Neuroscience data talk

Tomas Vega Zuniga and Bahti Zakirov (NDT)

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ISTA

Host:

Speaker: Tomas Vega Zuniga (Posdtoc, Jsch group)Title: A corollary discharge center for visionAbstractA constant challenge for moving animals is to distinguish self-induced sensory signals from externally generated ones to detect and act upon behaviorally relevant stimuli. Such computation requires a fine-tuned correction of the animals movements, termed corollary discharge (CD), and is critical for sensorimotor coordination. In mammalian vision, such CD mechanisms have been found and are thought to primarily reside in higher cortical structures. Here, I will show that a general CD signal already regulates the first visual relay center of the brain, the superior colliculus (SC). Long-range feedforward inhibitory projections from the thalamus, i.e., the ventral LGN (vLGN), function as a CD, effectively modulating vision. Through a series of anatomical and physiological experiments, I will show the specificity, strength, and properties of vLGN projections to the SC and describe their influence on vision and behavior in vivo. Our data indicate that vLGN is a critical hub for meaningful visual operations during behavior, emphasizing that vision is an active processSpeaker: Bahti Zakirov (PhD student, Tkacik Group)Title: Optimal Recurrent Connectivity for sensory coding of relevant informationAbstract:Sensory neurons in the brain extract task-relevant information from stimuli by forming strong recurrent connections within cortical regions and layers. It is an open question how these connections could support representations of relevant stimuli even at the early stages of sensory pathways. We explore this question using a normative model of a sensory population that modulates recurrent connections between neurons to separate relevant images from non-relevant backgrounds. We find that optimized networks solve this task by forming mutually-inhibiting excitatory subnetworks, which exchange information that is spatially non-specific and cannot be encoded by individual neurons. In addition to normative insights about what connectivity should be like to perform this task, we suggest analyses of neural data to aid experimental studies on the role of recurrent connectivity in adaptive sensory processing. Before presenting these results, I will walk through the basic aspects of normative theory in a manner accessible to a broad audience.

Tuesday, March 28, 2023 04:00pm - 05:00pm
Mondi Seminar Room 2, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.