



SFB 1315

Mechanisms and Disturbances in Memory Consolidation:
From synapses to systems

Tuesday

FEB 4, 2025

4:00 pm

BCCN Lecture Hall

Philipstraße 13/Haus 6

10115 Berlin

Meeting-ID: 775 491 0236

SFB1315.ifb@hu-berlin.de

SFB 1315 LECTURE SERIES 2025

RECONCILING SPATIAL REPRESENTATIONS IN THE HIPPOCAMPUS WITH EPISODIC MEMORY

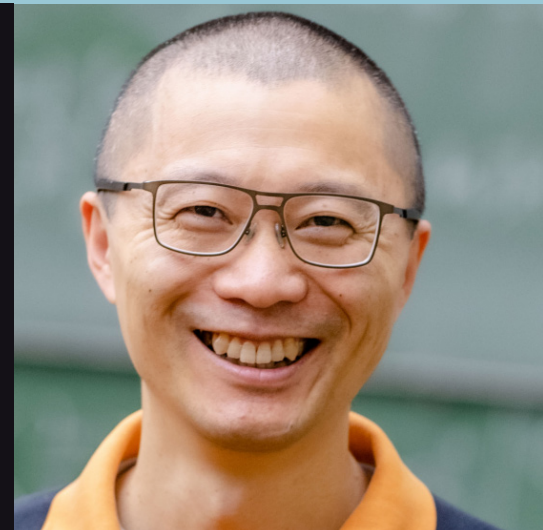
SEN CHENG

Research Group Computational Neuroscience

Institut für Neuroinformatik

Ruhr-Universität Bochum

Bochum



Funded by

DFG Deutsche
Forschungsgemeinschaft
German Research Foundation



SFB 1315

Mechanisms and Disturbances in Memory Consolidation:
From synapses to systems

Tuesday

FEB 4, 2025
4:00 pm

BCCN Lecture Hall
Philipstraße 13/Haus 6
10115 Berlin
Meeting-ID: 775 491 0236

RECONCILING SPATIAL REPRESENTATIONS IN THE HIPPOCAMPUS WITH EPISODIC MEMORY

A fundamental question in neuroscience is why the hippocampus, critical for episodic memory in humans, primarily exhibits spatial representations like place cells in many species. This talk proposes that spatial coding emerges naturally when episodic memory systems are engaged in navigation tasks.

We demonstrate this using a novel computational model based on memory-augmented neural networks. The model autonomously learns to store and retrieve information from an external memory buffer and shows remarkable flexibility: When solving visual tasks in supervised learning, it develops representations of categories and visual features. When learning to navigate a simulated maze based only on visual inputs using reinforcement learning, it spontaneously develops population-level representations that capture the maze's 2D spatial structure.

These findings suggest that spatial representations in the hippocampus are not primary, but rather emerge as a consequence of using episodic memory systems to solve spatial problems, reconciling two major lines of research on the hippocampus that

have largely remained separate until now.

About the Speaker

Sen Cheng's group investigates neural mechanisms underlying learning and memory. Focusing on the hippocampus - the brain region involved in episodic memory, as well as in the learning and memory of sequences, Professor Cheng's research focuses on as yet unexplored dynamics of these processes. (Read further at <https://www.ini.rub.de>)

Sen Cheng's talk is hosted by SFB1315 Deputy Speaker Richard Kempter (Sub-projects A01, B01)

Certificate of attendance:

Please contact team assistant serenella.brinati.1@hu-berlin.de



Funded by



Deutsche
Forschungsgemeinschaft
German Research Foundation