

MIND MEETING

Seminar Series

2023

All welcome!
Attendance is free

14 September

3.30 pm CEST online talk via Zoom

please contact doeller-office@cbs.mpg.de for login details

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Learning representations of specifics and generalities over time

There is a fundamental tension between storing discrete traces of individual experiences, which allows recall of particular moments in our past without interference, and extracting regularities across these experiences, which supports generalization and prediction in similar situations in the future. One influential proposal for how the brain resolves this tension is that it separates the processes anatomically into Complementary Learning Systems, with the hippocampus rapidly encoding individual episodes and the neocortex slowly extracting regularities over days, months, and years. But this does not explain our ability to learn and generalize from new regularities in our environment quickly, often within minutes. We have put forward a neural network model of the hippocampus that suggests that the hippocampus itself may contain complementary learning systems, with one pathway specializing in the rapid learning of regularities and a separate pathway handling the region's classic episodic memory functions. This proposal has broad implications for how we learn and represent novel information of specific and generalized types, which we test across statistical learning, inference, and category learning paradigms. We also explore how this system interacts with slower-learning neocortical memory systems, with empirical and modeling investigations into how the hippocampus shapes neocortical representations during sleep. Together, the work helps us understand how structured information in our environment is initially encoded and how it then transforms over time.

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