investigators may be well-trained for translational research careers.” This view has led to MD/PhD having high rates of grant funding from NIMH. The fields of neuroscience and genetics have developed such depth in terms of knowledge base, research strategies and research techniques that PhD training (or its equivalent) may be a necessity for effective translational research and obtaining research funding. Unfortunately, the number of psychiatrist MD/PhD researchers is small. The NIH and NIMH substantially support Medical Scientist Training Programs and individual MD/PhD students, and have done so over many years. However, the established method of combined MD/PhD training is inefficient, in that the period of intense research and PhD completion is followed by many years of clinical training. Thus there is a long separation from research, leading to a decline in research skills, distance from the knowledge base, and a need to retrain after residency. New models for training translational researchers are needed, and we have developed an innovative program for the production of superbly trained MD/PhD psychiatrist-researchers. The program offers individuals who, at the end of medical school, are ready to commit both to psychiatry and research, a training opportunity that will simultaneously promote both their clinical and research abilities. The program will integrate their clinical training with their PhD training, and their PhD research with post-residency research. The excellence of both clinical and research training at Mount Sinai, in addition to excellent financial incentives, make it a very advantageous program.

Program Approach and Content

The Psychiatry Residency+PhD Program (PR+PhD) will participate as the "Residency+PhD Track" in the offerings of the Icahn School of Medicine at Mount Sinai (ISMMS) Psychiatry Residency Training Program, so that applicants may enter the program via the National Residency Matching Plan. The program consists of 5 components.

a) Completion of all clinical rotations and experiences required by the American Board of Psychiatry and Neurology for Board Certification. Also, attendance at core didactics of the Residency Program.
b) Completion of all coursework, examinations, research activities and thesis requirements of the Graduate School of Biomedical Sciences at the Icahn School of Medicine at Mount Sinai for the PhD degree in either Neuroscience or Biomedical Sciences (Genetics and Genomics)
c) Research done with close mentorship and involvement of both a MD/PhD advisor and the Program Director.
d) Training in the writing of research publications and grant applications, necessary skills for academic careers.
e) Other scientific career-building activities, including connection with other scientists, those in the residency’s Physician-Scientist Track, the many outstanding neuroscientists at Mount Sinai, and neuroscientific professional organizations.

**Resident Clinical Activities**

The plan for the PR+PhD program is to front-load the clinical experiences, but to have them continue throughout the 7 years. Specifically, the first year will be a full “residency year” devoted to meeting requirements in Primary Care, Neurology and Inpatient Psychiatry. For each of the 6 following years, only 50% will be “residency time” and there will be an additional 50% of NIMH-supported time. During years 2, 3 and 4 the NIMH time will be used for PhD didactics plus research, and for years 5-7 this time will be for research only (See Table below).

Core Residency Didactics: The residents in the PR+PhD program will have the same didactics in Years 1, 2 and 3 as their classmates, 2 hrs/week in Year 1 and 4 hrs/week in years 2 and 3 as part of “residency time.” They will not attend in year 4 and beyond, unless they wish to do so.

**Clinical and Elective Research Assignments During Residency Time**

**Year 1:** (12 months of residency training)
- 4 month of primary care
- 2 month of neurology
- 6 months of inpatient psychiatry, with 1 month geriatric, 1 month addiction, and 1 month child and adolescent psychiatry inpatient rotations

**Year 2:** (counting for 6 months of residency training)
- 6 months of adult outpatient psychiatry, (done as 50% time over 12 months) with some supervised ER experiences evenings, nights and weekends

**Year 3:** (counting for 6 months of residency training)
- 6 months of outpatient psychiatry, (done as 50% time over 12 months) with 10% (0.6 months) child and adolescent psychiatry

**Year 4:** (counting for 6 months of residency training)
- 1.8 months of outpatient psychiatry (done as 10% time with adults, and 5% time with children and adolescents, over 12 months
- 4.2 months of research time

**Year 5:** (counting for 6 months of residency training)
- 1 month of consultation-liaison psychiatry (done as a block rotation)
- 5 months of research time

**Year 6:** (counting for 6 months of residency training)
- 1 month of consultation-liaison psychiatry (done as a block rotation)
- 5 months of research time

**Year 7:** (counting for 6 months of residency training)
- 1.2 months of community, emergency and forensic psychiatry (done as 10% time over 12 months)
- 4.8 months of research time
## Clinical, Research and Didactic Activities Over 7 Years

<table>
<thead>
<tr>
<th>Training Year</th>
<th>Residency Time*</th>
<th>Residency Activities</th>
<th>NIMH Time</th>
<th>NIMH-Supported Activities</th>
<th>Effective Research Time**</th>
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<td>Outpatient Psychiat</td>
<td>50%</td>
<td>PhD Didactics (20%) and Research (30%)</td>
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<td>Outpatient Psychiat</td>
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<td>PhD Didactics (20%) and Research (30%)</td>
<td>30%</td>
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<tr>
<td>4</td>
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<td>Clinical (15%)* and Research Elective (35%)</td>
<td>50%</td>
<td>PhD Didactics (5%) and Research (45%)</td>
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<td>Research</td>
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<td>Research</td>
<td>90%</td>
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<td>Totals</td>
<td>48 months supported by Mount Sinai Hospital</td>
<td>36 months supported by NIMH</td>
<td>55 months</td>
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* Residency Time is time spent on clinical rotations, residency didactics and research electives, spread over 7 years, all paid by the hospital as with any other psychiatry resident.

** Effective Research Time combines the research elective time under Residency Time with the research time provided by NIMH support.

*** The clinical experiences are in Consultation-Liaison, Child and Adolescent, Outpatient, Community, Emergency, and Forensic Psychiatry (see text).

The elective research time coming from residency assignments adds to 19 months. The total amount of research–related time adds the 36 months of NIMH-supported time (6 months x 6 years) to the 19, and arrives at **55 months, 4.6 years**. In this way, the NIMH support and the elective residency research leverage each other to provide the time that would be considered appropriate for completing a PhD.

### PhD Didactics and Thesis

The Graduate School of Biomedical Sciences at the Icahn School of Medicine at Mount Sinai has 9 defined Multidisciplinary Training Areas (MTAs), each with its own curriculum and leaders. One is Neuroscience, with 53 current PhD students, and another is Genetic and Genomic Sciences, with 18 current PhD students.

The PhD didactics will begin in Year 2 of the program, and continue in Years 3 and 4, on a part-time basis, along with the half-time residency activities described above. The PhD course work required in this program will be the same as that required of current MD/PhD candidates at Mount Sinai. 72 credits are needed, but 20 -28 credits may be awarded for Medical School coursework and research. Also, 6 credits are awarded for each semester of independent research while pursuing the PhD.

*Three “Core Courses” are taken sequentially in year 2. Each Core course has Journal Clubs embedded in them in addition to weekly didactic lectures. Course Credits are in parentheses.*

**Neuroscience Core Courses:**
- Systems Neuroscience (4)
Cellular and Molecular Neuroscience (4)  
Neural Basis of Behavioral Plasticity and Cognitive Processes (4)

**Genetics/Genomic Core Courses:**
- Biomedical Sciences 1 (6)
- Biomedical Sciences 2 (6)

**Seminars and Journal Clubs.** Year 3 and year 4 students choose from many departmental seminars and journal clubs

**Neuroscience Advanced Courses**
- Cognitive Neuroscience Advanced Topics (1)  
- Brain Imaging: In Vivo Methods (1)  
- Neuropharmacology (1)  
- Neurodegeneration (2)  
- Molecular Pathogenesis of Neurological & Psychiatric Disorders (3)  
- Neuroanatomy (3)  
- Advanced Topics in Synapses (1)  
- Molecular Pathways of Metabolic Disease (2)  
- Topics in Clinical Neuroscience (1)  
- Neurobiology of Aging & Adult Development (3)

**Genetics and Genomics Advanced Courses**
- Translational Genomics (2)  
- Statistical Genetics (2)  
- Intro to Human Genome Sequencing (2)  
- Psychiatric Genomics (2)  
- Advanced Topics in Human Genetics (3)  
- A Systems Approach to the Genetic Basis of Disease (3)

**Other required courses:**
- Responsible Conduct of Research, year 2 or 3 (1)  
- Biostatistics, year 2 or 3 (3)

Additionally, students receive instruction in scientific writing and attend grant proposal writing workshops. For example, there is a “Specific Aims” workshop two months before the thesis proposal time period so that the students learn how to write and critique in preparation of their thesis proposals. There is also an oral presentation skills workshop on how to effectively present a PowerPoint presentation.

The Program has given much thought to the PhD thesis. In obtaining research funding, journal publications are given substantial weight. The Mount Sinai Graduate Program allows trainees to combine 3 publications into a thesis, with the addition of an introduction chapter and a discussion chapter. It is this plan which we consider most appropriate for trainees in this Program, and thus trainees will be encouraged to publish their research results early in the training schedule.

**Program Faculty**

**Thesis Preceptors:**
This program is fortunate to include such strong departments of Neuroscience and Genetics/Genomics at Mount Sinai, a new Institute and facilities, and such strong connections between these Departments, Institutes and the Department of Psychiatry. Thus, there are many research faculty members who are well qualified as PhD preceptors for trainees in this program. In conjunction with the Advisory Committee, we have selected the following as our primary list of potential PhD preceptors; it includes both established full professors, and some younger faculty members with exciting current research. This presents to our trainees those whom we believe have a strong capability, and interest, in training psychiatrists to do translational research. They are listed alphabetically with their primary appointment.

**Schahram Akbarian, MD, PhD (Psychiatry), Director of the Neuroepigenetics Laboratory, Dr.**
Akbarian employs an array of methods, including cell type-specific chromatin sortings in human, non-
human primate and rodent brain, as well as conditional deletions of chromatin modifying proteins in genetically engineered mice. These methodological approaches are aimed at uncovering epigenetic regulations that are unique to the human brain, as well as testing the role of specific chromatin remodeling mechanisms in normal and diseased brain development.

One particular focus is the regulation of histone methylation markings associated with transcription start sites and other regulatory sequences at the 5'-end of genes. This includes behavioral studies and transcriptome and epigenome mapping in mutant mice with demethylases that were recently implicated in the neurobiology and genetics of some cases on the autism, mood, and psychosis spectra.

In parallel, the lab charts on a genome-wide scale the epigenetic architecture of cortical neurons, including occupancies of histone methylation markings, in postmortem brain of subjects diagnosed with schizophrenia, depression, or autism.

Finally, the lab measures the "epigenetic distance" between different cell types residing in the same tissue/same subject. Such comparative epigenome mapping is expected to provide novel, unprecedented insights into the role of regulatory, non-coding sequences important for cellular differentiation, as well as hominid brain evolution.

Mark Baxter, PhD (Neuroscience). The Baxter lab focuses on the neural mechanisms of learning, memory, executive function, and decision-making, and the ways in which these mechanisms fail in aging and neuropsychiatric disorders. Baxter’s research interests include the functional neuroanatomy of frontal and temporal cortex, regulation of higher cognitive functions by neuromodulators, the biological basis of cognitive impairments in neurodegenerative disease and neuropsychiatric conditions, as well as the neurobiological and cognitive effects of general anesthesia.

Deanna Benson, PhD (Neuroscience). The Benson lab has been investigating mechanisms promoting axon guidance and targeted synapse assembly in the rodent hippocampus and cerebral cortex, focusing on molecules mediating cell-cell recognition and adhesion. The function of adhesion molecules (e.g. L1, semaphorins, and cadherins) and the ERM (ezrin, radixin, and moesin) family of actin linker proteins in axonal guidance, and in the regulation of synapse specificity and laminar targeting, is being investigated.

Kristen Brennand, PhD (Psychiatry). Dr. Brennand’s research focuses on using human induced pluripotent stem cells to model psychiatric disorders. By reprogramming skin samples from patients with schizophrenia (SZ) into stem cells and then differentiating these stem cells into neurons, she showed that SZ neurons had reduced neuronal connectivity and aberrant gene expression; some of these defects were improved by treatment with antipsychotic medications, as published in Nature in 2011. She is now expanding her studies to include better clinically characterized patients, including a cohort of childhood onset SZ patients and a second cohort of monozygotic (MZ) twins discordant for SZ. Her lab seeks to define the disrupted molecular pathways and cellular processes that contribute to schizophrenia.

Joseph Buxbaum, PhD (Psychiatry) Director of the Laboratory of Molecular Neuropsychiatry which studies human psychiatric and neurological diseases using the methods of cell biology, molecular biology, genetics, genomics, and animal models. Currently, Dr. Buxbaum’s lab is focusing on Alzheimer's disease, autism, and schizophrenia.

The focus in Alzheimer's disease is on the accumulation of the pathological amyloid A beta protein, and how amyloid protein precursor (APP) cleavage may regulate transcription.

In autism, the lab uses techniques of molecular genetics to identify, and then characterize, genes that contribute to autism susceptibility, carrying out whole exome sequencing to identify de novo mutations in autism. The lab has several rodent models where autism genes have been mutated. In the case of the Shank3 gene, Dr. Buxbaum’s studies have led to an ongoing clinical trial.

In schizophrenia, the lab is following up on microarray studies that implicate oligodendrocyte abnormalities in schizophrenia. They have made relevant mouse models and are exploring methods of deriving neurons from patient samples together with collaborators, Drs. Sklar and Brennand.
Patrizia Casaccia, MD, PhD (Neuroscience). Dr. Casaccia’s work adopts molecular and cellular techniques to find new therapies for multiple sclerosis. Her work includes translational research in regenerative and personalized medicine. The lab focuses on myelin repair with a special emphasis on the effect of aging and gender in patients with MS leading to novel screening for the discovery of new therapies to protect the neurons and replace damaged myelin. Recently, the Casaccia lab has investigated the effect of emotional stress on myelin, hence, addressing high comorbidity between MS and depression.

Elizabeth Cropper, PhD (Neuroscience). The cellular and molecular mechanisms that endow neural circuits with the ability to respond to changes in the external environment, simultaneously maintaining coordinated patterns of activity, are being investigated in an experimentally advantageous preparation, the marine mollusk Aplysia Californica. Mechanisms responsible for the expression of plasticity in complex rhythmic behavior, driven by a central pattern generator and composed of multiple phases are being characterized.

Joel Dudley, PhD (Genetics/Genomics): Director of Biomedical Informatics in the Institute for Genetics and Multiscale Biology. His focus is on genomic medicine, translational bioinformatics, personal genomics, evolutionary biology, drug discovery, and molecular diagnostics.

Graham Ellis-Davies, PhD (Neuroscience). The lab does multi-disciplinary research using synthetic organic chemistry, photochemistry, two-photon microscopy and transgenics to study neuronal plasticity and degeneration. It is particularly interested in how stress and aging affect synapses.

Menachem Fromer, PhD (Psychiatry). Dr. Fromer, a recent recruit, focuses on sequencing data and genetic interpretation of this data within a disease context, specifically schizophrenia. His work has yielded efficient algorithms for processing large datasets of protein sequences and clustering them into functional groups, accurate algorithms for modeling protein structures and protein-protein interactions at the atomic level, and general-purpose algorithms for finding multiple optimal solutions for widely used mathematical models. His current focus is developing computational tools to analyze exome sequencing data for a sample of thousands of schizophrenia patients in order to uncover copy number variation.

Samuel Gandy, MD, PhD (Psychiatry and Neurology). The Gandy laboratory focuses on molecular pathogenesis and drug discovery in Alzheimer’s disease. Particular areas of interest include genes that co-regulate risk for both Alzheimer’s disease and type 2 diabetes, mechanisms of action of intravenous immunoglobulin in Alzheimer’s disease, iPS cell models of Alzheimer’s disease, and roles of neurogenesis and autophagy in the pathogenesis of Alzheimer’s disease.

Rita Goldstein, PhD (Psychiatry) Dr. Goldstein directs the NARC (Neuropsychoimaging of Addiction and Related Conditions) research group that uses multimodality functional neuroimaging methods (including fMRI, EEG/ERP, PET) to explore the neurobiological basis of impaired cognitive and emotional functioning in human drug addiction and other disorders of self-control. An important application of this research is to facilitate the development of intervention modalities that would improve treatment outcome in drug addiction and other chronically relapsing disorders of self-regulation.

Javier Gonzalez-Maeso, PhD (Psychiatry). Dr. Gonzalez-Maeso is interested in investigating the structure and function of G-protein-coupled receptors with the ultimate goal of discovering new drugs for the treatment of neuropsychiatric disorders. The lab uses several interdisciplinary approaches involving tissue cultures, mouse models, and post-mortem human brain analysis. The major focus of his group is to formulate epigenetic approaches to improve antipsychotic medications.
Ming-Hu Han, PhD (Pharmacology and Neuroscience). Dr. Han’s group is using advanced optogenetic tools to characterize the cellular and circuit level mechanisms that govern susceptibility versus resilience to chronic stress in mouse models. His research has uncovered several novel ionic mechanisms of stress vulnerability within specific neural pathways and provides tangible pathways forward in the development of new antidepressant medications.

Vahram Haroutunian, PhD (Psychiatry & Neuroscience). Dr. Haroutunian’s research centers on clinical and neurobiological correlates of schizophrenia and dementia, using combinations of cognitive and neuropsychological assessments, molecular biological techniques, neuropathological studies and rodent models to understand the biological substrates of mental illness and dementia with special emphasis on clinical application and translation.

Patrick Hof, MD (Neuroscience). Dr. Hof’s research is directed towards the study of selective neuronal vulnerability in dementing illnesses using classical neuropathological as well as modern quantitative immunohistochemical methods. Neuronal susceptibility to degeneration in the cerebral cortex is studied in Alzheimer’s disease, other dementing disorders, and animal models of age-related illnesses.

George Huntley, PhD (Neuroscience). Dr. Huntley’s principal research focus is on mechanisms of synaptic plasticity through which synaptic structure and function are modified developmentally, by learning and memory, and following injury. Current research projects include: 1) determining the role of adhesion and related molecules in synaptic function; 2) characterizing roles of several autism-linked genes in establishment and plasticity of cortical sensory maps; 3) molecular mechanisms of hippocampal synaptic remodeling.

Yasmin Hurd, PhD (Psychiatry). The Hurd lab investigates the relationship between psychiatric and drug abuse disorders with a growing emphasis on identifying factors that increase the risk for these disorders. Work is focused on systematic study of the human brains of drug abusers and subjects with psychiatric disorders in relation to opioid neuropeptide, cannabinoid and dopamine neural systems, mapping specific genes in the mesocorticolimbic system that regulate emotional function.

Hirofumi Morishita, MD, PhD (Psychiatry) Following PhD and psychiatry residency in Japan, his research focuses on understanding the mechanisms of experience-dependent brain plasticity during developmental critical periods. By combining molecular, circuit, and systems level methodologies in mouse visual cortex, he identified novel molecular “brakes” on adult plasticity, the removal of which led to successfully restored juvenile brain plasticity in adulthood. His current research aims to translate the critical period principle beyond vision and toward an understanding of neurodevelopmental disorders such as schizophrenia.

John Morrison, PhD (Neuroscience). Dr. Morrison’s lab studies the molecular and structural nature of age-related alterations in synaptic plasticity that lead to decreased cognitive function and/or degeneration, and links between age-related decreases in estrogen levels (i.e., menopause), NMDA receptors, and cortical circuits. Cellular neuropathologic analyses of human brain, experimental and neuropathologic analyses of non-human primate cortex, and detailed neuropathologic analyses of genetically manipulated mice, are involved.

Eric Nestler, MD, PhD (Neuroscience). Dr. Nestler's research focuses on the role of the brain's reward pathways in the regulation of mood and motivation under normal conditions and its contribution to depression and antidepressant action in animal models. Regulation of reward pathway function by transcriptional mechanisms, in particular stress-induced transcription factors such as CREB and DeltaFosB and their physiological target genes, and epigenetic mechanisms that provide insight into stress and antidepressant action, are studied.
Dalila Pinto, PhD (Psychiatry). Her research focuses on understanding how the human genome varies in sequence, structure and copy number, and how this genetic variation contributes to phenotype differences and disease risk in families and populations. Over the past five years she has played a leading role in mapping and characterizing the functional impact of structural variants (e.g., deletions, duplications, inversions and complex rearrangements) in autism and other disorders. By using a combination of high-throughput technologies together with bioinformatics and statistical genetics, her current research aims to integrate various forms of genetic variation with gene expression, epigenetics and clinical data, to identify genes and biological pathways involved in autism and related neurodevelopmental disorders.

Shaun Purcell, PhD (Psychiatry). Dr. Purcell’s methodological work focuses on the design of genetic studies, the detection of gene variants influencing complex human traits and the dissection of these effects in the larger context of other genetic and environmental factors. His group develops widely used genetic tools, including the software package PLINK, a toolset for the analysis of whole-genome association studies cited over 3000 times in the last 5 years. Current foci include leading the analysis of a large-scale whole-exome sequencing study of schizophrenia and bipolar disorder and developing computational tools for the analysis of next-generation sequencing data.

Scott Russo, PhD (Neuroscience). The Russo lab investigates how the brain adapts to stress and drugs, leading to altered synaptic connectivity and behavioral changes relevant to depression and addiction. Behavioral models are analyzed by molecular, biochemical, and neuroanatomical techniques. Recent work, for example, has demonstrated a role for synaptic plasticity within the brain’s reward circuitry in mediating the deleterious effects of stress as well as the importance of peripheral immune cytokines in mediating some of this stress-induced cellular and behavioral pathology.

Stephen Salton, MD, PhD (Neuroscience). Dr. Salton studies the function of neurotrophic growth factors such as BDNF and NGF by identifying the target genes that they regulate, signaling pathways involved in gene induction, and the role that these downstream gene products play in CNS and PNS development and function, and in the regulation of complex behavior, including depression and memory.

Eric Schadt, PhD (Genetics/Genomics) One of the world’s foremost experts in computational biology, he has focused on the generation and integration of large-scale sequence variation, molecular profiling and clinical data in disease populations to construct predictive network models of disease, providing for direct links between molecular biology and the pathophysiology of disease. He has contributed to a number of discoveries relating to the genetic basis of common human diseases such as diabetes and obesity.

Daniela Schiller, PhD (Psychiatry). Dr. Schiller's research focuses on the neural mechanisms underlying emotional control. In that the environment we live in is constantly changing, our learned emotional responses need to be continuously updated to appropriately reflect current circumstances. Understanding the neural mechanisms that make such emotional flexibility may shed light on the impairments leading to anxiety disorders.

Andrew Sharp, PhD: His laboratory performs global analyses of structural variation, epigenetics, and gene expression combining innovative experimental and bioinformatic approaches. It uses both wet lab technologies such as DNA microarrays and high-massively parallel sequencing in addition to performing computational analyses of the human genome, and large datasets produced by high-throughput technologies.

Pamela Sklar MD, PhD (Psychiatry), Director of the Division of Psychiatric Genomics. Dr. Sklar was recruited to MSSM to develop a Division in the psychiatry department where gene finding in
psychiatric genomics, functional characterization, molecular analysis and clinical translational genomics are tightly coupled in order to reach the point where human genetic insights affect the clinical practice of psychiatry. She is currently PI on 3 NIH grants on the genetics of schizophrenia and bipolar disorder. The highly interdisciplinary nature of this Division is demonstrated by the co-recruitment of all faculty in concert with the appropriate institute heads (Nestler for FBI, Schadt for Multiscale Genomics). The Division includes a Center for Statistical Genetics led by Shaun Purcell, PhD with two new junior faculty, Eli Stahl, PhD (Theoretical and Computational Genetics), Menachem Fromer, PhD (Computational Genetics, Functional Analyses). Additional genetic analyses of autism are being led by Dalila Pinto, PhD (Clinical Correlations of Structural Variants). Molecular analyses are being carried out by new recruits Kristen Brennand, PhD (Pluripotent Stem Cell Models) and Hirofumi Morishita, MD, PhD (Genetics of Brain Plasticity). Clinical analyses and clinical trials are being led by Katherine Burdick, PhD (Neurocognition). These recruits have built a vibrant new culture in the Division. Together, they represent what might be an unequaled educational environment for a psychiatrist wishing to train in psychiatric genetics.

**Eli Stahl, PhD (Psychiatry).** Dr. Stahl, a recent recruit focuses on computational methods for the development and analyses of complex genetic disorders including autoimmune disorders and neuropsychiatric diseases. His focus has been on genetic association studies, genomics, and medical genetics of rheumatoid arthritis. Current projects include (1) characterizing the risk allele spectrum in schizophrenia, ALS, gout, rheumatoid arthritis and other diseases, (2) establishing the genetic contribution to drug efficacy and toxicity in bipolar disorder, cancer, statin therapy, and others, (3) estimating genetic correlations among psychiatric and autoimmune/inflammatory diseases, (4) building genetic predictors of height, body mass index/obesity, and heart disease.

**Klaudiusz Weiss, PhD (Neuroscience).** The Weiss lab has developed and applied a multidisciplinary approach combining behavioral, morphological, electrophysiological, cell biological and molecular-biological techniques to explain the neural basis of those forms of behavioral plasticity that are due to changes in the motivational state of animals, addressing these questions in the marine mollusc Aplysia.

**Hongyan Zou, MD, PhD (Neuroscience).** Dr. Jenny Zou is interested in molecular mechanisms controlling how neurons are born, extend axons, and regenerate or fail to regenerate after mammalian CNS injury. Dr. Zou uses mouse axon injury models, dissociated and explant neural cultures, molecular, cellular, biochemical and various imaging techniques to study signaling pathways that promote neurogenesis and axonogenesis. Such knowledge is crucial for targeting molecules for effective CNS regeneration.

**Current Trainee Stipends and Hospital Support:**

All trainees will be registered as psychiatry residents, and will be paid in accordance with the Mount Sinai Hospital (MSH) House Staff Salaries for each of their 7 years in the program. Since after Year One the trainees are only half-time residents, they will increase their PGY level each two years. The current MSH salaries are listed. The NIMH funds bring the salary to that of a full-time resident. If MSH stipends for residents increase, as has happened each year, the trainees’ salaries in this program will increase as well.

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<thead>
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<th>Training Year</th>
<th>Paid As</th>
<th>Hospital Payment*</th>
<th>NIMH Component</th>
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</table>

* Plus health insurance benefits

Application Process for the Residency+PhD Program

**PGY 1s via the NRMP**

Those who are eligible to apply for PGY 1 positions via ERAS should do so by selecting this track, as well as any of the other two tracks (Physician Scientist and Regular Track) for which they would like to apply.

ERAS information will be reviewed, and after screening additional information will be requested, which is the information that is requested of anyone applying for Mount Sinai PhD programs (online submission). This information will then be reviewed, and applicants will have specific interviews related to the program, as well as regular residency interviews.

**PGY 2s via Transfer**

We also welcome applications for transfer into the PGY 2 year of this program from those who will have completed, by July, 2014, a comparable PGY 1 year in an ACGME-approved Psychiatry Residency Program. In other words, those who have completed the 4 months of required training in Primary Care, 2 months in Neurology, and all or most other months in Inpatient Psychiatry.

The application procedure for PGY 2 entry will include review of PGY 1 application materials, updated CV, personal statement and letters of recommendation. Then review of the information that is requested of anyone applying for Mount Sinai PhD programs (online submission), and interviews.

Further Information

Applicants are encouraged to view the Graduate School Website
http://icahn.mssm.edu/education/graduate-school

Choosing: PhD Program

Multidisciplinary Training Areas
Neuroscience and Genetics/Genomics