

**MASTER 2 Neurosciences Fondamentales et Cliniques
UCB Lyon 1, Lyon, France**

**Internship proposal 2020-2021
(internship from January to end of May 2021)**

Host laboratory:

Centre de Recherche en Neurosciences de Lyon, INSERM U 1028 - CNRS UMR 5292
Centre Hospitalier Le Vinatier – Bâtiment 462 – NeuroCampus
95 Boulevard Pinel, 69675 BRON Cedex

Host team :

SLEEP Team - Physiopathologie des réseaux neuronaux du cycle veille-sommeil

Internship supervisors :

Nadia Urbain, CR1 INSERM

nadia.urbain@inserm.fr

<https://nadiaurbainlab.wordpress.com/>

Project title :

Sensorimotor integration in the trigeminal and thalamic sensory relay nuclei

Project summary :

Paradoxical sleep (PS) and wakefulness (WK), while fundamentally different consciousness states, are characterized by similar EEG patterns. Investigating how sensory inputs are encoded / gated along the sensory stream from the periphery to the cortex in PS compared to WK is a crucial step in a better understanding of the function of PS. Using the anatomically well-defined whisker somatosensory system as a model and state-of-art electrophysiological methods combined with optogenetics in head-fixed mice, this project aims to collect decisive data in the sensory relay nuclei to study the efficiency of sensory information transfer from the periphery to the cortex and the presence of cortical or subcortical mechanisms that gate the flow of sensory inputs depending on the different brain states. The successful applicant will familiarize him(her)self with electrophysiological recordings and signal analysis.

3-5 recent publications :

- N. Urbain, N. Fourcaud-Trocmé, S. Laheux, P.A. Salin and L.J. Gentet. Brain-state-dependent modulation of neuronal firing and membrane potential dynamics in the somatosensory thalamus during natural sleep. *Cell Report*, 2019, 26: 1443-1447.
- N. Urbain, P.A. Salin, P.A. Libourel, J.C. Comte, L.J. Gentet and C.C. Petersen. Whisking-related changes in neuronal firing and membrane potential dynamics in the somatosensory thalamus of awake mice. *Cell Report*, 2015, 13: 647-656.
- T. Furuta, N. Urbain, T. Kaneko and M. Deschênes. Corticofugal control of vibrissa-sensitive neurons in the interpolaris nucleus of the trigeminal complex. *Journal of Neuroscience*, 2010, 30: 1832-1838.
- N. Urbain and M. Deschênes. Motor cortex gates vibrissal responses in a thalamocortical projection pathway. *Neuron*, 2007, 56: 714-725.