



P A D O V A  
**neuroscience**  
C E N T E R

**11 APRIL 2024 3:00 pm**

**SALA SEMINARI VIMM**

(Via Giuseppe Orus 2, Padova)

# **PNC SEMINARS**

**A talk by Arianna Menardi (University of Padova)**

## **INTERINDIVIDUAL DIFFERENCES IN THE FUNCTIONAL CONNECTOME AT REST: FROM PERSONALIZED APPROACHES TO BIOMARKERS OF COGNITIVE FITNESS**

The study of the functional connectome allows us to understand the routes of information flow in the brain. When applied to the single subject level, it enables us to map how differences in the region-to-region communication translate into differences in cognitive functioning. In light of this, we are witnessing a shift in the literature, gradually moving from group-level inferences to the study of interindividual differences. Most importantly, the emergence of concepts such as those of Precision Medicine are further pushing the new frontiers in Research towards that of highly individualized protocols in light of the individual clinical-biological makeup. Within this framework, I will present several studies that we have conducted in which the anatomy and functional connectome of the individual were employed to i) personalize stimulation protocols; ii) understand the degree of heritability of the functional connectivity; iii) relate topological efficiency to cognitive fitness. Furthermore, I will overview the importance of resting state activity, challenging its view as solely reflecting baseline activity in the brain, but rather as a biomarker of both high order functioning and pathology, such as in Alzheimer's Disease.

## Biography

Arianna Menardi works as a Researcher (RTD-A) at the Department of Neuroscience, University of Padova.

During her career, she collaborated with several national and international research groups. In 2017, she joined the Berenson-Allen Center for Non-invasive Brain Stimulation at Harvard Medical School, where she worked under the Supervision of Prof. Alvaro Pascual-Leone and Dr. Emiliano Santarnecchi in studying cortical excitability (as assessed by Transcranial Magnetic Stimulation-TMS) in Alzheimer's Disease patients. In 2018 she joined the Brain Investigation and Neuromodulation Lab in Siena, where she worked on network-targeted interventions by means of multi-electrodes transcranial electrical stimulation (tES) during concomitant functional magnetic resonance imaging (fMRI), under the supervision of Prof. Simone Rossi and Dr. Emiliano Santarnecchi. In 2019 she started her PhD at the Padova Neuroscience Center, under the supervision of Prof. Antonino Vallesi, Prof. Maurizio Corbetta and Dr. Emiliano Santarnecchi. Her PhD project focused on the study of interindividual differences in the brain topographical properties for the selection of personalized stimulation targets in the brain. Collaborators to this project included Prof. Marie Banich and Prof. Naomi Friedman for the University of Colorado Boulder, Prof. Albert-Laszlo Barabasi and Dr. Emma Towlson from the Northeastern University, in Boston.

More recently, Arianna won a Grant for Young Researchers by the Italian Association for Research on Alzheimer's Disease to investigate individual alterations in the functional connectivity as a potential early biomarker of pathology progression.