TITLE: **EEG resting state and cognition in healthy and MCI older adults**

ABSTRACT:

Many EEG studies have explored the effects of aging on brain activity during the resting state (Ishii et al 2017, Miraglia et al 2017). Physiological aging has been characterized as a progressive change in brain wave frequency, power, morphology, and distribution during rest. The present project intends to capture changes in EEG activity and connectivity (Liu et al., 2017; 2018) that underlie healthy neurocognitive aging. This is meant to facilitate the early detection of brain neuropathology, as for instance mild cognitive impartment (MCI). The research work will address healthy and pathological brain aging from a neurophysiological perspective, focusing on oscillatory activity changes during the resting state, functional connectivity between brain regions, and changes in signal complexity.

REFERENCES :

Ishii et al (2017) Brain Aging: Oscillations, Functional Connectivity, and Signal Complexity Neuropsychobiology 11 DOI: 10.1159/000486870

Miraglia F, Vecchio F, Rossini PM. (2017) Searching for signs of aging and dementia in EEG through network analysis. Behav Brain Res. 2017 Jan 15;317:292-300. doi: 10.1016/j.bbr.2016.09.057. Epub 2016 Sep 28. Review.

Quanying Liu, Seyedehrezvan Farahibozorg, Camillo Porcaro, Nicole Wenderoth, Dante Mantini (2017) Detecting large-scale networks in the human brain using high-density electroencephalography. Hum Brain Mapp. 2017 Sep;38(9):4631-4643. doi: 10.1002/hbm.23688.

Quanying Liu, Marco Ganzetti, Nicole Wenderoth, Dante Mantini (2018) Detecting Large-Scale Brain Networks Using EEG: Impact of Electrode Density, Head Modeling and Source Localization Front Neuroinform. 2018; 12: 4. Published online 2018 Mar 2. doi: 10.3389/fninf.2018.00004

PARTICIPANTS:

PI: Patrizia Bisiacchi

Co-PI: Dante Mantini

EXPERIMENTAL DATA:

To be acquired	x
Already acquired (ready to be used)	

We will enroll a total of 60 participants (30 healthy elderly and 30 patients with MCI) matched for age, gender, and scholarity. These participants will be recruited at the IRCCS San Camillo Hospital in Venice.

Behavioural and brain imaging measurements will be performed at the IRCCS San Camillo Hospital. A battery of cognitive tests will be carried out, including neuropsychological assessment and some computerized tests. High-density EEG measurements will be performed using a 128-channel system (BrainAmp, BrainProducts, Germany) with active electrodes with impedance conversion (ActiCAP, BrainProducts). For each participant, a structural image of the head will be obtained using a 3T Philips Ingenia scanner. Advanced EEG analyses will be based on in-house software for artifact removal, head modelling, source localization and connectivity analysis (for details see Liu et al., 2017; 2018). After deriving EEG activity and connectivity measures at the source level for each participant, we will conduct statistical analyses, testing for differences across the experimental groups (ANOVA, with post-hoc tests). We will also relate these EEG measures with cognitive performance using general linear models.

ETHICS COMMITTEE:

Obtained	
Conditioned submission*	Expected time response (in months):
Not required	

* request will be submitted only if a PhD student will be associated to the project