UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

Thesis Project Form

Title (tentative): Circuits and Neuromodulation of the Social Brain

Thesis advisor(s): Chiappalone Michela, Francesco Papaleo (IIT: francesco.papaleo@iit.it)

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Description

Motivation and application domain

The student will be working in a multicultural and multi-disciplinary group, where biologists, pharmacologists, psychologists, medical doctors, mathematicians and bioengineers collaborate, each with their own expertise, to carry out common research.
The Genetics of Cognition Research line is coordinated by Dr. Francesco Papaleo, who has extensive experience in the Neuroscience area.
The research focuses on multidisciplinary research projects to investigate the neuromodulation and circuits involved in the expression and development of high-level socio-cognitive abilities in in vivo genetically modified models relevant to neurodevelopmental disorders characterized by socio-cognitive abnormalities.

General objectives and main activities

To achieve this goal, we will employ a combined approach strictly linking advanced behavioral outputs (interbrain synchrony, social tasks including emotion recognition, cooperation, altruism, hierarchy, social reward etc.) with cell-specific and circuit-specific manipulations using in vivo chemo- and opto-genetics, in vivo miniscopes, in vivo fiberphotometry, and in vivo electrophysiology. For reference to recent work, please see: Scheggia et al., Nature Neuroscience 2022; Mastrogiacomo et al., Molecular Psychiatry 2022; Scheggia et al., Nature Neuroscience 2020; Ferretti et al., Current Biology 2019; Scheggia et al., Nature Communications 2018.

Training Objectives (technical/analytical tools, experimental methodologies)

The thesis will allow training in analyses of calcium imaging neuronal activity data, interbrain synchronization, design and perform in vivo socio-cognitive behavioral studies, cell type and circuit specific recordings and manipulations during socio-cognitive tasks

Place(s) where the thesis work will be carried out: Istituto Italiano di tecnologia, via Morego 30, Genova

Additional information

Pre-requisite abilities/skills: Coding expertise is strongly recommended

Maximum number of students: 2