



ONLINE SEMINAR BY DR. MARCO MAINARDI

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Consiglio Nazionale delle Ricerche - Pisa)
March 24th, 2022 - 3:00 p.m.

Zoom link: <https://bit.ly/3N9T3ZU>

Title of the seminar: Understanding learning and memory at the single-synapse scale

Abstract: Plasticity of synaptic connections adjusts the signal flow across neural circuits to support the acquisition and storage of information. Dendritic spines host most excitatory synapses in the brain and incessantly remodel to meet the computational demands for acquisition or recall of new episodic memories, or goal-oriented behavioral schemes.

Despite the obvious physiological importance of synaptic plasticity and its implications in pathological contexts, appropriate tools for the specific analysis of potentiated synapses are scarce. To fulfill this gap, Dr Mainardi has contributed to the creation of genetically encoded tools allowing the expression of virtually every protein of interest specifically at potentiated dendritic spines. This system has been applied to express (i) fluorescent reporters and obtain maps of the distribution of potentiated dendritic spines along the dendritic tree of hippocampal neurons or (ii) a FLAG-tagged version of the PSD-95 postsynaptic hub protein and isolate its potentiation-specific interactome. These data provide a first cartography and molecular fingerprinting of synaptic potentiation triggered by a specific learning task, in addition to paving the way for further studies in models of neurological diseases characterized by impaired learning and memory.