

CARNEGIE MELLON UNIVERSITY

BME 2021 SPRING SEMINAR SERIES

Traveling waves in cortex: spatiotemporal dynamics shape perceptual and cognitive processes



PRESENTED BY

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SCHEDULE

Thursday, March 11
(10:45-11:45AM)

With new multichannel recording technologies, neuroscientists can now record from cortex with high spatial and temporal resolution. Early recordings during anesthesia observed waves traveling across the cortex. While for a long time traveling waves were thought to disappear in awake animals, in recent work we have revealed traveling waves in these complex activity states. Whether these waves play active functional roles in sensory perception and cognitive processes, however, has remained unclear.

In my research, I have introduced new, general computational methods for detection and quantification of spatiotemporal patterns in high-noise multisite recordings. These methods have revealed that small visual stimuli consistently evoke waves traveling outward from the point of input in primary visual cortex of the awake monkey. Further, we have recently found that spontaneous cortical activity is structured into waves traveling across visual area MT, and that these spontaneous waves modulate both excitability of local networks and the probability of faint stimulus detection. Our results thus indicate that spontaneous and stimulus-evoked waves play active roles in sensory processes. In upcoming work, we aim to understand the general computational roles for these waves in sensory and cognitive processes.

