



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2024-2025

(internship from January to June 2025)

Host laboratory:

Laboratoire Interuniversitaire de Biologie de la Motricité (LIBM), UR 7424, 8 rue Raphael Dubois, 69 100 Villeurbanne (Lyon site of the LIBM).

Host team :

Mental Processes, Cerebral Plasticity and Motor Performance <https://libm.univ-st-etienne.fr/en/research-teams/mp3.html>

Internship supervisors :

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- DEBARNOT Ursula, Maître de conférences (HDR)
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- LEFEVRE Romaric, Doctorant STAPS.

Project title :

SMILES (Sleep, Motor Imagery, Learning, EEG, Sequence) / Effects of sleep on gross motor sequence learning by motor imagery in young and older adults.

Project summary :

Motor sequence learning requires repeated practice, which may be exhausting for older adults, especially during rehabilitation. Among less physically demanding interventions to preserve/enhance motor functions in elderly people, motor imagery (MI) training has gained attention. However, we do not know whether MI training might benefit from sleep in older adults, as shown in young adults. This project will focus on four research questions: (1) Does acquisition of a gross motor task supported by MI training differ between young and older adults? (2) Do the effects of sleep versus wakefulness on consolidation after MI training differ between age groups? (3) How does EEG activity (mu rhythm; 7-13Hz) during MI of a gross motor task differ from rest, and does it change after learning in the two populations? (4) How is EEG activity (sleep spindle, slow wave activity) during sleep associated with the consolidation process of the motor task in the two age groups?

3-5 recent publications :

Saimpont, A., Métais, A. & Collet, C (2023). Learning by motor imagery in older adults. *Aging* (Albany NY). 2023 Oct 13;15(19):9894-9895. <https://doi.org/10.18632/aging.205185>

Metais, A., Muller, C.O., Boublay, N., Breuil, C., Guillot, A., Daligault, S., di Rienzo, F., Collet, C., Krolak-Salmon, P. & Saimpont, A. (2022). Anodal tDCS does not enhance the learning of the sequential finger-tapping task by motor imagery practice in healthy older adults. *Frontiers in Aging Neuroscience*, Dec 9;14:1060791. <https://doi.org/10.3389/fnagi.2022.1060791>

Debarnot, U., Metais, A., Digonet, G., Freitas, E., Blache, Y. & Saimpont, A. (2022). Sleep dependent consolidation of gross motor sequence learning with motor imagery. *Psychology of Sport and Exercise* 61, 102216. <https://doi.org/10.1016/j.psychsport.2022.102216>