SFB 1315
Mechanisms and Disturbances in Memory Consolidation:
From synapses to systems

Tuesday

DEC 1, 2020
4:00 pm CET

ZOOM ID: 7754910236
Register at:
SFB1315.ifb@hu-berlin.de

SFB 1315 LECTURE SERIES 2019-2020

CHARACTERISING THE NEURAL CIRCUITRY OF AUTOBIOGRAPHICAL MEMORIES

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CHARACTERISING THE NEURAL CIRCUITRY OF AUTOBIOGRAPHICAL MEMORIES

Autobiographical memories are the ghosts of our past. Through them we visit places long departed, see faces once familiar, and hear voices now silent. These, often decades-old, personal experiences can be recalled on a whim or come unbidden into our everyday consciousness. Autobiographical memories are crucial to cognition because they facilitate almost everything we do, endow us with a sense of self and underwrite our capacity for autonomy. They are often compromised by common neurological and psychiatric pathologies with devastating effects.

Despite autobiographical memories being central to everyday mental life, there is no agreed model of autobiographical memory retrieval, and we lack an understanding of the neural mechanisms involved. This precludes principled interventions to manage or alleviate memory deficits, and to test the efficacy of treatment regimens. This knowledge gap exists because autobiographical memories are challenging to study – they are immersive, multi-faceted, multi-modal, can stretch over long timescales and are grounded in the real world.

One missing piece of the puzzle concerns the millisecond neural dynamics of autobiographical memory retrieval. Surprisingly, there are very few magnetoencephalography (MEG) studies examining such recall, despite the important insights this could offer into the activity and interactions of key brain regions such as the hippocampus and ventromedial prefrontal cortex. In this talk I will describe a series of MEG studies aimed at uncovering the neural circuitry underpinning the recollection of autobiographical memories, and how this changes as memories age.

I will end by describing our progress on leveraging an exciting new technology – optically pumped MEG (OP-MEG) which, when combined with virtual reality, offers the opportunity to examine millisecond neural responses from the whole brain, including deep structures, while participants move within a virtual environment, with the attendant head motion and vestibular inputs.

OP-MEG means that we can now image the brain when events are first experienced, and potentially track the resultant memory trace through sleep and over time. Moreover, we can start to ascertain at what point, and how, memory processing fails in the context of brain pathologies that compromise memory.

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