Laboratory of neural coding

Biography

2011- Senior Lecturer at the Edmund and Lily Safra center from Brain Science and the Alexander Silberman institute of Life Science, The Hebrew University of Jerusalem.

2008-2010: Wellcome Trust research fellow, University College London
Project: Sensitivity to perturbations in vivo implies high noise and suggests rate coding in cortex (Prof. Michael Häusser?s lab, University College London).

2005-2008: MRC Senior research fellow, University College London

Research

The main focus of the lab is in the interface between the biophysical properties of individual neurons and neuronal coding. In particular we focus on questions that relate the interaction between nonlinear processes in dendrites and their effect on the way neurons encode information. A key factor of neuronal coding is neuronal noise, both at the cellular level and in the network. Therefore, we are also interested in the interaction between the single neuron and the network in which it is embedded ? the effect neuron?s activity on the network as well as the effect of the network?s activity on the neuron.

In terms of model system we believe that it is important to consider both sensory systems where stimuli are external to the organism as well as self generated activity. For the first we focus on the barrel cortex in mice and for the latter we are beginning to explore the mouse ultrasonic vocalization motor system as well as prefrontal cortex. We aspire to carry out experiments inspired by theoretical predictions and to combine modeling in order to access aspects of the questions that are not accessible by experiments. We use a variety of advanced techniques in order to answer these questions including: Whole cell patch clamp, Two Photon imaging, Optogenetics, Unltrasonic sound recordings, and computer simulations.
It is now widely accepted that deciphering the enigma of the brain is the most challenging intellectual endeavor of the 21st century, "The Century of the Brain" - Join our quest and become a friend of ELSC.

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