

## Joint DANDRITE-NeuroCampus - Biomedicine/Neuroscience Lecture

with Nobel laureate in Physiology or Medicine 2014

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Friday April 24<sup>th</sup> 2020 at 14:15,  
Aarhus University Aula,  
Building 1412 – 129B  
Nordre Ringgade 4, 8000 Aarhus C



### Space and time: Internal dynamics of the brain's entorhinal cortex

In mammals, space is mapped by specialized position-coding cell types in entorhinal cortex and hippocampus, including entorhinal grid cells, which are active only when animals are at locations that tile environments in a periodic hexagonal pattern. I will show how space-coding neurons in the medial entorhinal cortex (MEC) collectively form a low-dimensional network representation that persists across behavioral tasks and activity states. The nature of this representation provides important clues about underlying mechanisms of the grid pattern. I will further ask how entorhinal networks are organized in time. To determine how activity is self-organized in the MEC network, we have tested mice in a spontaneous locomotion task under sensory-deprived conditions, when activity is determined primarily by the intrinsic structure of the network. Using 2-photon calcium imaging, we monitored the activity of several hundreds of MEC layer-2 neurons. We find a striking presence of stereotyped sequence elements in the network activity. These may be recruited during encoding of space, and more widely experience, in the entorhinal-hippocampal network. Deficiencies in these mechanisms may be at the core of neurological diseases characterized by early entorhinal cell death, spatial disorientation and memory dysfunction, such as Alzheimer's disease.

PROMEMO

Hosted by: Prof. Poul Henning Jensen,  
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