

Proposition de stage 2023-2024
MASTER 2 Sciences Cognitives Fondamentales et Appliquées
Université Lumière Lyon 2

Host laboratory:

Lyon Neuroscience Research Center (CRNL)
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Host team:

Impact team
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Internship supervisors:

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Project title:

Detecting motor preparation from brain signals and modulating the sense of agency

Project summary:

The sense of agency is the consciousness of controlling our own volitional actions. It builds on deciding, initiating and executing actions, observing their consequences and comparing them with our expectations. All these processes occur in a few hundreds of milliseconds in the case of simple motor actions. The aim of this project is to identify the timeline of the build-up of this sense of agency and to manipulate it in a group of healthy participants. We will use brain activity (recorded with magnetoencephalography or MEG) and pupil and gaze signals (recorded with an eyetracker) to detect motor preparation in order to manipulate the timing at which participants receive feedback for their actions through a brain computer interface (BCI). We will evaluate whether the sense of agency is disturbed by our intervention and how it can be regained. Experience with Python (or willingness to learn) is recommended.

Recent publications:

- Kong G, Aberkane C, Desoche C, Farnè A, Vernet M (2023) No evidence in favour of the existence of 'intentional' binding. *BioRxiv* :2023.02.06.526214.
<https://www.biorxiv.org/content/10.1101/2023.02.06.526214v1.full.pdf>
- Vernet M, Quentin R, Japee S, Ungerleider LG. (2020) From visual awareness to consciousness without sensory input: the role of spontaneous brain activity. *Cogn Neuropsychol*, 37 (3-4), 216-219
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7335319/>
- Vernet M, Japee S, Lokey S, Ahmed S, Zachariou V, Ungerleider LG. (2019). Endogenous visuospatial attention increases visual awareness independent of visual discrimination sensitivity. *Neuropsychologia*, 128, 297-304.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5809327/>
- Vernet M, Stengel C, Quentin R, Amengual JL, Valero-Cabre A. (2019). Entrainment of local synchrony reveals a causal role for high-beta right frontal oscillations in human visual consciousness. *Sci Rep*, 9(1), 14510.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6787242/>