



## Research Assistant / PhD positions open in Cognitive Neuroscience (Barcelona)

The [Brainlab – Cognitive Neuroscience Research Group](#) invites applications for a research assistant position with the possibility to extend into a PhD contract

We are seeking for talented graduates in any field related to the Neurosciences  
(Psychology, Cognitive Sciences, Computer Sciences, Medicine, Biology, Engineering, Physics)

Requirements: 1) EU citizenship, 2) to have 300 ECTS completed (at least 60 ECTS in a Master degree)  
3) highest academic marks, 4) programming skills (e.g., Matlab, Python, R)

Candidates will have the opportunity to enter the [PhD Program in Biomedicine](#) (Area of Neurosciences) of the University of Barcelona.

**The candidate will join the project “NORAMP: The locus-coeruleus norepinephrine system at the interface between motor and auditory processing”.**

**Principal Investigators: Dr. [Iria SanMiguel](#) and Dr. [Marc Via](#)**

This project fuses the [motor-sensory interactions](#) and [neurogenetics](#) research lines of the Brainlab with the objective to test the role of the LC-NE system in auditory processing.

Extracting meaning from sound is an extremely complex ability that often requires effortful listening. Auditory information evolves in time and thus the dynamic allocation of attention, linked to temporal expectations, is key to auditory perception. One important way to provide a temporal structure to sensory input is through “active sensing”. In the auditory modality, motor-like signals may drive the synchronization of temporal expectations with the dynamics of the auditory input, generating global sensory optimization windows at relevant time points. The diffuse neuromodulatory systems of the brain have been proposed to play such a role of global modulators of synaptic transmission. In particular, the action of the locus-coeruleus norepinephrine (LC-NE) has been described as a temporally precise but spatially unspecific filter. Moreover, LC-NE activity is tightly coupled to action, and a plethora of evidence shows that NE boosts signal processing at sensory cortices. This puts the LC-NE system at the intersection between attention and action and suggests a possible role in active sensing. We hypothesize that the LC-NE system may play a fundamental role in auditory perception, facilitating the dynamic allocation of attention in time necessary to tune the feature extraction processes of auditory sensory areas into the rhythms of language and music, among other sounds. In this project we will use three approaches to investigate the relationship between LC-NE activity and auditory processing in perceptual tasks: 1) examining motor-driven modulations of sound processing; 2) studying the neural processes involved in effortful listening; and 3) through the study of interindividual differences in auditory and LC function and their genetic determinants along the continuum of psychosis. With these three approaches, we aim to demonstrate that variation in LC-NE function is associated with the modulation of auditory processing as reflected in perceptual and electrophysiological



measures. The results of this project will clarify the contribution of LC-mediated noradrenergic neuromodulation to the tracking of dynamic, continuous sounds such as speech and music, and to the action-driven modulation of auditory processing. Further, they will evaluate the role of LC-NE neuromodulation in abnormal auditory processing along the continuum of psychosis and identify genetic variants contributing to the observed interindividual differences in LC-NE mediated modulation of auditory processing. Our multidisciplinary approach, combining different behavioral, physiological, and molecular methods in healthy and pathological populations will certainly contribute to a better understanding of these neurocognitive processes.

Applicants should send a letter of motivation, CV, a copy of the academic marks record (in ECTS format) and any recommendation letters to [isanmiguel@ub.edu](mailto:isanmiguel@ub.edu) [**subject:** RA/PhD NORAMP position].

The selection process will take place during September 2023