

## Chen Institute Symposium 2023

**Speaker:** Bijan Pesaran

**Talk title:** Mechanisms of inhibitory multiregional communication supporting flexible behavior

**Abstract:** The activity of neurons in different brain regions is coordinated during our natural behaviors. Understanding how flexible, natural behaviors are controlled depends on understanding how neurons in different regions of the brain communicate. Neural coherence in a gamma-frequency (40-90 Hz) band has been implicated in excitatory multiregional communication. Inhibitory control mechanisms are also required to flexibly control behaviour, but little is known about how neurons in one region transiently suppress individual neurons in another to support behavior. In this talk, I will present our work investigating how neuronal firing in a sender-region transiently suppresses firing in a receiver-region. I will specifically study inhibitory communication in the prefrontal and posterior parietal cortices during flexible, natural behaviors in which attention and saccades are transiently inhibited in order to improve task performance. We find evidence in the activity of single neurons for a novel mechanism of inhibitory communication in which beta-frequency neural coherence transiently inhibits multiregional communication to flexibly coordinate our natural behavior. Our results suggest that beta coherence may specifically engage feedforward inhibition by suppressing synaptic influences across an inhibitory feedforward pathway. I will finish by introducing our recent results that use modern genetic tools to label and image the activity of specific populations of neurons in the primate brain using multiphoton microscopy.