Bonn Computational Neuroscience Seminar

Bidirectional hippocampal/cortical interactions

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Talk Abstract

Hippocampus–neocortex interactions during sleep are critical for memory processes: Hippocampally initiated replay contributes to memory consolidation in the neocortex and hippocampal sharp wave/ripples modulate cortical activity. Yet, the spatial and temporal patterns of this interaction are unknown. With voltage imaging, electrocorticography, and laminarly resolved hippocampal potentials, we characterized cortico-hippocampal signaling during anesthesia and nonrapid eye movement sleep. We observed neocortical activation transients, with statistics suggesting a quasi-critical regime, may be helpful for communication across remote brain areas. From activity transients, we identified, in a data-driven fashion, three functional networks. A network overlapping with the default mode network and centered on retrosplenial cortex was the most associated with hippocampal activity. Hippocampal slow gamma rhythms were strongly associated to neocortical transients, even more than ripples. In fact, neocortical activity predicted hippocampal slow gamma and followed ripples, suggesting that consolidation processes rely on bidirectional signaling between hippocampus and neocortex.

Prof. Francesco Battaglia

Francesco Battaglia is a cognitive neuroscientist and senior researcher at the Donders Institute for Brain, Cognition, and Behaviour at Radboud University in the Netherlands. He studies memory encoding and consolidation through neural ensemble recordings in freely behaving rodents. He has characterized the interaction between cell assemblies in the prefrontal cortex and hippocampus and is researching hippocampal place cells and oscillatory dynamics in transgenic models. Additionally, Battaglia is involved in EU-funded consortia developing next-generation tools for large-scale neural ensemble recording and closed-loop optogenetic stimulation of neural circuits.

Friday, 24th March 2023, 12 am

In-Person:
University of Bonn Medical Center
Venusberg-Campus 1
Epileptology/ Building 83
Seminar room (room 266), Ground Floor
Directions

Online:
https://uni-bonn.zoom.us/j/62321512510?pwd=ZC9SMDdBRGoxQ1ZLamwvYjZBc0pXUT09

Meeting-ID: 623 2151 2510

Code: 355800

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