



BRAIN DYNAMICS RELATED TO SHORT-TERM MEMORY AND LEARNING

A TALK BY

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**SEMINARIO
IN MODALITA'
TELEMATICA**

Through the combination of in vivo optical imaging and chronic expression of genetically encoded calcium indicators it is now feasible to directly 'watch' brain activity patterns related to specific behaviors. I will introduce wide-field calcium imaging and multi-fiber photometry as two complementary methods that enable measurements across mouse neocortex and in large sets of subcortical regions, respectively. Specific patterns of brain-wide signal flow that occur in mice performing whisker-based or auditory sensory discrimination tasks will be discussed, highlighting salient patterns related to short-term memory. In addition, taking advantage of chronic measurements over weeks, I will present salient changes in brain dynamics that relate to task learning.



Fritjof Helmchen received his Diploma in Physics from the University of Heidelberg. He completed his PhD thesis in Neuroscience at the Max-Planck-Institute for Medical Research in Heidelberg and received his doctorate from the University of Göttingen in 1996. As a postdoc, Dr. Helmchen worked at the Bell Laboratories, Lucent Technologies, NJ, where he pioneered in vivo applications of two-photon microscopy. He then returned to the Max-Planck-Institute for Medical Research, Heidelberg, heading a junior research group from 2000-2005. In 2005 Dr. Helmchen was appointed Professor of Neurophysiology and Co-Director at the Brain Research Institute of the University of Zurich, Switzerland. Dr. Helmchen's research is centered on the further development and application of imaging techniques for the study of neural network dynamics and neural computations as the basis of animal perception and behaviour.



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