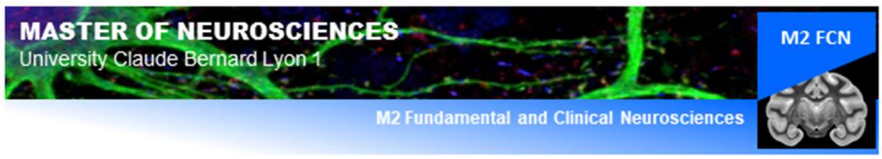

MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2026-2027

(internship from January to June 2027)

Host laboratory: CRNL

Host team: CAP, https://www.crnl.fr/fr/equipe/cap

Internship supervisors: Fabien Perrin, Professor, fabien.perrin@univ-lyon1.fr

Project title: Rethinking Disorders of Consciousness Through Patient-Environment Interaction

Project summary:

Consciousness encompasses both our capacity to respond to the world across wake-sleep cycles and the subjective experience we have of that world and of ourselves (Baynes et al., 2016, 2020). The recovery of consciousness after a coma may present as a partial or staggered return of these various dimensions. This pattern suggests that consciousness is not a unitary phenomenon but rather emerges from the dynamic interplay between a patient and their environment. Based on this, we hypothesize that the return of consciousness reflects our ability to embody (i.e., to inhabit the body) and to situate ourselves (i.e., to engage with the world). Consequently, its most precise clinical assessment lies in the degree of interaction among the brain, the rest of the body, and the environment (Thompson & Varela, 2001).

We have developed a novel method for the continuous and synchronized collection of multimodal data from conscious individuals and patients emerging from coma. Our analysis focuses on variations across modalities, including brain activity (EEG), cardiac activity (ECG), and behavior (video and AI, Michelot et al., 2025).

The goal of this internship is to contribute to patient data collection and to the development—using Python and AI—of new metrics for quantifying intermodality dynamics (Gates & Liu, 2016).

3-5 recent publications:

Bayne T, Hohwy J, Owen AM. Are There Levels of Consciousness? Trends Cogn Sci. 2016 Jun;20(6):405-413. doi: 10.1016/j.tics.2016.03.009. Epub 2016 Apr 18.
Bayne T, Seth AK, Massimini M. Are There Islands of Awareness? Trends Neurosci. 2020 Jan;43(1):6-16. doi: 10.1016/j.tins.2019.11.003. Epub 2019 Dec 10.
Gates KM, Liu S. Methods for Quantifying Patterns of Dynamic Interactions in Dyads. Assessment. 2016 Aug;23(4):459-471. doi: 10.1177/1073191116641508.

Michelot B, Corneyllie A, Thevenet M, Duffner S, Perrin F. A modular machine learning tool for holistic and fine-grained behavioral analysis. Behav Res Methods. 2024 Dec 19;57(1):24. doi: 10.3758/s13428-024-02511-3.
Thompson E, Varela FJ. Radical embodiment: neural dynamics and consciousness. Trends Cogn Sci. 2001 Oct 1;5(10):418-425. doi: 10.1016/s1364-6613(00)01750-2.