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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

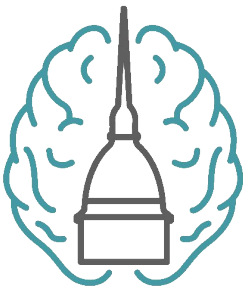
The lecture will last 1 hour and it will be followed by discussion

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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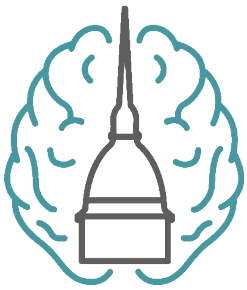
SEMINAR CYCLE

of the PhD in Neuroscience of Turin

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 started 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 (>1 hour). We are currently applying this new tool to measure hippocampal dynamics underlying memory formation and consolidation.