MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2022-2023

(internship from January to June 2023)

Host laboratory: Institut des Sciences Cognitives Marc Jeannerod

Host team : Neuroprime

www.neuroprime.org

Internship supervisors : Sylvia Wirth, Research Director,

swirth@isc.cnrs.fr

Project title : Spatial navigation beyond the hippocampus

Project summary :

Wayfinding is essential to every living creature. This proposal aims to determine the neural basis of navigation, in cortical structures projecting on the hippocampus. We will focus on characterizing activity in retrosplenial and posterior cingulate cortices with the hypothesis that these areas integrate egocentric navigation into an allocentric frame of the world. We will carry neural recordings while non-human primates navigate an environment in virtual reality as it permits experimental control of the sensory visual input. By analyzing neural activity in these regions, we will determine the functional properties of the cells that allow to represent external stimuli with respect to self or relative to each other. The results will document neural mechanisms taking place in cortical areas that interface regions processing visual input and hippocampus, which is the center of memory including spatial memory. The results will therefore shed light on the way a neural map of the external world is constructed.

3-5 recent publications :

Wirth S, Soumier A, Eliava M, Derdikman D, Wagner S, Grinevich V, Sirigu A. Territorial blueprint in the hippocampal system. Trends Cogn Sci. 2021 Oct;25(10):831-842. doi: 10.1016/j.tics.2021.06.005. Epub 2021 Jul 16. PMID: 34281765.

Please send your proposal to marion.richard@univ-lyon1.fr for publication on the Master of Neuroscience website.

Baraduc P, Duhamel JR, Wirth S. Schema cells in the macaque hippocampus. Science. 2019 Feb 8;363(6427):635-639. doi: 10.1126/science.aav5404. PMID: 30733419.

Rolls ET, Wirth S. Spatial representations in the primate hippocampus, and their functions in memory and navigation. Prog Neurobiol. 2018 Dec;171:90-113. doi: 10.1016/j.pneurobio.2018.09.004. Epub 2018 Sep 13. PMID: 30219248.

Wirth S, Baraduc P, Planté A, Pinède S, Duhamel JR. Gaze-informed, task-situated representation of space in primate hippocampus during virtual navigation. PLoS Biol. 2017 Feb 27;15(2):e2001045. doi: 10.1371/journal.pbio.2001045. PMID: 28241007; PMCID: PMC5328243.