



Summer research program seminar series

Title:

Interactions between neural representation of space, ongoing actions, and memory

Date: Wednesday, July 10, 2024

Time: 4:00 PM

Zoom meeting Link:

<https://zoom.us/j/94604761879?pwd=wWV0UMmVaz3gbhj5DDQFoYbLAnwBNS.1>

Meeting ID: 946 0476 1879

Passcode: 169500



Abstract:

The hippocampus is a mammalian brain structure that expresses spatial representations and is crucial for navigation. While navigation relies heavily on locomotion, the interactions between hippocampal spatial representations and the specifics of locomotor processes have been largely unexplored. Traditionally, the hippocampus is thought to represent mainly higher-order cognitive and locomotor variables such as position, speed, and direction of movement, whereas the limb movements that propel the animal are primarily computed and represented in subcortical circuits, including the spinal cord, brainstem, and cerebellum. Whether hippocampal representations are actually decoupled from the detailed structure of locomotor processes remains unknown. To address this question, we conducted experiments to simultaneously monitor hippocampal spatial representations and ongoing limb movements underlying locomotion at fast timescales. In this talk, I will share the findings from our recent publication (Joshi et al., 2023), which reveal a dynamic and rapid interaction between hippocampal spatial representations and individual steps. I will also outline the broader motivations behind this research, the methods we developed to address these questions, and our future directions.

About the speaker:

Abhilasha is a systems neuroscientist and visiting scientist at the Champalimaud Center for the Unknown in Lisbon, Portugal. Her research focuses on the interactions between internal cognitive computations and ongoing actions during behavior. She completed her bachelor's and master's degrees in biology at IISER Mohali. During her graduate work at the University of Oxford, she discovered the cellular, synaptic, and physiological properties of a specialized group of long-range projection neurons that coordinate rhythmic oscillatory activity in the hippocampus, a brain region critical for learning and memory. During her postdoc at the University of California, San Francisco, she developed an approach to monitor neural and behavioral information at fast timescales during behavior, which led her to discover the link between hippocampal spatial representations and locomotor steps during upcoming spatial decisions. Abhilasha has been the recipient of various awards and recognitions for her contributions to neuroscience, including the Simons Foundation Fellows to Faculty Award, the Peter and Patricia Gruber Award at the Society for Neuroscience, the Life Sciences Research Foundation postdoctoral fellowship, and the Healthy Aging Seed Award by the European Institute of Technology.