



Talks by rising stars of neuroscience

**Targeted Activation of Hippocampal Place Cells Drives
Memory-Guided Spatial Behaviour**

Nick Robinson - Häusser lab

(University College London)

The hippocampus is crucial for spatial navigation and episodic memory formation. Hippocampal place cells exhibit spatially selective activity within an environment and have been proposed to form the neural basis of a cognitive map of space that supports these mnemonic functions. However, the direct influence of place cell activity on spatial navigation behaviour has not yet been demonstrated. Using an 'all-optical' combination of simultaneous two-photon calcium imaging and two-photon holographically targeted optogenetics, we identified and selectively activated place cells that encoded behaviourally relevant locations in a virtual reality environment. Targeted stimulation of a small number of place cells was sufficient to bias the behaviour of animals during a spatial memory task, providing causal evidence that hippocampal place cells actively support spatial navigation and memory. Time permitting, I will also describe new experiments aimed at understanding the fundamental encoding mechanism that supports episodic memory, focusing on the role of hippocampal sequences across multiple timescales and behaviours.

Event link:

<https://www.crowdcast.io/e/wwneurise/>