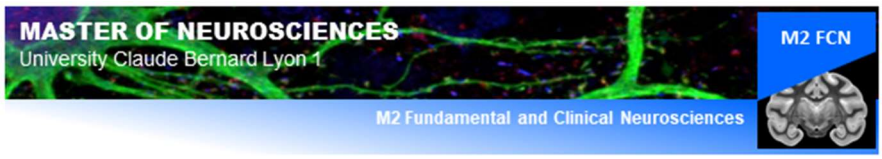

Université Claude Bernard Lyon 1

MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2025-2026

(internship from January to June 2026)

Host laboratory: CRNL, Bâtiment 462 - Neurocampus - CH le Vinatier, 95 bd Pinel, Bron-Lyon

Host team : Sleep Team; https://nadiaurbainlab.wordpress.com

Internship supervisors : Nadia Urbain, CR1 INSERM, nadia.urbain@inserm.fr

Project title : Silencing the zona incerta for a smooth motor execution: an experimental approach to Parkinson's disease in mice

Project summary :

This Master 2 project is to investigate how the zona incerta integrates sensory and motor inputs to ensure a smooth motor execution. The zona incerta is a small nucleus extensively connected with other structures in the brain, acting as a key integrative hub for sensory, motor and visceral functions. The zona plays a key role in motor control; deep brain stimulation of the zona incerta has recently emerged as a treatment for motor symptoms of Parkinson's disease. However, its activity during movement is poorly described both in physiological and pathological conditions; and whether its abnormal activity is responsible for motor disorders in Parkinson's disease is not known.
This Master 2 project aims 1- to clarify the activity of incertal cells during motor behavior in wild-type mice and in a model of the Parkinson's disease; and 2- to explore the cortical gating of incertal pathological activity. To achieve this, the candidate will combine electrophysiology with cutting-edge techniques, such as viral transfections, and optogenetics in mice. Mice will be placed in an immersive environment for precise temporal monitoring of locomotion speed and whisker movements.

3-5 recent publications :

Ossowska K (2020) Zona incerta as a therapeutic target in Parkinson's disease. J Neurol 267: 591-606

Boscher F, Jumel K, Dvořáková T, Gentet LJ, Urbain N. (2024) Thalamocortical Dynamics during Rapid Eye Movement Sleep in the Mouse Somatosensory Pathway. J Neurosci. 44(25):e0158242024

Urbain N, Deschênes M (2007) Motor cortex gates vibrissal responses in a thalamocortical projection pathway. Neuron 56:714-725

Wang X, et al. (2020) Zona Incerta: An Integrative Node for Global Behavioral Modulation. Trends Neurosci. 43, 82–87