OUR MISSION

To discover the neural processes underlying adaptive and maladaptive behavior observed in neurological and psychiatric disorders.

ABOUT US

The Systems and Behavioral Neuroscience Group is dedicated to studying the molecular, cellular, network and behavioral mechanisms of sensory information processing, learning and memory, attention, emotion, ingestive behavior, and the neuropsychiatric disorders associated with these processes.

Interacting scientifically and collaborating within the group, the department, the University, and beyond, the Systems and Behavioral Neuroscience Group conducts state-of-the-art studies that lead to pioneering clinical trials and interventions.

OUR RESEARCH

The Systems and Behavioral Neuroscience Group consists of faculty, students and postdocs who interrogate the neural mechanisms underlying behavior. The group uses an array of techniques to investigate the processes by which the brain orchestrates behavior and how dysregulation of these processes can lead to psychiatric disorders.

- Alcohol use disorder (Jacqueline Barker, PhD; Jessica Barson, PhD)
- Anxiety, stress, depression, PTSD (Jessica Barson, PhD; Jacqueline Barker, PhD; Rodrigo España, PhD; Dong Wang, PhD; Ramesh Raghupathi, PhD)
- Autism (Wen-Jun Gao, MD, PhD; Ramesh Raghupathi, PhD)
- Binge eating (Jessica Barson, PhD)
- Executive function (Wen-Jun Gao, MD, PhD; Sandhya Kortagere, PhD; Ramesh Raghupathi, PhD)
- Learning and memory (Ramesh Raghupathi, PhD; Dong Wang, PhD)
- Locomotion and neural networks (Kimberly Dougherty, PhD)
- Pain (Megan Detloff, PhD)
- Parkinson's disease (Sandhya Kortagere, PhD)
- Psychostimulant drugs and ADHD (Jessica Barson, PhD; Jacqueline Barker, PhD; Rodrigo España, PhD; Ole Mortensen, PhD)
- Social behavior (Wen-Jun Gao, MD, PhD; Ramesh Raghupathi, PhD)
- Schizophrenia (Wen-Jun Gao, MD, PhD)
- Sleep and arousal (Rodrigo España, PhD; Dong Wang, PhD)
- Substance abuse (Jessica Barson, PhD; Jacqueline Barker, PhD; Rodrigo España, PhD)
- Traumatic brain injury (Ramesh Raghupathi, PhD)
TECHNIQUES

Behaviors
Morris water maze; T-maze; elevated plus maze; self-administration; light-dark box; open field; hole board; forced swim; fear conditioning; running wheel CatWalk; MotoTrak; treadmill; Hargreaves’ heat; von Frey; attention; avoidance; three-chamber test; novel object; social interaction; sucrose preference

Neural manipulation
Optogenetics; chemogenetics; drug infusion; lesion; closed-loop control

Neural recording
Whole-cell patch clamp; multichannel in vivo electrophysiology; fiber photometry; microendoscopy calcium imaging

Neuroanatomy
Tract tracing; immunohistochemistry; laser capture and molecular profiling with qRT-PCR; in situ hybridization (RNAscope); tissue clearing

Neurochemistry
Fast scan cyclic voltammetry; HPLC; Western blot; Flow cytometry

Transgenic models
Conditional KO; inducible/conditional transgenic models

Traumatic injury
Repetitive traumatic brain injury (TBI); pediatric TBI; sex differences in TBI; spinal transection and contusion models

OUTLOOK FOR OUR TRAINEES

Conferences & Networking Opportunities
Our students attend national and international conferences to network with leaders in science, medicine, industry and government.

Student Success
- 50% of students who applied for NIH funding received an NIH fellowship in the past three years.
- Students were primary or co-authors on 35 peer-reviewed publications in 2020.
- In the past three years, students were awarded nearly 50 awards for travel, presentations or research.
- Our graduates are postdoctoral fellows at the National Institutes of Health (NIH), Stanford University, University of Pennsylvania, University of California San Francisco (UCSF), Scripps Research, Salk Institute and other prestigious institutions.

Get in Touch
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Brielle Ferguson, PhD Neuroscience ’17, is a postdoctoral fellow at Stanford University and will start as an Assistant Professor at Harvard University in 2022. She is cofounder of BlackInNeuro and was named one of Forbes’ 30 under 30 Scientists. While at Drexel in Dr. Wen-Jun Gao’s laboratory, she received a Dean’s Fellowship and an F31 Fellowship.