Neuroscience Seminar Series schedule

All seminars are currently scheduled from 4-5 pm mountain time. For the time being, all the speakers are schedule to present in-person, but this may change; I will keep you posted.

Fall 2024

September 10th, 2024 – Dr. Fernando Giraldez
Emeritus Professor, Genetic and Neuroscience Program, Universitat Pompeu Fabra, Barcelona, Spain

Title: **Titian's brushstroke and the retina**

Abstract: Classical painting as reverse engineering of the visual system. Every work of art is a challenge to the senses. A painting is no more than a set of pigments lying on a flat space that hits the human visual system. The brain has rules for seeing the world and painters need to discover those rules in order to create illusions of reality. Masters of painting have been able to reverse engineer the visual system to solve the problem of representing reality not so much as it is but as we see it. They are true brain explorers. One major example is Titian's brushstroke, *pitture di machie*, which along with Leonardo's *sfumato* persuade our senses of the vividness of a natural scene. I would like to discuss some physiological principles that underlie these pictorial techniques by looking at some masterpieces of the Museo del Prado.

September 24th, 2024 – Dr. Caterina Gratton

Associate Professor of Psychology, Department of Psychology, University of Illinois at Urbana-Champaign, IL.

Title: **Gaining precision: Studying individuals to provide new insights into human brain networks and their role in control.**

Abstract: Different regions of the brain interact with one another through large-scale networks. These network interactions are important to many aspects of cognition, including our ability to control our thoughts and actions in the service of goals. In my lab, we study large-scale network organization in humans and the principles by which it can vary -- and how these variations contribute to control functions and their breakdown. In the presentation, I will review a sampling of recent studies from our lab investigating forms of variation in large-scale networks within and across people. I will then discuss how these variations influence our studies of control.

October 22nd, 2024 – Dr. Chris Ford

Professor, Department of Pharmacology, University of Colorado School of Medicine, Aurora, CO.

Title: **Encoding dopamine signals in striatal circuits.**

Abstract: Our lab examines how neuromodulators are encoded in the mesolimbic and nigrostriatal systems and how circuit dysfunctions in these areas contribute to neurological and psychiatric disorders. Dopamine, acetylcholine and serotonin play key roles in the basal ganglia and nucleus accumbens, controlling a variety of motivated behaviors including decision-making, action selection, motor skill learning, habit formation and reward processing. We use the combination of electrophysiology, 2-photon imaging, optogenetics, genetically encoded optical sensors, electrochemistry, in vivo fiber photometry and behavioral approaches to study how transmission mediated by these neuromodulators is encoded within mesolimbic and nigrostriatal circuits. By identifying the mechanisms regulating signaling we aim to identify the disruptions in these systems that underlie psychiatric disorders such as drug addiction and schizophrenia and neurological disorders such as Parkinson's disease.

November 5th, 2024 – Dr. Brian Trainor
Professor, Department of Psychology, University of California, Davis, CA.

Title: **Oxytocin regulation of behavioral responses to social stress**

Abstract: Social anxiety disorder (or social phobia) is the most common form of anxiety disorder in the United States. Affected individuals avoid social contexts, which disrupts social relationships and impairs performance at school or work. New treatment approaches are needed because ~40% of affected individuals who seek existing treatments do not respond. Oxytocin is a well-known modulator of social behaviors and has been put forth as a possible therapeutic. In some studies using human participants, intranasal oxytocin enhances social approach related behaviors. However, other studies (especially in women) report that intranasal oxytocin increases social anxiety. How can the same neuropeptide exert such different effects on behavior? Studying California mice, we found that oxytocin acting within the mesolimbic dopamine system drives social approach while oxytocin acting in the extended amygdala drives social avoidance. I will present new data on how social stress alters the reactivity of different populations of oxytocin neurons in the hypothalamus, which may help explain sex differences in behavioral responses to social stress.

November 19th, 2024 – Dr. Claire de La Serre

Associate Professor, Department of Biomedical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO.

Title: **Microbiota-vagal signaling and feeding behavior**

Abstract: There has been a lot of press on the role of gut bacteria in health and disease, especially obesity. However, there is still a lot of unknown on how bacteria in the gut can influence the neurons in the brain responsible for controlling food choices and food intake. My recent research has focused on understanding 1) how bacteria communicate with the brain and 2) what aspects of feeding are influenced by gut bacterial makeup. Maybe your gut bacteria are the ones telling you to eat that cookie!

December 10th, 2024 – Dr. Anthony Kline

Assistant Professor, Department of Cell and Developmental Biology, University of Colorado Anschutz Medical Campus, Aurora, CO.

Title: **Rehabilitative strategies for experimental traumatic brain injury: from environmental enrichments to music-based interventions.**

Abstract: Traumatic brain injury (TBI) is estimated to impact sixty-nine million individuals globally each year and of those approximately 2.8 million reside in the USA. According to the Brain Injury Alliance of Colorado, there are approximately 23,500 emergency room visits related to TBIs each year. Of those, almost 5,000 are hospitalized and about 1,000 die. Colorado ranks ninth in the nation for TBI-related fatalities and 13th for hospitalizations. The majority of moderate-to-severe TBI survivors endure persistent disturbances in motor, cognitive, and emotional health domains (e.g., anxiety and coping) that negatively impact their long-term academic, occupational, and social functioning. Despite the prolific research on pharmacological interventions to promote recovery after TBI, there are no FDA-approved therapies as none have successfully translated to the hospital or rehabilitative facilities. The lack of beneficial pharmacotherapies strongly advocates for rigorous empirical evaluation of novel alternative strategies in the continued pursuit to achieve measurable therapeutic success after TBI. My laboratory has been evaluating the role of environmental enrichment, which is a preclinical model of neurorehabilitation as it confers robust benefits in motor and cognitive recovery after TBI and attenuates histological damage. Recently, we have become interested in music-based interventions that integrate musical elements to create an enriched and multimodal rehabilitative paradigm that exerts psychophysiological effects across neurological disorders. Our early data support the use of music to facilitate recovery after TBI. In this seminar I will present preclinical data on both enrichment and music as rehabilitative therapies for TBI.