ELSC Seminar: Nachum Ulanovsky

June 18, 2015

On the topic of "Natural Neuroscience"

ELSC cordially invite you
to the lecture given by:

Nachum Ulanovsky
Department of Neurobiology, Weizmann Institute of Science, Israel

On the topic of
"Natural Neuroscience"

The lecture will be held on Thursday, June 18, 2015
at 17:00, at ELSC: Silverman Bldg., 3rd Wing, 6th Floor, Edmond J. Safra Campus

Light refreshments at 16:45

Abstract:

The work in our lab focuses on understanding the neural basis of behavior in freely-moving, freely behaving mammals? in particular, the neural basis of spatial behaviors, spatial memory and spatial cognition ? using bats as our animal model. In my talk I will describe some of our recent studies, including:
(i) Recordings of 3-D place cells, 3-D grid cells, and 3-D head-direction cells in the hippocampal formation of freely-flying bats, using a custom neural telemetry system ? which revealed an elaborate 3-D spatial representation system in the bat?s brain; (ii) A new kind of vectorial representation of goals that we found in the bat hippocampal formation; and (iii) Absence of theta oscillations in the bat?s hippocampal formation ? arguing against a central role of theta in spatial cognition, and suggesting that what matters for hippocampal function is synchronization and not oscillations. I will also describe our studies of spatial
memory and navigation of bats in the wild, using micro-GPS devices, which revealed outstanding navigational abilities and provided the first evidence for a large-scale 'cognitive map' in a mammal. Overall, our general approach is to take advantage of the unique properties of bats: their temporally-discrete sensory system (sonar) and excellent vision, and their 3D flight abilities in order to ask general questions in Systems Neuroscience; particularly questions that are difficult to address using rodents. Our long-term vision is to develop a "Natural Neuroscience" approach for studying the neural basis of behavior by tapping into the animal's natural behaviors in complex, large-scale, naturalistic settings while not compromising on rigorous experimental control. We firmly believe that pursuing such an approach will lead to novel and surprising insights about the Brain.

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