

## Virtual DANDRITE Lecture

**Tuesday 23 November 2021**

**15.00 – 16.00**

### Online via Zoom

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Katrine: [karasmus@dandrite.au.dk](mailto:karasmus@dandrite.au.dk)



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### **Circuit mechanisms of associative memory**

Mounting evidence shows that dopamine in the striatum is critically involved in reward-based reinforcement learning. However, it remains unclear how dopamine reward signals influence the entorhinal-hippocampal circuit, another brain network critical for learning and memory. Using in vivo optogenetic and electrophysiological approaches, we recently found that dopamine signals from the ventral tegmental area/substantia nigra control encoding of cue-reward association rules in layer 2a fan cells of the lateral entorhinal cortex (LEC) (Lee, Jun, Soma, Nakazono et al., *Nature*, 2021). Our results suggest that LEC fan cells represent a cognitive map of abstract task rules, and LEC dopamine facilitates the incorporation of new memories into this map. I would like to discuss how we can unify the roles of two central, but previously independent, players in learning – dopamine and the entorhinal-hippocampal circuit – in future studies.

If time allows, I also would like to share our results on how neuronal activities in the entorhinal-hippocampal memory circuit are lost in a mouse model of Alzheimer's disease (Jun et al., *Neuron* 2020), and discuss how the systems neuroscience approach can contribute to the understanding of Alzheimer's disease pathogenesis.

**Host:** Tomonori Takeuchi, Team Leader and Associate Professor at DANDRITE, Aarhus University.