

Saints Pères Neuroscience Seminar Series

Friday, November 22th, 2019 at 11:30

Salle des Conférences (R229)

Centre Universitaire des Saints-Pères

45 rue des Saints-Pères, 75006 Paris

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Neocortical dynamics during sensory discrimination behavior

Through the combination of in vivo optical imaging and chronic expression of genetically encoded calcium indicators it is now feasible to directly 'watch' neuronal population dynamics in the neocortex of awake, head-restrained mice during specific behaviors. Here, I will present results from calcium imaging experiments in mouse neocortex while the animals perform whisker-based or auditory sensory discrimination tasks. We used wide-field calcium imaging to resolve spatiotemporal activation patterns across large parts of the neocortex during individual trials. We also chronically monitored cortical dynamics over weeks and across task learning. We observed wide-spread, coordinated activation of multiple cortical areas, which correlated with various behavioral aspects such as whisking, body movements, and licking. In particular, we identified highly distinct patterns of persistent cortical activity during a short-term memory phase, which were contingent of the animal's behavior (active versus passive). We also found that posterior parietal cortex (PPC) presumably acts as a routing hub, with distinct subdivisions being activated for tactile versus auditory discriminations. During learning we identified two salient phases framing the effective learning period, which in particular reorganized the signal flow through posterior association areas, including PPC. Our results contribute to the understanding of the principles of large-scale activation patterns supporting sensory discrimination and of how these patterns emerge during learning.

Those interested in meeting with the speaker please contact

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