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,*

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Project title : How do monkeys navigate in virtual reality?

Project summary : *approx 10 lines*

There is no consensus on the variables that control spatial navigation in virtual reality. Depending on the environmental features and the cues available, different strategies can be built. These strategies rely on spatial coordinates, encoded either in an egocentric reference frame (relative to the self), an allocentric one (relative to other object), or a combination of those two.

Here, we will test the optimal conditions to generate allocentric maps in the non-human primate navigating virtual mazes. You will work on behavioral data, analyzing different parameters of the monkey's strategy (virtual position, orientation, eye activity), their learning of the task, and their adaptation to variations in the protocol.

In the future, we aim at relating those behavioral parameters to the neuronal activity of the monkeys to investigate the way cingulate cortex and hippocampus support navigation.

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

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.

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.