

# Math & Brain seminars



## Matematica e Cervello

**Thursday 02/05/24 - 17:00**  
**Room 1A150**

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## **Statistical approaches for understanding the brain through electrophysiological data: an overview**

Most brain functions are regulated by intercorrelated electrical currents flowing in few specific brain areas. Magneto- and electro-encephalography (M/EEG) are two modern neuroimaging techniques capable of non-invasively recording the electromagnetic field produced outside the scalp by these neural currents with an outstanding temporal resolution. Interpreting the recorded M/EEG data is not straightforward and advanced mathematical and statistical techniques are required to estimate the dynamical brain activity that has generated the measured data. A typical workflow of analysis consists of two steps: (i) first the active brain regions and their time-courses are estimated by solving an ill-posed inverse problem (ii) then proper statistical metrics are computed to estimate functional connectivity, i.e. to quantify the statistical dependencies between the time-courses reconstructed at different brain locations.

The aim of this talk is to provide some insights on modern statistical tools for facing and optimizing such a workflow.

### **Organizers**

**S. De Marchi, W. Erb, M. Formentin, V. Franceschi,  
F. Marchetti, R. Monti, F. Rinaldi**