

Assistant Professor in:

CELLULAR NEUROPHYSIOLOGY (RTDA – BIO/09),

NEUROCOMPUTATION (RTDA - ING-INF/06),

NEUROIMAGING AND BRAIN MODELLING (RTDA – BIO/09)

Three Assistant Professor (RTD-A) positions are open by the *University of Pavia* on the PNRR (National Plan for Recovery and Resilience - Next Generation EU) -PE Neuroscience project “**MNESYS**- A multiscale integrated approach to the study of the nervous system in health and disease.”

WORKING ENVIRONMENT

The Assistant Professors will work in the Neurophysiology Unit of the Department of Brain and Behavioural Sciences (University of Pavia, Italy, <https://web.unipv.it/>). The Neurophysiology Unit is comprised of three main laboratories (Cellular Neurophysiology, Neurocomputation, Neuroimaging and Brain Modelling) and generates state of the art concepts, models, and theories about brain functioning. The research unit has a specific expertise in the study of neurons and circuits of the cerebellum in health and disease and is actively investigating multiscale brain processing in the experimental animal and humans. An overview of laboratory activities and organization can be found at <https://dangelo.unipv.it/>. The post holder will take part to the PNRR “MNESYS” project and collaborate with other international and national projects (including Human Brain Project, TEF-Health, PNRR-EBRAINS, PNRR-ICT) running in the research unit. The three new associate professors will interact together and with the rest of the team to generate multiscale data and models of brain function and dysfunction.

CELLULAR NEUROPHYSIOLOGY (RTDA - BIO09)

The research will address central nervous system activity in physiological and pathological conditions in mice. The recording techniques will cover cellular neurophysiology *in vitro* (patch-clamp, hd-MEA, 2-photon multi-spot calcium imaging) and *in vivo* (micro-endoscopic calcium imaging, MEA) integrated with optogenetics and histological and molecular determinations. The work will consider specific neuropathological conditions (including cerebellar ataxia, dystonia, paroxysmal dyskinesia, autism) in mice bearing specific gene

mutations. The experiments will be complemented with construction and validation of computational models of neurons and circuits in other sections of the research unit.

NEUROCOMPUTATION (RTDA - ING-INF/06)

The research will address simulations of central nervous system function and dysfunction by developing multiscale computational models, focusing on detailed neuronal micro-circuits and meso-scale circuits. The models will be transformed into simpler forms (e.g., spiking neural networks and mean field models) to be integrated into virtual brain models in other sections of the research unit. The models will be constructed and validated using rich multimodal datasets (including those produced by MNESYS) to simulate a set of neuropathological conditions (including cerebellar ataxia, dystonia, paroxysmal dyskinesia, autism).

NEUROIMAGING AND BRAIN MODELLING (RTDA - BIO09)

The research activity of the post holder will concern the analysis of large scale signals acquired with multi-modal imaging methods, including MRI, to study brain function. The post will require a deep understanding of quantitative MRI methods and develop potential integration of features in realistic computational models of brain function and dysfunction. The researcher will also be engaged in MRI protocol development and acquisition to acquire cutting edge data for model parameterization and validation. The work will address specific neuropathological conditions in the spectrum of neurodegenerative, neuroinflammatory and mood disorders.

DETAILS ON THE CALL

The official call will appear on *"Gazzetta Ufficiale della Repubblica Italiana"* and on the website of the University of Pavia in the next few weeks (<http://www-5.unipv.it/alboufficiale/>).

Expected starting date: 1 March 2023. Duration: three years that can be extended for other two years. The contract for three years is € 152,247.90 including social security costs and IRAP (regional taxes). The potential academic progression occurs through RTT (Assistant Professor in tenure track), scientific qualification ("abilitazione"), Associate Professor etc.

The evaluation of candidates will include CV, publications, reference letters, oral discussion including English language assessment.

CONTACT AND INFOS

Any details about the call, research activity and specific projects and arrangements will be discussed with the applicants. Curriculum Vitae, reference letters and other inquiries should be emailed to dangelo@unipv.it.