



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2023-2024

(internship from January to June 2024)

Host laboratory: Centre de Recherche en Neurosciences de Lyon (CRNL), CH Le Vinatier - Bâtiment 462 - Neurocampus, 95 Bd Pinel, 69500 Bron.

Host team : IMPACT team, 16 avenue du Doyen Jean Lépine, 69500 Bron.

Internship supervisors : Gérard Derosière, Chercheur INSERM (CRCN), Email : gerard.derosiere@gmail.com

Project title : Establishing the role of fronto-striato-motor circuits in effort-based decision-making using non-invasive brain stimulation approaches in humans

Project summary :

From insects to rodents to humans, animals must constantly decide whether to engage in physical efforts to reach rewarding goals. This process – referred to as effort-based decision-making – is dysfunctional in apathy, a syndrome characterized by a reduced propensity to initiate effortful actions, with a huge prevalence in a large number of neurological and psychiatric disorders. Yet, the neural bases of effort-based decisions, and thus of apathy, remain unclear. The project will **test the hypothesis that effort-based decisions emerge from dynamic interactions between a key fronto-striatal network and the motor cortex**. It involves a **unique combination of transcranial magnetic stimulation (TMS)**, largely exploited to stimulate the cerebral cortex in humans, and **transcranial temporal interference stimulation (tTIS), an highly innovative technique** allowing the non-invasive stimulation of subcortical structures in humans.

3-5 recent publications :

1. Neige C, Yadav G., **Derosiere G.** (2023). The oscillatory nature of movement initiation. *The Journal of Neuroscience*.
2. Neige C, Zazou AA, Vassiliadis P, Lebon F, Brees T, **Derosiere G.** (2022). Probing the influence of SMA and vmPFC on the motor system with dual-site transcranial magnetic stimulation. *BioRxiv*: <https://doi.org/10.1101/2022.01.18.476729>.
3. **Derosiere G**, Thura D, Cisek P, Duque J. (2022). Hasty sensorimotor decisions rely on an overlap of broad and selective changes in motor activity. *PLOS Biology*, 20(4), e3001598.
4. **Derosiere G**, Duque J. (2020). Tuning the corticospinal system: how distributed brain circuits shape human actions. *The Neuroscientist*, p. 1073858419896751.
5. **Derosiere G**, Vassiliadis P, Duque J. (2020). Advanced TMS approaches to probe corticospinal excitability during action preparation. *NeuroImage*, 116746.

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