MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2026-2027

(internship from January to June 2027)

Host laboratory: Lyon Neuroscience Research Center (CRNL); CHU Le Vinatier, Bat 462
Host team: Perception Attention Memory: https://pam-lyon.cnrs.fr/

Internship supervisors: KÖSEM Anne; Researcher (CR, HDR); anne.kosem@inserm.fr

Project title: Neural mechanisms underlying temporal predictions

Project summary:
Keywords: Cognition, temporal prediction, auditory perception, EEG

In our everyday life, predicting the timing of incoming sensory events is very helpful to optimize perception and action. For example, a musician needs to infer the correct timing of each musical note in order to play in sync with the rest of the band. To do this, temporal predictions can be based on preceding temporal context (like the beat of the music that has just been played). Temporal predictive mechanisms are known to influence perception when stimulation is periodic. However, natural environments rarely contain exclusively periodic stimuli: for example, language and music are sensory stimuli that have complex temporal regularities that can be used to form temporal expectations. Recent behavioral work in our team (Bonnet et al., 2024) suggest that probabilistic contexts can also generate temporal predictions that influence auditory perception. This M2 project aims to investigate the neural mechanisms underlying probabilistic temporal predictions. The project will involve analyzing an existing EEG dataset to identify neural markers associated with these prediction mechanisms, with particular emphasis on slow brain dynamics (Breska et Deouell, 2017; Herbst & Obleser, 2017; Zoefel & Kösem, 2024).

3-5 recent publications:

1. Bonnet, P., Bonnefond, M., & Kösem, A. (2024). What is a rhythm for the brain? The impact of contextual temporal variability on auditory perception. *Journal of Cognition*, *7*(1), 15.
2. Breska, A., & Deouell, L. Y. (2017). Neural mechanisms of rhythm-based temporal prediction: Delta phase-locking reflects temporal predictability but not rhythmic entrainment. *PLoS Biology*, 15, e2001665
3. Herbst, S. K., & Obleser, J. (2017). Implicit variations of temporal predictability: Shaping the neural oscillatory and behavioural response. *Neuropsychologia*, *101*, 141-152.
4. Zoefel, B., & Kösem, A. (2024). Neural tracking of continuous acoustics: properties, speech-specificity and open questions. *European Journal of Neuroscience*, *59*(3), 394-414.