SESIONES CIENTIFICAS DEL CTB
VIERNES 24 DE OCTUBRE DE 2014

PONENTE: Dr. Jordi Soriano Fradera

Jordi was born in Barcelona, Spain in 1970. He studied Physics at the University of Barcelona, where he also undertook a PhD in the context of physics of fluids. In 2003 he switched to biophysics, and carried out a postdoc in Bayreuth, Germany, to study dynamics in multicellular organisms and, in particular, the formation of the foot- head axis in metazoans. In 2005 he started a second postdoc at the Weizmann Institute of Science, Israel, where he developed new experimental techniques to study connectivity in living neuronal networks. Since 2009 Jordi is the head of a research group in neuroscience at the University of Barcelona, where he investigates spontaneous activity and collective phenomena in neuronal cultures. Along the last two years the group has joined efforts with the medical community in Barcelona to develop in vitro models for neurological disorders, in particular Sanfilippo and Huntington. As a result of these multidisciplinary efforts, Jordi's group and partners recently received a research grant from "La Marató" Foundation to deepen in the understanding and treatment of Huntington disease.
Webpage of the group: soriano-lab.eu.

"EXPLORING OPEN PROBLEMS IN PHYSICS AND MEDICINE THROUGH NEURONAL CULTURES"

Neuronal cultures are an excellent experimental tool to investigate the interplay between network dynamics and neural architecture. In my group in Barcelona we study spontaneous activity in diverse configurations of neuronal cultures as model systems for Physics, Neuroscience and Medicine. In the experiments, we monitor spontaneous activity using calciumfluorescence imaging, which allows the detection of neuronal firing events with both high temporal and spatial resolution. Network's dynamics is characterized by collective episodes of activity (termed network bursts) in which the neuronal population fires together in a short time window. The detailed analysis of these bursts in the context of network theory and non-linear physics allows for the quantification of very important phenomena. In the talk I will describe experiments and modelling tools aimed at addressing two specific problems: the initiation and maintenance of spontaneous activity on the one hand, and the relation between functional and structural connectivity on the other hand. I will finally describe how our experimental approaches can be applied to investigate neurodegenerative disorders of genetic origin, in particular Sanfilippo and Huntington, and explore therapeutic strategies in vitro.