The Friedman Brain Institute Announces
2023 FBI Research Scholars

On behalf of the Philanthropic Leadership Council of The Friedman Brain Institute, we are pleased to announce the 2023 recipients of The FBI Research Scholars Awards.

Richard and Susan Friedman Research Scholar Award

Sairam Geethanath, PhD
ASSISTANT PROFESSOR, Diagnostic, Molecular and Interventional Radiology

Shilpa R. Taufique, PhD
ASSISTANT PROFESSOR, Psychiatry

Accessible community-based neuroimaging of substance use disorder patients to monitor therapeutic efficacy.

Substance use disorder (SUD) negatively impacts brain health. Underserved populations experience disproportionately poor SUD-related outcomes. Inequitable healthcare access is a key contributor to this situation. Recent studies have highlighted the need for densely sampled temporal neuroimaging data in addiction disorders to maximize clinical insight. Magnetic Resonance Imaging (MRI) is the preferred tool for investigating the human brain. Currently, two-thirds of the world's population, mostly in low-resource settings, do not have access to MRI. This low accessibility results from the siting, infrastructure, engineering, electrical power, and on-site expertise requirements of high-field MRI systems. In contrast, portable low-field imaging (LFI) can provide a dense temporal sampling of neuroimaging data. Our project will demonstrate LFI as a novel quantitative tool to monitor therapeutic efficacy in SUD patients.

Fascitelli Research Scholar Award

Dalila D. Pinto, PhD
ASSISTANT PROFESSOR, Psychiatry and Genetics and Genomic Sciences

Melissa A. Umphlett, MD
ASSISTANT PROFESSOR, Pathology, Molecular and Cell Based Medicine

Madeline C. Fields, MD
ASSOCIATE PROFESSOR, Neurology

Molecular Profiling of Pediatric-Onset Focal Epilepsies.

Refractory child-onset focal epilepsies (FE) are a tremendous burden on affected children and their families, and are associated with early death. Our goal is to use a unique collection of specimens obtained from stereotactic electroencephalography and surgical resection of seizure-onset foci and develop tools to identify somatic molecular alterations. This research lays the groundwork to unlock an important new resource for profiling brain tissues and cell types, amenable for finding alterations in inoperable cases and FEs that are MRI-negative, complementing neuroimaging and neuropathology.

Joseph and Nancy DiSabato Research Scholar Award

Sarah Ann Levy, PhD
INSTRUCTOR, Neurology

Aß Deposition and Cognitive Impairment in Older Adults with MS.

Cognitive deficits are common in older adults with multiple sclerosis (MS), but a major issue is disentangling whether cognitive impairment is due to MS or an additional neurodegenerative disorder. As such, there has been an emergence of interest regarding the co-existence of MS and age-related neurodegenerative conditions, such as Alzheimer's disease (AD). From a neuropsychological standpoint, it is difficult to discriminate MS from AD given a similar pattern of progressive cognitive deficits, including impairment in episodic memory. Our study will use positron emission tomography (PET) to investigate AD-specific biomarkers and quantify Aß burden in persons with MS. Results will help clarify our understanding of a non-AD neuropsychological profile in aging patients with MS and cognitive impairment, and will shed insight into the shared and disparate pathophysiological mechanisms of AD and MS.

Scherr Family Foundation Research Scholar Award

Stephanie K. Tankou, MD, PhD
ASSISTANT PROFESSOR, Neurology

Graham J. Britton, PhD
INSTRUCTOR, Genetics and Genomic Sciences

Identifying pro- and anti-encephalitogenic strains from human multiple sclerosis-associated microbiotas.

Multiple sclerosis (MS) is an incurable disease affecting the brain and spine and the most common cause of serious disability in young people.
The human gut is home to trillions of microbes collectively referred to as the gut microbiota. Perturbations in the composition of the gut microbiota is one of several factors that contribute to MS. We are using mice to investigate how gut derived bacteria from MS patients cause inflammation leading to MS. We are also studying the gut microbiota of healthy people to identify gut bacteria that can dampen the inflammatory immune response causing MS.
Our research will expand our understanding of how gut bacteria contribute to MS and could lead to the development of new drugs for the prevention and treatment of MS.

Harvey Schwartz Research Scholar Award

Muhammad A. Parvaz, PhD
ASSISTANT PROFESSOR, Psychiatry and Neuroscience

Cheryl M. Corcoran, MD
ASSOCIATE PROFESSOR, Psychiatry

Neurocomputational modeling to distinguish clinical phenotypes of comorbid psychosis and cannabis use.

Rising prevalence of high-potency cannabis use confers greater than a twofold risk for later development of a primary psychotic disorder. Such high comorbidity often leads to the development of a cannabis-induced psychotic disorder, which only in some cases progresses to become a primary psychotic disorder with comorbid cannabis use, complicating the diagnostic process. Currently, the onset of a primary psychotic disorder is assessed by tracking clinical presentations over time, which is costly, time-consuming, and unfeasible. Here, we propose to develop neurocomputational brain network models using dynamic causal modeling of the person-specific high-density EEG data to mechanistically predict clinical outcomes. These disease-specific and neurobiologically informed models will deepen our understanding of differential mechanisms and will help identify disease-specific targets to develop more effective and personalized treatment and intervention.

Zhao Research Scholar Award

Michael S Breen, PhD
ASSISTANT PROFESSOR, Genetics and Genomic Sciences

Makiko Yasuda, MD, PhD
ASSOCIATE PROFESSOR, Genetics and Genomic Sciences

A novel in vivo reporter model to assess specificity and efficacy of RNA editing therapy and delivery tools.

A breakthrough in the field of RNA therapeutics has been the discovery of antisense oligonucleotides (ASOs) that recruit the cell's own machinery to repair disease-causing mutations. Here, rationally designed ASOs can reprogram a unique class of RNA editing enzymes, termed adenosine deaminases acting on RNAs, to target a select RNA molecule and nucleotide of interest and 'edit' to repair nonsense mutations on pre-mRNA. This project is designed to generate a landmark in vivo reporter mouse model containing a disrupted eGFP harboring an in-frame stop codon that will fluoresce only after correction. By coupling our ASO approach with a burgeoning selection of gene delivery tools, this model is poised to accelerate our understanding of the specificity, efficiency, tissue tropism and biodistribution of RNA editing therapeutics across diverse modes of delivery.

Jane Martin and Stuart Katz Research Scholar Award

Fanny M Elahi, MD, PhD
ASSISTANT PROFESSOR, Neurology, Pathology, Molecular and Cell Based Medicine and

Kuan-Lin Huang, PhD
ASSISTANT PROFESSOR, Genetics and Genomic Sciences

Alison M Goate, D.Phil.
PROFESSOR, Genetics and Genomic Sciences, Neuroscience and Neurology

Unbiased Discovery of Early Molecular Dysregulations in Alzheimer's Disease.

Alzheimer's disease (AD) is the most common neurodegenerative disease affecting the aging brain. However, an understanding of molecular instigators and drivers of AD in early disease, and ability to predict pace of progression are lacking. These knowledge gaps present barriers to care and design of novel therapeutic trials that could impact disease course. Our team will generate a multi-dimensional dataset with AD genetics, plasma proteomics, clinical data and demographics from the Mount Sinai BioMe cohort. Advanced machine learning methods will be applied to uncover proteomic signatures and pathways that predict AD neuropathology and clinical symptoms across the continuum of preclinical to symptomatic disease. We hope to ultimately deliver novel biomarkers with potential to re-imagine predictive modeling and design impactful clinical trials for Alzheimer's disease.

Lipschultz Research Scholar Award

Xiaoting Wu, PhD
ASSISTANT PROFESSOR, Neuroscience

Denise J Cai, PhD
ASSOCIATE PROFESSOR, Neuroscience

Investigation and rescue of aberrant hippocampal ensemble activity in ASD-associated mouse models.

Social memory, the ability to recognize and remember conspecifics, is impaired in autism spectrum disorder (ASD). Hippocampal subregion CA2 encodes social memory, and its ensemble activity is disrupted in ASD-associated mice. Yet, it remains elusive how aberrant hippocampal ensemble activity arises in ASD. As antipsychotics are ineffective in improving social cognitive symptoms, there are currently no medications which can ameliorate the devastating impact of social memory deficits. Therefore, we will characterize CA2 ensemble activity in healthy and disease states and establish a pipeline for drug screening which will allow us to easily identify drug candidates which can rescue neural and behavioral deficits in social memory. This proposal will investigate multiple ASD-associated lines to provide a common framework for developing improved therapeutics for social cognitive deficits.

Nash Family Research Scholar Award

Haeyoung Baang, MD
ASSISTANT PROFESSOR, Neurosurgery and Neurology

Differentiation between Vegetative State and Minimally Conscious State with Computerized Analysis of Facial Movements on Clinical Examination.

The aim of my research is to identify facial movements distinguishing different categories of disorders of consciousness (DoC) such as vegetative state/unresponsive wakeful syndrome (VS/UWS) and minimally conscious state (MCS) on clinical examinations with computerized analysis in collaboration with Dr. Tanya Nauvel and Stephen Heisig who are the experts on this modality. Additionally, we seek to identify electroencephalogram (EEG) characteristics of VS/UWS and MCS with simultaneous monitoring. The ultimate goal of this project is to better understand DoC and develop an accurate diagnostic tool of it which is a prerequisite for prognostication of patients with DoC.

Ram Sundaram and Preethi Krishna Research Scholar

Ki A Goosens, PhD
ASSOCIATE PROFESSOR, Psychiatry

Mone Zaidi, MD, PhD, MBA
PROFESSOR, Medicine, Pharmacological Sciences and Geriatrics and Palliative Medicine

A Novel Role for Follicle-Stimulating Hormone in Alzheimer's Disease and comorbid health conditions in Down Syndrome.

Down Syndrome (DS) is the most common chromosomal disorder in humans; roughly 1 in 700 babies is born with DS. People with DS have a greater prevalence of many health conditions, including bone frailty, obesity, and Alzheimer's disease. Because people with DS have extra copies of many genes, it is often assumed that each health condition arises from extra copies of different genes. However, people with DS have elevated levels of follicle-stimulating hormone (FSH), a hormone classically linked to fertility and our recent work shows that FSH regulates far more than fertility. Our published work links elevated FSH to lower bone mineral density, increased deposition of adipose tissue, and greater accumulation of Alzheimer's pathology in the brain. We will examine whether blocking FSH signaling normalizes these three disparate health issues in a mouse model of DS, thus exploring a new target for health problems associated with DS.

Icahn School of Medicine at Mount Sinai