



***Main research lines:***

- Biophysical properties of glutamate ionotropic receptors (AMPA and NMDA);
- Biophysical properties of Na<sup>+</sup> channels and axonal membrane excitability
- LTP/LTD learning rule and modulation by acetylcholine
- Oscillations and resonance in local microcircuits
- Quantal analysis of synaptic transmission and plasticity
- Determination of excitation and learning dynamics in the cerebellar network
- Animal models of pathology (prion disease, channelopathies)
- VSD imaging and MEA recordings of network activity in situ and in vivo
- fMRI and EEG analysis of the cortico-cerebellar loop in physiological and pathological conditions in humans
- Mathematical modeling of neuronal excitability, synaptic transmission, and network dynamics

***Main techniques:***

- Patch-clamp and calcium imaging in brain slices;
- Extracellular field recording in brain slices and in vivo;
- Voltage-sensitive dye (VSD) imaging in vitro and in vivo
- Multielectrode (MEA) recordings in situ;
- Mathematical modeling of neuronal activity;

***Academic activities***

- Director of the PhD in Physiology and Neuroscience, University of Pavia
- Director elect of the PhD in Biomedical Sciences, University of Pavia
- Director of the Brain Connectivity Center (BCC), IRCCS National Neurological Institute, C. Mondino Foundation, Pavia
- Teaching Physiology, Neuroscience, Neurophysiopathology, Neuronal Modeling, by the University of Pavia
- Editor in Chief of *Frontiers in Cellular Neuroscience*
- Associate Editor of *The Journal of Physiology*
- Associate Editor of *Functional Neurology*
- Member of the directive committee of the Italian Society for Neuroscience (SINS)
- Organizer of the Meeting “Information transfer and computation in the cerebellum: an experimental and modelling approach” (3-5 september 1999, Pavia, Collegio Ghislieri)

- Organizer of the Meeting “The node and the network: the fundamental contribution of Camillo Golgi to modern neuroscience”. Celebrazioni Golgiane, September 2006
- Organizer of the Meeting “The Cerebellum: from neurons to higher control and cognition”, July 2010.