

## EGIDIO D'ANGELO - CV

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### SCIENTIFIC CONTRIBUTION

ED is Full Professor of Physiology at the University of Pavia. At UNIPV, ED is co-chair of the Department of Brain and Behavioral Sciences and is member of the IRCCS Mondino being coordinator of the Brain Digital Neuroscience Centre. ED teaches Human Physiology (Neurology, Pharmacy), Advanced System Neurophysiology (Neurobiology) and Neuroscience (Interfaculty). ED He is director of the “International School of Brain Cells and Circuits ‘Camillo Golgi’”, which is part of the renowned Ettore Majorana Foundation and Centre for Scientific Culture, Erice (Italy). ED coordinates brain research at the international level, spanning from neurophysiology to neurotechnology and medicine and has taken part in 10 European projects (currently in HBP, CEN, TEF-Health) and several National projects of MinSal, MUR and other funding agencies including CARIPLO, Telethon, Regione Lombardia. ED was European coordinator of RealNet (based in IRCCS Mondino) and CerebNet (based in UNIPV). ED has taken part in the Human Brain Project from the very beginning, where he was member of the Scientific Board and is now leader in core sectors for brain modelling. He is chair of the Italian Community of EBRAINS (the European Infrastructure for Digital Brain Research). ED is taking part in 3 PNRR projects: MNESYS (director of the UNIPV unit), EBRAINS-Italy, and CN1. During the years, ED was president and organizer of international events (including the Golgi Centennial Symposium and the meeting of the Italian Physiological Society) and have been invited as a speaker by several academic institutions and meeting organisers (recently FIL-UCL, CERN, Rimini meeting, CAETS, ISMRM).

ED has been and is covering important institutional and coordination roles, including participation to the Centro Fermi of Rome and to the Commissione Programmazione Ricerca (MUR), has been president and organizer of several national and international meetings (including the Italian Physiological Society), has been invited speaker in several national and international institutions and meeting (recently UCL, CERN, Rimini meeting, CAETS, ISMRM), is Editor of scientific journals (former Journal of Physiology associate editor, current Frontiers in Cellular Neuroscience field editor).

ED has a long-standing track record in brain research, keeping the cerebellum as a core subject, to understand neuronal functions, synaptic plasticity, circuit computation and brain dynamics (Nature Neurosci. 2001; TINS 2009; Science, 2019; TINS 2022). ED pioneered patch-clamp recordings in brain slices (Nature, 1990; Cell 2006), then modelled neurons and microcircuits (J. Neuroscience 2001; Neuron, 2006; Nature Comm, 2016; Nature Comm. Biol 2020a,b) and developed closed-loop simulators with spiking cerebellar networks embedded into robotic controllers and neuromorphic hardware (PLOS, 2015; Frontiers, 2020a,b,c). More recently, with his team, ED applied virtual brain modelling to analyse MRI functional and structural data (Sci. Rep, 2017; TINS 2022; BiorXiv, 2023) and generated the Brain Scaffold Builder, a multiscale modelling framework integrated into EBRAINS (Nature Comm. Biol. 2022).

ED has been core partner and co-director in the European flagship Human Brain Project (HBP - 2020 Framework Programme for Research and Innovation under the Framework Partnership Agreement No. 650003), aimed at bridging cellular-molecular research with integrative neuroscience through computational models and advanced ICT technologies. This HBP activity involves world-wide collaborations on MRI (UCL, UK), BOLD signal (AMRITA University, India), closed-loop robotic simulators (Neuroengineering Department of Politecnico di Milano and Scuola Superiore Sant'Anna, Pisa), recordings in vivo (University of Jerusalem, Israel), neuronal modelling (Cajal Institute, Madrid), Virtual Brain Modeling (CNRS, Aix-Marseille; Charite, Berlin), Medical Informatics (EPFL, Lausanne). The current proposal leverages on this multi-level research approach by integrating biomedical information into highly detailed computational models to generate new neuromimetic computation technologies, thereby fostering new analytical processes for big data and deep learning and advanced applications in biomedical research.

### **ACADEMIC ACTIVITY**

- Full Professor of Physiology
- Director of the Neurophysiology Unit and vice-director of the Department of Brain and Behavioral Sciences, University of Pavia. The unit hosts the three laboratories of molecular-cellular neurophysiology, computational modelling and brain imaging (MRI) and modelling.
- Founder and coordinator of the Doctoral Course in Biomedical Sciences, University of Pavia, which graduates about 20 students each year.
- Director of the School for Brain Cells and Circuits "Camillo Golgi" of the Centro Ettore Majorana for Science and Culture (Erice, Italy)
- Teaching in Physiology, Neuroscience, Neurophysiology of integrated systems

### **COORDINATION ACTIVITY**

- Founder and Director of the Brain Connectivity Centre (BCC) at University of Pavia-IRCCS Mondino, which is a new multidisciplinary centre for integrated neuroscience research.
- Member of the Scientific Directory Board of Human Brain Project (SIB) of Human Brain Project (EU), where he is co-Leader of subproject WP1 "Brain modelling" and leader of several tasks and subtasks.
- Member of the Centro Fermi for Physics (Ministry of Internal Affairs, Rome)
- Member of "Commissione Programmazione Ricerca" (MUR).
- Past member of the Directory Board of the Italian Neuroscience Society.
- Past member of the Directory Board of the Italian Physiological Society.
- Past member of the Physiological Society (UK)
- Scientific ambassador of the European Cerebellum Consortium
- Chair of the EBRAINS Italian Community

### **EDITORIAL ACTIVITY**

- Field Editor of Frontiers in Cellular Neuroscience 2013-now.
- Past Associate Editor of The Journal of Physiology (London) 2009-2013
- Editor of a special topic on Journal of Physiology
- Editor of 6 special topics on Frontiers in Cellular Neuroscience
- Editor of the textbook "Fisiologia" (Edi-Ermes) and of several book chapters.

### **RESEARCH PROJECTS**

EUROPEAN PROJECTS. PI of 10 European projects and European coordinator of 2 of them (REALNET and CEREBNET) devoted to the experimental and computational analysis of cerebellar circuits. Currently in:

- EBRAINS 2.0
- Virtual Brain Twins
- HBP
- CEN
- TEF-Health

NATIONAL PROJECTS. National coordinator of research projects of

- Ministry of Research of Italy (PRIN)
- Ministry of Health of Italy (Ricerca Finalizzata)
- Centro Fermi, Progetto "Brain"
- Regione Lombardia, Progetto Cancer and Brain (UNIPV coordinator)
- PNRR EBRAINS-Italy (UNIPV coordinator)
- PNRR MNESYS (UNIPV coordinator)
- PNRR CN1

#### **KEYWORDS**

NMDA receptor, synaptic transmission, synaptic plasticity, cerebellum, granule cells, Golgi cells, Purkinje cells, electrophysiology, patch-clamp, calcium imaging, two-photon microscopy, mathematical modelling, optogenetics, multielectrode array recordings, spiking neuronal networks, neurorobotics, MRI, brain modelling.