MAX PLANCK SCHOOL of cognition

Monday, November 18, 2024, 16:00 (CET)

Cognition Colloquium

Professor Peter Dayan

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Navigating Uncertainty: Reward Location Variability Induces Reorganization of Hippocampal Spatial Representations

Aleatoric and epistemic uncertainty are ubiquitous. In particular, the location and availability of reward in the environment can vary in different and unsignalled ways. Hippocampal place cell populations over-represent salient locations in an animal's environment, including those associated with rewards; however, how the spatial uncertainties impact the cognitive map is unclear. We report a virtual spatial navigation task designed to test the impact of different levels and types of uncertainty about reward on place cell populations. When the reward location changed on a trial-by-trial basis, inducing expected uncertainty, a greater proportion of place cells followed along, and the reward and the track end became anchors of a warped spatial metric. When the reward location then unexpectedly moved, the fraction of reward place cells that followed was greater when starting from a state of expected, compared to low, uncertainty. Overall, we show that different forms of potentially interacting uncertainty generate remapping in parallel, task-relevant, reference frames.

This is joint work with Charline Tessereau, Feng Xuan, Jack Mellor and Dan Dombeck.

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Meeting ID: 935 2603 0034
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