MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2023-2024

(internship from January to June 2024)

Host laboratory: Lyon Neuroscience Research Center (CRNL).
CH Le Vinatier, Bâtiment 452 – 95 Boulevard Pinel – 69675 Bron Cedex

Host team : MEL group (https://www.romainquentin.fr/) in EDUWELL team
(https://www.crnl.fr/fr/equipe/eduwell)

Internship supervisors :
Romain QUENTIN, INSERM Researcher, romain.quentin@inserm.fr
Dmitrii TODOROV, INSERM Postdoc, dmitrii.todorov@inserm.fr

Project title : Neural mechanisms of learning from errors

Project summary : Imagine someone starting to play darts in an unfamiliar place. First, they miss a lot but after a while they manage to adapt hit not close to the target. This process is an example of a more general process called "motor learning". Such learning relies on a visually perceived error (distance between the place where a dart hit the wall and the center of the target) that informs movement correction affecting next dart throw. Popular theories posit that the magnitude of this correction can vary depending on how much was learned from previous errors, which is controlled so called *error-sensitivity* variable. The neural mechanisms underlying this learning process are unknown. The goal of this project is to identify the computational rules and neural signatures that define the error and the error-sensitivity signals. Our approach is to develop neuro-computational models of learning that explain behavioral data and directly test the against neural activity recorded during motor learning in humans. The intern will be able to collect behavioral data and potentially magnetoencephalography data during a motor learning task and analyze both behavioral and neural data.

3-5 recent publications :

- Differential brain mechanisms of selection and maintenance of information during working memory. Quentin R, King Jr, Sallard E, Fishman N, Thompson R, Buch Er, Cohen Lg. The Journal Of Neuroscience (2019)
- Buch E.R, Claudino L, Quentin R, Bönstrup M, Cohen L.G. Consolidation of human skill linked to waking hippocampo-neocortical replay. Cell Reports 35 (10) 109193 (2021)
- Herzfeld DJ, Vaswani PA, Marko MK, Shadmehr R. A memory of errors in sensorimotor learning. Science. Sep 12;345-6202 (2014)

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