

James S. McDonnell Department of Genetics

Website: <http://genetics.wustl.edu>

Research Electives

Genetics Research Electives

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

Barak Cohen, PhD

Couch Biomedical Research Building, Room 4308
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Functional genomics in yeast; gene regulatory networks, complex trait genetics, and synthetic biology studies of cis-regulation.

Joseph Dougherty, PhD

Couch Biomedical Research Building, Room 6316
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Our laboratory utilizes a variety of techniques spanning from human molecular genetics and informatics to mouse behavioral neuroscience and neuroanatomy. We develop and employ mouse models of psychiatric disorders, particularly those that mimic genetic variations that we have identified in human patient populations, with the goal of trying to understand the cellular and molecular underpinnings of these disorders.

Susan K. Dutcher, PhD

Couch Biomedical Research Building, Room 5301
Phone: 314-362-2765
dutcher@wustl.edu

Studies of the role of centrioles and basal bodies in ciliary signaling, assembly, and motility using molecular genetics and computational and biochemical approaches.

Sheng Chih (Peter) Jin, PhD

Couch Biomedical Research Building, Room 5206
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Phone: 314-273-2710

We use human genetic, genomic, and bioinformatic approaches to identify mutations underlying human diseases and their molecular mechanisms.

Tristan (Qingyun) Li, PhD

McDonnell Medical Sciences Building, 8th Floor
Phone: 314-273-1422
qingyunli@wustl.edu

Our lab is broadly interested in neuroimmunology, with a focus on microglial biology. We combine cutting-edge, single-cell genomic technologies with in vitro and in vivo genetic, molecular, and cellular tools to investigate microglial functions in the establishment of the nervous system as well as how changes in these functions contribute to neurological diseases.

Jeffrey Milbrandt, MD, PhD

Couch Biomedical Research Building, Room 6306
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jmilbrandt@wustl.edu

We are performing Cas9/CRISPR activation and repression screens in iPSC-derived neurons together with single-cell transcriptomics analysis to evaluate the causal effects of genetic variants associated with neuropsychiatric diseases. We are also studying how metabolism influences the axonal/glia interactions important for proper nerve function. We use genetic and metabolomic analysis to identify molecular mechanisms of axonal degeneration, a self-destructive process that plays an important role in many neurodegenerative conditions, particularly motor neuron diseases like ALS and peripheral neuropathy.

Rob Mitra, PhD

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Our focus is on systems biology, gene regulation and technology development. Projects in the lab fall into three general categories: (1) understanding the molecular logic of transcription factor cooperativity; (2) mapping the gene regulatory networks that control developmental processes and using this knowledge to reprogram fibroblasts into useful cell types; and (3) developing novel technologies to more efficiently achieve the first two aims.

Samantha Morris, PhD

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s.morris@wustl.edu

This lab strives to engineer cell fate to generate clinically valuable cell populations via stem cell and developmental biology. Our research focuses on dissecting the gene regulatory networks that define cell identity, using the developing embryo and tissue regeneration as a guide to engineer fate in vitro. We apply insight from these analyses to generate clinically relevant

populations by differentiating cells from a pluripotent state or by directly converting cells between mature fates. We employ a combination of computational, single-cell transcriptomics with cell and developmental biology approaches.

Michael A. Province, PhD

Farrell Learning and Teaching Center (FLTC), 6th floor, Suite 605

Phone: 314-362-3616

mprovince@wustl.edu

Development and evaluation of novel statistical genetics methodology, especially as applied to genomic identification and validation of variants for human complex quantitative traits, such as heart disease, cancer, pulmonary function, diabetes, and human longevity.

Nancy L. Saccone, PhD

Farrell Learning and Teaching Center (FLTC), 6th floor, Suite 606

Phone: 314-747-3263

nlism@wustl.edu (nlisms@wustl.edu)

Statistical genetics and psychiatric genetics; development and application of analysis methods for studying the genetics of human disease and complex traits.

Tim Schedl, PhD

Couch Biomedical Research Building, Room 5305

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Our lab studies germ cell development in the model organism *Caenorhabditis elegans*. The major focuses are control of the decision to proliferate or enter the meiotic pathway, control and coordination of meiotic prophase progression and gametogenesis, and control of meiotic maturation and ovulation.

James Skeath, PhD

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Identification of the genes and the elucidation of the molecular mechanisms that regulate the early events of *Drosophila* central neurogenesis; illumination of the mechanisms that form, pattern and specify the individual identities of the progenitor cells of the *Drosophila* embryonic central nervous system.

Gary D. Stormo, PhD

Couch Biomedical Research Building, Room 4208

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stormo@wustl.edu

Computational biology of protein-DNA interactions, RNA folding, gene and promoter finding; biochemical analysis of DNA-protein interactions and gene regulation.

Tychele Turner, PhD

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tychele@wustl.edu

The focus of the Turner laboratory is the discovery and characterization of genetic etiological factors involved in neurodevelopmental disorders. We utilize both computational and experimental approaches to explore this genetic architecture.

Ting Wang, PhD

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Our lab uses genomics and epigenomics approaches to investigate how epigenetic factors determine cell fate. We study cell fate in normal development, differentiation, and regeneration; cell fate in tumorigenesis and epigenetic therapy; and cell fate in evolution.