SEMINAR CYCLE

of the PhD in Neuroscience of Turin

6th Appointment

Prof. Cathie Ventalon

Institut de Biologie de l'ENS, Ecole Normale Supérieure, Paris

"Fast confocal fluorescence imaging and targeted photoactivation in freely behaving mice."

21th June, 2024 h 2:00 PM-3:00 PM

The lecture will last 1 hour and it will be followed by discussion

Host: Prof. Serena Bovetti

Great Hall "A. Mosso"
Corso Massimo D'Azeglio 50,
entrance from Via Michelangelo
Link: https://bit.ly/3V9oR7a

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PROF. CATHIE VENTALON

Cathie Ventalon is a research fellow at the Biology Institute of the Ecole Normale Supérieure in Paris. She was originally trained in Optics. During her post-doc in J. Mertz's laboratory (Boston University), she starting developing novel fluorescence imaging techniques with optical sectioning. In 2007, she joined V. Emiliani's team at Paris Descartes University as a CNRS researcher. She focused on the combination of functional fluorescence imaging with spatially selective photoactivation. In 2014, she joined L. Bourdieu's team at IBENS where she continues developing cutting-edge techniques allowing optical recordings and manipulation of neuronal activity in freely-behaving rodents.

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ABSTRACT

To apply optical methods to freely-behaving mice to study perception and memory, two approaches have been followed: a microscope can be fully miniaturized and placed on the rodent head, or an image guide can be used as a relay between a regular-size custom-made microscope and the animal. Using this second strategy, we have developed two fiberscopes. The first system allows for photoactivation with near-cellular resolution in freely-behaving mice. The second system allows for fast fluorescence imaging with optical sectioning, using line-scanning confocal imaging. Using this device, we demonstrated fast (>100 Hz) fluorescence imaging of blood flow and neuronal activity in the brain of freely-behaving mice, with reduced out-of-focus background compared with widefield imaging. In particular, we were able to image the activity of place cells in the hippocampus during sleep and during navigation in a linear track, at 100 Hz and during long sessions (>1hour). We are currently applying this new tool to measure hippocampal dynamics underlying memory formation and consolidation.

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