



Master's Internship

Project proposal

Project title: *The neural mechanisms of memory development*

On-site supervisor: *Dr. Freyja Olafsdottir*

Principal investigator: *Dr. Freyja Olafsdottir*

Period of time: *September 2019 - March 2020*

Donders Theme: *Neural computations and neurotechnology*

Research centre: *DCN*

Project description

The ability to form, store and recall episodic and spatial memories is central to everyday life. However, this ability is not mature at birth. In fact, the earliest memories most people can recall are from ~3years of age - a phenomenon known as 'childhood amnesia'. Although the past decades have seen a concerted research effort to understand the neural basis of mature memory, remarkably little is known about the processes mediating its maturation. The aim of my research group is to identify the mechanisms that support the unfoldment of memory in development. Such an understanding may provide fundamental insight into the workings of the memory system, could help shed light on developmental amnesic conditions and may delineate the requirements for healthy cognitive development.

A candidate mechanism that may support the emergence of memory early in life are so-called 'memory reactivations' (or 'replay'), which occur most frequently during rest and sleep in rodents. Replay involves the spontaneous, and sped-up, reactivation of wakeful memories, and is thought to underlie the consolidation of newly formed memories. As such, perhaps the immaturity of memory early in life reflects the immaturity of replay? This is a question we aim to address in the lab through chronic recording of neurons from the hippocampus and entorhinal cortex in young, developing rodent pups.



As an intern on this project you would assist with the development of memory tasks suitable for rodent pups and data collection and analysis of behavioural and electrophysiological experimental data. You would work in the Department of Neurophysiology at the Donders Centre for Neuroscience (DCN).

Relevant literature: Ólafsdóttir HF, Bush D, Barry C (2018). The Role of Replay in Memory and Planning. *Current biology*, 28(1):R37-50.

More information: f.olafsdottir@neurophysiology.nl

