Title (tentative): Electrical stimulation in cultured neuronal networks for dynamic activity control

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Motivation and application domain

The rationale is to take advantage of cultured networks coupled to standard and high-density MEAs for systematically studying the changes in network activity by applying different protocols of electrical stimulation.

General objectives and main activities

The main objective is to systematically study in cultured networks the effect of very small DC current stimulation in presence of induced epileptic activity in cortical (or hippocampal) networks. The use of MEAs allows to deliver electrical stimulation from different spatial positions and in different configurations (single ended, differential, ..). The effects of the applied stimuli will be evaluated with respect to the induced epileptogenic activity. This basic-systematic study could have implications in the possible treatments of epileptic seizures in future clinical applications.

Training Objectives (technical/analytical tools, experimental methodologies)

Use of Micro Electrode Arrays (standard and high-density)
Development of experimental protocols and execution of experiments
Analysis of data through standard and new algorithms

Place(s) where the thesis work will be carried out: Neuroengineering Lab

Curriculum: Neuroengineering and Bio-ICT

Maximum number of students: 2