

MASTER 2 Neurosciences Fondamentales et Cliniques

Internship proposal 2021-2022

(internship from January to end of May 2022)

Host laboratory: *CRNL & LIRIS (Lyon Neurosciences Research Center and Laboratoire d'InfoRmatique en Image et Systèmes d'information)*

Host team: *Auditory Cognition and Psychoacoustics & Imagine Teams*

Internship supervisors: *Fabien Perrin (fabien.perrin@univ-lyon1.fr) & Stefan Duffner (stefan.duffner@liris.cnrs.fr)*

Project title: Embodied consciousness recovery

Project summary:

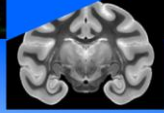
Consciousness is a multifaceted concept that refers to states, mental contents and subjective experiences². Awakening from coma is a clinical opportunity to study consciousness recovery from a dynamic point of view, i.e. by evaluating the interplay of brain, body and environment⁵ throughout the recovery process. While personally relevant stimuli increase the chances to observe behavioral and brain responses in these patients⁴, fine-grained bodily manifestations associated with emotional/social interactions and coma recovery are not known.

To this aim, we will conduct a behavioral naturalistic study in which embodied consciousness recovery will be evaluated using video. Bodily manifestations (gaze, facial expression, interactional body synchrony) that occur during emotional/social interactions (with caregivers or relatives), will be extracted by state-of-the-art deep learning models from the video recordings¹ and classified by supervised learning analysis according to the subjective report of visiting persons, notably their intuition of the patient's "presence"³.

3-5 recent publications:

- 1-Baltrušaitis T, Robinson P, Morency L (2016) OpenFace: An open source facial behavior analysis toolkit. IEEE Winter Conference on Applications of Computer Vision (WACV), Lake Placid, NY: 1-10. doi: 10.1109/WACV.2016.7477553
- 2-Bayne T, Hohwy J, Owen AM (2016) Are There Levels of Consciousness? Trends Cogn Sci 20(6): 405-413. doi: 10.1016/j.tics.2016.03.009

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



- 3-Hermann B, Goudard G, Courcoux K, et al. (2019) Wisdom of the caregivers: pooling individual subjective reports to diagnose states of consciousness in brain-injured patients. *BMJ Open* 9 (2): e026211. doi: 10.1136/bmjopen-2018-026211
- 4-Perrin F, Castro M, Tillmann B, Luauté J. (2015) Promoting the use of personally relevant stimuli for investigating patients with disorders of consciousness. *Frontiers in Psychology - Consciousness Research* 6: 1102. doi: 10.3389/fpsyg.2015.01102.
- 5-Thompson E, Varela F (2001) Radical embodiment: neural dynamics and consciousness. *Trends Cogn Sci.* 5(10): 418-425. doi: 10.1016/s1364-6613(00)01750-2.