Gemma Huguet (UPC)

Eines de sistemes dinàmics per a l'estudi del cervell
The study of the brain by means of Dynamical Systems

The study of the brain has attracted the attention of scientists from different disciplines; amongst them, mathematicians have developed tools and mathematical models for the study of the workings of this body. The goal of this talk is to illustrate how mathematics, and in particular dynamical systems theory, can contribute to the understanding of fundamental mechanisms responsible for the activity of the nervous system.

In this talk we will focus on the study of neuronal oscillations, both regular and irregular. We will introduce some neuronal models and we will show how tools from dynamical systems theory such as the parameterization method for invariant manifolds or the separatrix map can be used to provide a thorough analysis of the dynamics. We will show how the conclusions obtained may have implications in the context of communication trough coherence and alternations between different neuronal states, which may be interesting for biologists.