

**Master 2 internship project  
Year 2024-2025**

**Laboratory/Institute:** Grenoble Institut Neurosciences (GIN) **Director:** Dr. E. Barbier  
**Team:** Brain, Behavior and Neuromodulation **Head of the team:** J. Bastin

**Name and status of the scientist in charge of the project:** Dr Brigitte Piallat

**HDR:** yes  no

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**Program of the Master's degree in Biology:**

- Microbiology, Infectious Diseases and Immunology       Structural Biology of Pathogens  
 Physiology, Epigenetics, Differentiation, Cancer       Neurosciences and Neurobiology

**Title of the project:** Study of the implication of subthalamic nucleus in sleep/wake disturbances in Parkinson Disease

**Objectives (up to 3 lines):** In this study, we aim to characterize the sleep/wake disturbances in Parkinson's disease and the involvement of subthalamic nucleus in this behavior.

**Abstract (up to 10 lines):** Sleep, initially defined as a passive state, has in fact, a major role in a large number of biological phenomena such as the elimination of toxic substances and metabolic waste from the brain by the glymphatic system (Xie et al., 2013). Interestingly, it has been shown that these neurodegenerative diseases are strongly associated with a poor quality of sleep (Abbott & Videnovic, 2016). Sleep is highly modified in Parkinson's disease, but this has only been partially described. In addition, the subthalamic nucleus, which is a common target for deep brain stimulation, appears to play an important role in sleep behavior, but has not been fully studied. This study aims to characterize sleep/wake disturbances in Parkinson's disease. It will also enable us to monitor the activity of the subthalamic nucleus during wakefulness and sleep onset.

**Methods (up to 3 lines):** This study is preliminary to a clinical trial that will involve the neurology, neurosurgery and sleep laboratory departments of Grenoble University Hospital. The study will be based on data collected before, during and after implantation surgery. The student will have analyzed patients' clinical data, and their sleep scoring in the pre-implantation phase. In addition, the student will be asked to analyze the activity of the subthalamic nucleus for patients implanted during the period of their internship.

**Up to 3 relevant publications of the team:**

*Davin A, Chabardès S, Devergnas A, Benstaali C, Gutekunst CN, David O, Torres-Martinez N, Piallat B. Excessive daytime sleepiness in a model of Parkinson's disease improved by low-frequency stimulation of the pedunculopontine nucleus. NPJ Parkinsons Dis. 2023 Jan 25;9(1):9.*

*Davin A, Chabardès S, Belaid H, Fagret D, Djaileb L, Dauvilliers Y, David O, Torres-Martinez N, Piallat B. Early onset of sleep/wake disturbances in a progressive macaque model of Parkinson's disease. Sci Rep. 2022 Oct 19;12(1):17499.*

*Connolly MJ, Piallat B, Sendi M, Mahmoudi B, Higgins MK, Gutekunst CA, Devergnas A, Gross RE. Effects of acute hippocampal stimulation in the nonhuman primate penicillin model of temporal lobe seizures. Heliyon. 2024 Jul 6;10(14)*

**Requested domains of expertise (up to 5 keywords):**

Neurophysiology, nonhuman primate experiments, sleep physiology, electrophysiology