

PhD Open Position

This is a unique opportunity for a strongly motivated graduate student interested in studying the mechanisms, from synapses to neuronal circuits, underlying Decision making and Working Memory. The project will be developed within an ongoing collaboration between three laboratories in the Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), located in the center of Barcelona (Spain). These labs are:

1. Cortical Circuit Dynamics Lab headed by J. de la Rocha PhD: <http://neuro.fcrb.es/delaRochaLab/>
2. Theoretical Neurobiology of Cortical Circuits Lab, headed by Albert Compte, PhD: <http://neuro.fcrb.es/complab>
3. The Immune-mediated Neurological Disorders Lab, headed by Josep Dalmau, MD, PhD: <http://www.neuroimmunologybcn.org/research/pathogenesis-immune-mediated/index/>

The project is supported by the European Research Council and the Cellex foundation, and will be developed at IDIBAPS, a public biomedical research institute whose mission is to encourage Systems Neuroscience, translational research, and technological progress in the field of Biomedicine. The candidate will enroll in the Biomedicine PhD program of the University of Barcelona.

Title: The role of Working Memory in perception: from neuronal circuits to synapses.

Keywords: working memory, neural activity, cortical micro-circuit, NMDA receptors, calcium imaging, animal behavior, quantitative data analysis

Project description: This is a unique opportunity for a strongly motivated candidate interested in studying the mechanisms, from synapses to neuronal circuits, underlying Working Memory, the cognitive ability to maintain information in the brain during brief periods of time.

The project will study the mechanisms, from synapses to neuronal circuits, underlying the interaction between Working Memory and perception. Specifically it will investigate the ability to buffer perceptual information in the brain during brief periods of time and use it to interpret the incoming stream of new stimuli. The candidate will develop an animal model to test the retention of a stimulus sequence in Working Memory.

The candidate will develop an animal model to test the retention of a parametric stimulus in Working Memory. The behavior will be combined with a cutting-edge large-field calcium imaging technology to simultaneously monitor the activity of large number -of individual neurons distributed over several cortical areas. Using our recently established reversible antibody-mediated disruption of NMDA receptor function in mice (Planagumà et al 2015) we will characterize at the behavioral and neural circuit levels, the largely debated role of the NMDA receptor in Working Memory. The candidate will perform quantitative analyses of large data sets using methods from modern statistical analysis and machine learning.

Hosting labs and institution: The project will be developed within a collaboration between several investigators in IDIBAPS (Barcelona): Josep Dalmau, MD, PhD, Pablo Jercog PhD, Albert Compte PhD and Jaime de la Rocha PhD. Together, these labs have a strong publication record investigating the neural circuit basis of Working Memory and synaptic receptor mediated autoimmune brain pathologies, and they have extended experience in Calcium imaging, electro-physiology, analysis of behavioral/neuronal data sets and computational modeling. The project is supported by CELLEX foundation and the European Research Council, and will be developed at IDIBAPS, a public biomedical research institute whose mission is to

encourage Systems Neuroscience, translational research, and technological progress in the field of Biomedicine. The candidate will enroll in the Biomedicine PhD program of the University of Barcelona.

Candidate profile: Candidates with a very good track record in their undergraduate degree (e.g. biology, physics or psychology), a Master's in a neuroscience-related discipline and with an interest in cognition, in vivo neuronal imaging, and advanced data analysis techniques are encouraged to apply. Candidates with good oral and written skills in English will be given preference. Previous experience with Calcium imaging, training of rodents or programming (Matlab, Python, etc.) will be highly valued.

Please send CV, a brief statement of career goals and the name of 1-2 referees to: marodes@clinic.ub.es. Candidates will be evaluated starting in **March 15th** and until the position is filled. Estimated starting date: between May and September 2016.