Department of Neurology

Website: https://neuro.wustl.edu/education

Research Electives

Neurology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Beau Ances, MD
Taylor Avenue Building Extension, 2nd Floor
Phone: 314-747-8423

Neuroimaging of neurodegenerative disorders. Students can work in a neuroimaging laboratory that is focused on the translational discovery of neuroimaging biomarkers for neurodegenerative diseases. The laboratory focuses on the pathogenesis of Alzheimer's disease and HIV-associated neurocognitive disorders. We are investigating the effects of neurodegenerative diseases on the brain network level using functional (blood oxygen level dependent imaging, arterial spin labeling), structural (volumetrics, diffusion tensor imaging), and metabolic (PET amyloid and tau) methods. Multiple projects that involve bioengineering, neuroimaging and infectious disease are available, depending on the interest of the student.

Randall Bateman, MD
BJCIH 9603
Phone: 314-273-9057

Diagnostic tests, biomarkers, and pathophysiology of Alzheimer's disease and other neurologic diseases. This research elective will expose the student to translational research in the study of Alzheimer's disease and other neurodegenerative diseases. The student will participate in multiple areas of the research, including participant recruitment, consent, enrollment and the performance of clinical research studies to discover and develop diagnostic tests and biomarkers and to understand the pathophysiology of Alzheimer's disease. Lumbar puncture for cerebrospinal fluid sample collection, blood collection and intravenous labeling methods will be demonstrated and taught. The student will participate in sample analysis, including processing for mass spectrometry quantitation, proteomic analyses, clinical analyses including determining sensitivity and specificity of tests, and application to real-world populations including diverse clinical cohorts led by the PI (SEABIRD (https://sites.wustl.edu/seabird/)) and the SILQ Center (https://batemanlab.wustl.edu/silq-center/). Quantitation, analysis and modeling of the data will be taught in the context of data interpretation and clinical study design. The student will learn about how clinical tests and treatments are developed in medicine, advancing the leading edge of advanced medical diagnosis and treatment.

Anne H. Cross, MD, and Laura Piccio, MD, PhD
McMillan, 3rd Floor
Phone: 314-747-4591 or 314-747-0405

Understanding interactions of the immune system with the central nervous system as it relates to multiple sclerosis and other neuroimmunological disorders. Our goal is to understand how immune cells cross the blood-brain barrier and initiate the cascade of events that leads to the lesions of multiple sclerosis. We are also funded to study the effects of diet and adipokines on neuroinflammation. Depending on the time commitment of the student and their individual interests and goals, they will either assist with ongoing projects or be given a laboratory project on which to work. Projects may involve animal models of multiple sclerosis, cell culture or studies of human samples (cerebrospinal fluid, blood or autopsied specimens). Interested students should contact Dr. Cross (crossa@neuro.wustl.edu) or Dr. Piccio (picciol@neuro.wustl.edu) several weeks in advance before signing up for this research to allow for sufficient planning.

Joel S. Perlmutter, MD
East Building, 2nd Floor
Phone: 314-362-6026

Pathophysiology of movement disorders. The lab is primarily interested in the etiology, pathophysiology and treatment of basal ganglia disorders. We have several studies of Parkinson disease (PD). We are testing new drugs that might rescue injured nigrostriatal neurons (a model of PD) with the potential to slow the progression of PD. For these, we use PET to measure dopamine and related pathways and to quantify motor behavior. We also have an active program developing and validating neuroimaging biomarkers for PD and for determining the integrity of the nigrostriatal pathway that includes studies in human and animal models of PD. In addition, we have an active program that combines a variety of approaches to develop biomarkers and investigate the pathophysiology of dementia associated with PD. We use PET to measure radioligand binding in PD and dystonia. We use PET to investigate drug-mediated pathways and inflammatory responses in the brain and to parse out the effects of potential therapeutic interventions. We also develop and implement MR-based methods including diffusion tensor imaging and resting-state functional connectivity to investigate the brain mechanisms underlying PD and dystonia.

Brad A. Racette, MD
McMillan, 9th Floor
Phone: 314-362-5291

Our lab is primarily interested in environmental risk factors associated with Parkinson's disease. We use a variety of techniques to study these risk factors, including traditional field epidemiology, in which we evaluate workers exposed to metals in the United States and residents living near a smelter in South Africa; neuroimaging, in which we study the pathophysiology of toxin-mediated parkinsonism; geographic information systems research, in which we associate environmental toxin exposures with the incidence and prevalence of Parkinson's disease in the United States and Finland; and neuropathologic studies,

in which we evaluate manganese-exposed workers from South Africa. There are numerous opportunities available for students to be involved with any of these projects. Students will receive some clinical exposure as well to familiarize them with pertinent clinical syndromes.

Marcus E. Raichle, MD
East Building, 2nd Floor
Phone: 314-362-6907

This lab investigates in vivo brain hemodynamic, metabolic and functional studies of human cognition and emotion using cyclotron-produced isotopes and PET as well as fMRI in humans.

Gregory Wu, MD, PhD
McMillan, 3rd Floor
Phone: 314-362-3293

Understanding how immune responses are generated that target the central nervous system. Specifically, this lab studies antigen-presenting cell contributions to autoimmune animal models of multiple sclerosis. Our goal is to understand what cellular interactions are critical to the development of immune-mediated demyelination.