MASTER 2 Neurosciences Fondamentales et Cliniques

Internship proposal 2021-2022

(internship from January to end of May 2022)

Host laboratory: *Institut des sciences cognitives*

67 boulevard Pinel, Bron

Host team : *NeuroPrime*

Internship supervisors : *Sylvia Wirth*

Project title : Variables controlling spatial navigation in VR in non-human primates

Project summary :

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 behavioural 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 behavioural parameters to the neuronal activity of the monkeys to investigate the way cingulate cortex and hippocampus support navigation.

3-5 recent publications :

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.

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