

Neuroscience Seminar Series schedule

Spring 2021

All seminars are currently scheduled from 4-5 pm mountain time (this may have to change for some of our speakers on the East Coast!)

January 26, 2021 – Dr. Samer Hatter

Chief and Senior Investigator, Section on Light and Circadian Rhythms, National Institute of Mental Health, Bethesda, MD

Title: **How light influences behavior**

Abstract: Light is all around us. We appreciate the presence of light for our ability to see, but light does much more than this. Light influences many behaviors in us, not the least of which is adjusting our biological clock and the sleep wake cycle. In this talk, I will provide a comprehensive view of the pathways, both in the retina and the brain, that allow light to affect fundamental aspects of our life.

February 9, 2021 – Benjamin Greenwood
Associate Professor, Department of Psychology, University of Colorado Denver, CO

Title: More than a New Year's resolution: To enable stress resilience, make a habit of exercise

Abstract: Exercise can enhance protection and recovery from aversive, stressful events. I will present our work characterizing exercise-induced stress resilience in rodent models, including recent data demonstrating that exercise enables stress resilience more readily in female rats than males. Although exercise seems to enable stress resilience in both sexes by constraining the serotonergic response to stress, 1) how the experience of exercise is communicated to the serotonergic system, and 2) what makes females particularly responsive to exercise-induced stress resilience, are two critical unanswered questions. I will present data suggesting that the answers to both questions lie in the development of an exercise habit. Specifically, the brain's habit circuits that are required for the maintenance of physical activity, are 1) directly linked to the serotonergic system and 2) responsive to exercise in both sexes, but are more receptive to exercise in females than males. One implication of this work is that in order to achieve stress resilience from exercise, we'll need to maintain physical activity beyond our typically fleeting new year's resolutions.

February 23, 2021 – Dr. Stephan Lammel

Assistant Professor of Neurobiology, Department of Molecular and Cell Biology and Helen Wills Neuroscience Institute, University of California at Berkeley, CA

Title: **Dopamine Circuits in Reward and Aversion**

Abstract: The mesocorticolimbic dopamine (DA) system, composed of DA neurons in the ventral tegmental area (VTA) projecting to nucleus accumbens and prefrontal cortex, has been intensively studied because of its importance in reward processing and drug addiction. While VTA DA neurons were often thought to represent a homogeneous cell population, recent research has demonstrated a much greater diversity of DA cell type and function than had been previously supposed. Accordingly, VTA DA neurons encode much more than reward and also contribute to negative affect such as aversion and depression. How DA neurons could mediate both reward and aversion is currently unknown and an important goal of the research in the lab. In my presentation, I will discuss work from the lab that has elucidated the circuit architecture and function of the reciprocal connectivity in the mesolimbic DA system (Yang et al., 2018; *Neuron*). Moreover, I will also discuss recent data that demonstrate the identification of a subcircuit within the mesolimbic DA system that is activated by conditioned aversive stimuli (de Jong et al., 2019; *Neuron*). Altogether, our research suggest that we need to develop a new perspective on the DA circuitry that will guide future treatment strategies for addiction and other neuropsychiatric disorders where dysfunction of the neural systems underlying motivated behaviors have been strongly implicated.

March 9, 2021 – Dr. William “Trey” Todd

Assistant Professor, Department of Zoology and Physiology, Program in Neuroscience and Sensory Biology Core, University of Wyoming

Title: Circadian circuitry for aggression and potential pathways for sundowning syndrome in Alzheimer’s disease and related dementias.

Abstract: Circadian rhythms are an evolutionary adaptation to Earth’s 24-h rotation and the resulting light-dark cycle. My laboratory seeks to understand how specific input and output pathways of the mammalian circadian system influence the daily timing of particular behaviors, from sleep-wake and locomotor activity rhythms to more complex behaviors such as aggression. My research also focuses on how such circuitry is involved in neurobehavioral pathologies associated with circadian dysfunction and behavioral aggression, and in particular “sundowning syndrome” in Alzheimer’s disease and related dementias – which is characterized by increased agitation and aggression during the early evening.

April 6, 2021 – Dr. Melissa Warden
Assistant Professor, Department of Neurobiology and Behavior, Cornell University,
Ithaca, NY

Title: **TBA**

Abstract: TBA

April 20, 2021 – Dr. Kathryn Reissner

Associate Professor, Department of Psychology and Neuroscience, Neuroscience Center, University of North Carolina at Chapel Hill, NC

Title: Long-lasting effects of cocaine self-administration on accumbens astrocytes contribute to the incubation of cocaine craving

Abstract: Research over the last 50 years has revealed considerable cellular effects of recreational drug abuse to neurons. This has led to the disease model of addiction, which defines addiction as “a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual’s life experiences” (American Society of Addiction Medicine). However, knowledge necessary to integrate glial cells within the disease model of addiction has lagged considerably. We are particularly interested in understanding how astrocytes fit within this model. Astrocytes are the most abundant glial cells of the brain and serve a number of critical roles including regulation of synaptogenesis and neurotransmitter uptake, cellular metabolic regulation, injury responses, and more. Relatively recent work by our lab and others has revealed that rat cocaine self-administration leads to decreased expression and activity of several astroglial proteins, particularly within the nucleus accumbens, a critical node in the brain’s reward circuitry. In 2016, we utilized the membrane-associated fluorescent reporter Lck-GFP to perform high resolution imaging of individual astrocytes in the accumbens, revealing decreased structural features and synaptic colocalization of accumbens astrocytes after cocaine self-administration and extinction (Scofield et al 2016 Biological Psychiatry). Subsequently, we have expanded our investigation to more thoroughly understand the mechanism and consequences of cocaine self-administration on astrocytes within the reward circuitry. In my seminar, I will report data regarding the engagement of astrocytes in the behavioral model of the incubation of cocaine craving. Incubation is the phenomenon by which drug craving intensifies across abstinence, and has been observed in both humans and animal models. I will conclude by presenting our working model which seeks to integrate astrocytes in the cellular sequelae of cocaine self-administration, and consider whether astrocytes may represent viable targets of pharmacological intervention for substance use disorders.