PADOVA
neuroscience
CENTER

30 JANUARY 2025 3:00 pm

SALA SEMINARI VIMM

(Via Giuseppe Orus 2, Padova)

PNC SEMINARS

A talk by Marco Mainardi
(University of Padua)

TOWARDS A CIRCUIT-SPECIFIC CARTOGRAPHY AND MOLECULAR FINGERPRINTING OF SYNAPTIC PLASTICITY

Information storage in the brain, as well as adaptation of neural circuits to external stimuli, rely on restless rearrangement of synaptic connections. Moreover, synapses adjust their strength by varying their molecular composition. Despite the obvious importance of these phenomena, the use of specific tools to study them has been sporadic. Appropriate genetically encoded reporters and probes can help to fill this gap in terms of both imaging and determination of the molecular composition of synapses.

During my talk, I will discuss my most recent effort in this regard, which are based on the *in vivo* use of recombinant proteins for synapse visualization and for the isolation of the synaptome in specific activation states.

By using behavioral paradigms of hippocampus-dependent learning, my results contribute to elucidate whether specific hotspots for synaptic plasticity exist and to determine the changes in the molecular composition of synapses that support learning and memory.

Biography

Marco Mainardi is Associate Professor at the Dept. of Biomedical Sciences at the University of Padua. He graduated, *cum laude*, in Biomolecular Sciences and Techniques in July 2006, under the supervision of Prof.s Lamberto Maffei and Tommaso Pizzorusso. He also obtained, *cum laude*, an Honors Degree (*Diploma di Licenza*) in Biology after completing the *Corso Ordinario* in Biology (2001-2006) at the Class of Sciences of Scuola Normale Superiore, Pisa. He continued his education with a PhD course in Neurobiology at Scuola Normale Superiore (2006-2009) under the supervision of Proff.s Lamberto Maffei, Matteo Caleo and Tommaso Pizzorusso,

Marco Mainardi's research aims at (i) identifying the topography and molecular features of synapses undergoing plasticity triggered by learning and memory through the combination of *in vivo* delivery of gene constructs, confocal imaging, optogenetics and proteomics, in physiological conditions and in animal models of Alzheimer's disease; (ii) understanding the role of environment and lifestyle in promoting synaptic plasticity in brain aging and age-related neurodegeneration.