Expression of Interest

Contact Person/Scientist in Charge

- **Name and surname:** Santiago Canals
- **Email:** scanals@umh.es

INSTITUTO DE NEUROCIENCIAS CSIC-UMH

Department / Institute / Centre

- **Name:** INSTITUTO DE NEUROCIENCIAS CSIC-UMH
- **Address:** San Juan de Alicante
- **Province:** Alicante

Research Area

- Life Sciences (LIF)

Brief description of the institution:

The Instituto de Neurociencias (IN) is a joint venture of both the Spanish National Research Council (CSIC) and the University “Miguel Hernández” (UMH). It has been distinguished as a Centre of Excellence in the frame of the Severo Ochoa Program. This recognizes the IN as the most relevant brain research institute in Spain, and places it on the list of the most prominent research centres in Europe.

The mission of the IN is to investigate the development, structure and function of the nervous system in normal and pathological conditions. Our general objective is to improve our understanding of the brain. In other words, to understand the functioning of the healthy brain, in order to shed light on dysfunctions leading to disease. This goal is recognized as the main challenge faced by modern biology. The IN seeks to provide researchers with a nurturing environment to allow pursuing the most important questions in neuroscience because it is imperative to continue research efforts to understand how the brain works at the most basic level if we are to uncover insights that may help us correct problems in the brain.

Brief description of the Centre/Research Group (including URL if applicable):

The Instituto de Neurociencias (IN) is organized into functional research units that are flexible and serve as a framework that facilitates research activities and stimulates interaction and scientific collaboration among its members. The IN and its members maintain active interchange programs with universities, research centres and neurobiology laboratories around the world.

The research groups of the IN employ a wide variety of techniques that cover the fields of molecular and cellular biology, genetics, physiology and systems neurobiology. Among the technical facilities at the IN are fully equipped tissue, cell culture and experimental embryology rooms, optical projection tomography (OPT), confocal and two photon microscopy, fMRI and special areas for behavioural experiments.

The IN has an Excellence PhD Training Programme in Neurosciences, providing courses and research training to European graduate students in several areas of basic neurosciences. The program leads to a degree of Doctor of Philosophy. All courses of the program are given in English and have assigned an appropriate number of ECTS (European Credit Transfer System) credits to facilitate the recognition of completed courses at other institutions. This includes a weekly seminar programme. In addition, members of the IN organize international courses and workshops open to the European scientific community.

Project description:

Activity Propagation in Brain Networks ***(PI: Santiago Canals)***

Experience-dependent modulations of synaptic strength shape the functional structure of the brain, recruiting relevant networks in a particular context and supporting behavioural adaptation. Little is known, however, about how synapse dynamics are transformed into network dynamics. Recently we have demonstrated that brain circuits involved in learning and memory are functionally reorganized after local potentiation of synaptic transmission in the hippocampus. In our current research we aim at investigating the mechanisms and global impact of this network reorganization, focusing on short- and long-term synaptic plasticity and neuromodulation. To this end we combine functional magnetic resonance imaging (fMRI) with electrophysiological techniques and a battery of neurobiological tools (optogenetic, pharmacogenetic, electric microstimulation). We investigate dynamic functional connectivity, network topography and state transitions using different analytical approximations (including graph theory analysis) [see Curr Biol (2009), Philos Trans R Soc Lond B (2013), Nature Physics (2014), Cereb. Cortex (2015).

Applications

Until 30th July 2016:

- Brief CV (1 page)

- Letter of Motivation (max 2500 characters)