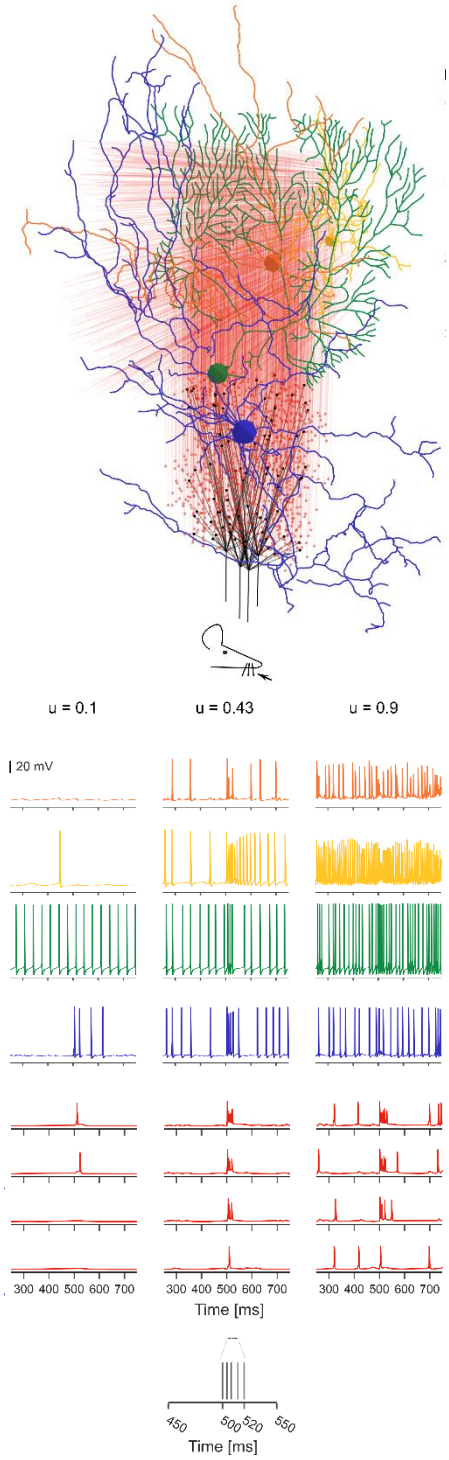
POSTDOC
CELLULAR NEUROPHYSIOLOGY

Experimental and modelling investigation of sodium channel dysfunction in the cerebellum to determine the basis of PRRT2 paroxysmal disorders.

Infos at: https://dangelo.unipv.it/



Working environment: the postdoc will work in the Neurophysiology Unit headed by Prof. Egidio D'Angelo in the Department of Brain and Behavioural Sciences (University of Pavia, Italy), which generates state of the art concepts, models and theories about brain functioning. The research focuses on the multiscale organization of the brain addressing the impact of microscopic mechanisms of the cerebellar circuit on physiology and pathology.

This PRIN project of the Italian ministry of Research will be carried out in close collaboration with the European projects (EBRAINS, TEF-Health, CEN, Virtual Brain Twin) and Italian projects (PNRR-EBRAINS, PNRR-ICT,) running in the research unit. Expected start: January-March 2024. Duration: 2 years.

Project: The cerebellum is gaining attention for its primary involvement in the physio-pathogenesis of several neurological diseases. In the motor domain, in addition to ataxia, also forms of dyskinesia resembling epileptic seizures are known to involve the cerebellum. The identification of the molecular and cellular basis of these pathologies can be effectively investigated in animal models bearing mutations imitating those occurring in humans. In this project, we will use PRoline-Rich Transmembrane protein-2 (PRRT2) KO mice showing paroxysmal kinesigenic dyskinesia. We will combine experimental measurements with detailed biophysical computational models to understand how PRRT2 KO alters GC firing and microcircuit computation. The experiments will be carried out in acute mouse cerebellar slices using state of the art technologies based on high-density multi-electrode array recordings (Biocam2- 3BRAIN) and multispot 2-photon calcium imaging (Femtosmart - FEMTONICS), which allow to map circuit alteration at the multicellular level. This work will provide a deeper understanding on the pathophysiology of paroxysmal kinesigenic dyskinesia, providing new cues to ameliorate the course of the disease through specific therapeutic interventions.