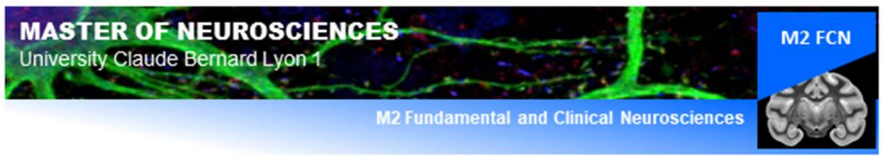

Université Claude Bernard Lyon 1

MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2025-2026

(internship from January to June 2026)

Host laboratory: *Centre de Recherche en Neurosciences de Lyon (CRNL), Inserm U1028 - CNRS UMR5292 – UCBL, Centre Hospitalier Le Vinatier - Bâtiment 462 – Neurocampus, 95 boulevard Pinel, 69675 Bron Cedex.*

Host team: *FORGETTING Team, https://www.crnl.fr/fr/equipe/forgetting*

Internship supervisors: *HAY Audrey, CR CNRS, Audrey.hay@cnrs.fr*

Project title: *Evolution of midline thalamic targets in the prefrontal cortex over the development of Alzheimer disease in mice.*

Project summary: *Over the course of Alzheimer disease, synaptic connections are affected and neurodegeneration occurs. In parallel, sleep degrades, which we believe is due to the alterations of the communication between the thalamus and the neocortex. To test this hypothesis, we will perform patch-clamp recordings in slices and identify the targets of the thalamus in a mouse model of Alzheimer disease. We will record from pyramidal neurons and interneurons and quantify the strength of the connection at different ages. To specifically stimulate thalamic fibers, we will use optogenetic which will be achieve by performing viral injections of viruses in the thalamus few weeks prior to the patch clamp experiment. We hypothesize that thalamic neurons will project primarily to interneurons and that this connection will be specifically affected by the development of Alzheimer disease.*

3-5 recent publications:

1- Hay YA, Deperrois N, Fuchsberger T, Quarrell T, Koerling AL, Paulsen O. Thalamus mediates neocortical Down state transition via GABAB receptor-targeting interneurons. Neuron. 2021 Sep 1;109(17):2682-2690.e5. doi: 10.1016/j.neuron.2021.06.030. Epub 2021 Jul 26. PMID: 34314698.

2- Jarzebowski P, Tang CS, Paulsen O, Hay YA. Impaired spatial learning and suppression of sharp wave ripples by cholinergic activation at the goal location. Elife. 2021 Apr 6;10:e65998. doi: 10.7554/eLife.65998. PMID: 33821790; PMCID: PMC8064750.

3- Hay YA, Naudé J, Faure P, Lambolez B. Target Interneuron Preference in Thalamocortical Pathways Determines the Temporal Structure of Cortical Responses. Cereb Cortex. 2019 Jul 5;29(7):2815-2831. doi: 10.1093/cercor/bhy148. PMID: 30059985.