The ROIconnect plug-in

ROIconnect plugin

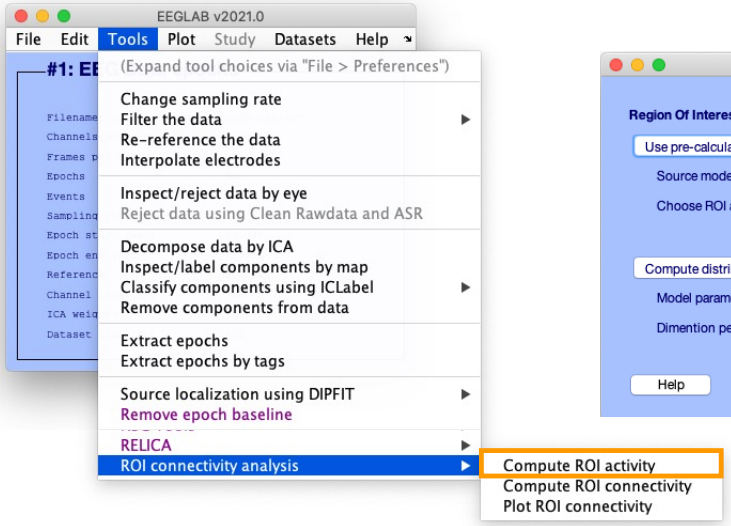
Stefan Hauffe

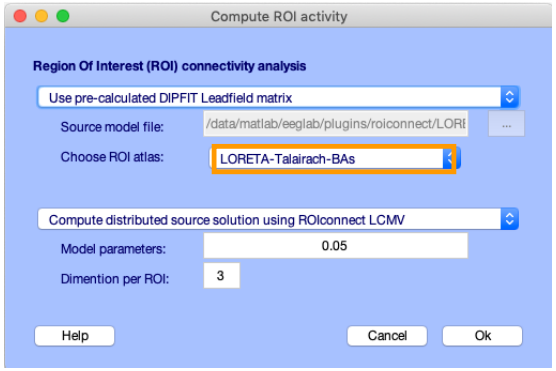
Franziska Pellegrini

Identifying best practices for detecting inter-regional functional connectivity from EEG

Franziska Pellegrini, Arnaud Delorme, Vadim Nikulin, Stefan Haufe

doi: https://doi.org/10.1101/2022.10.05.510753





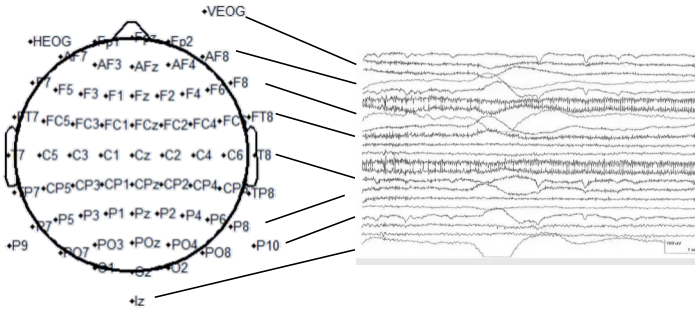
→ Leadfield matrix

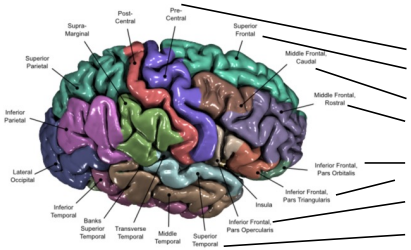
→ Atlas for ROIs

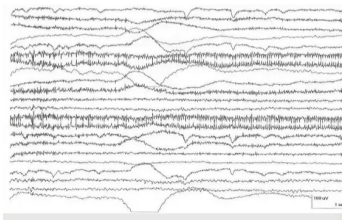
→ Method

Channel space

ROI space



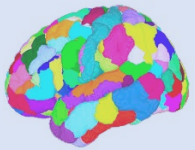




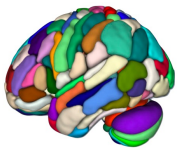
Connectivity analysis using ROIconnect

Volumetric atlases

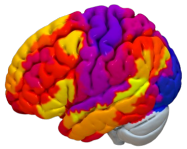
AFNI MNI



Brainnetome

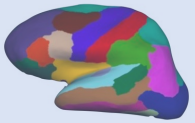


Schaefer 2018

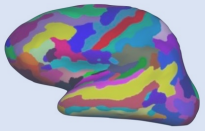


Surface atlases

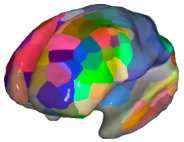
Desikan Kiliany

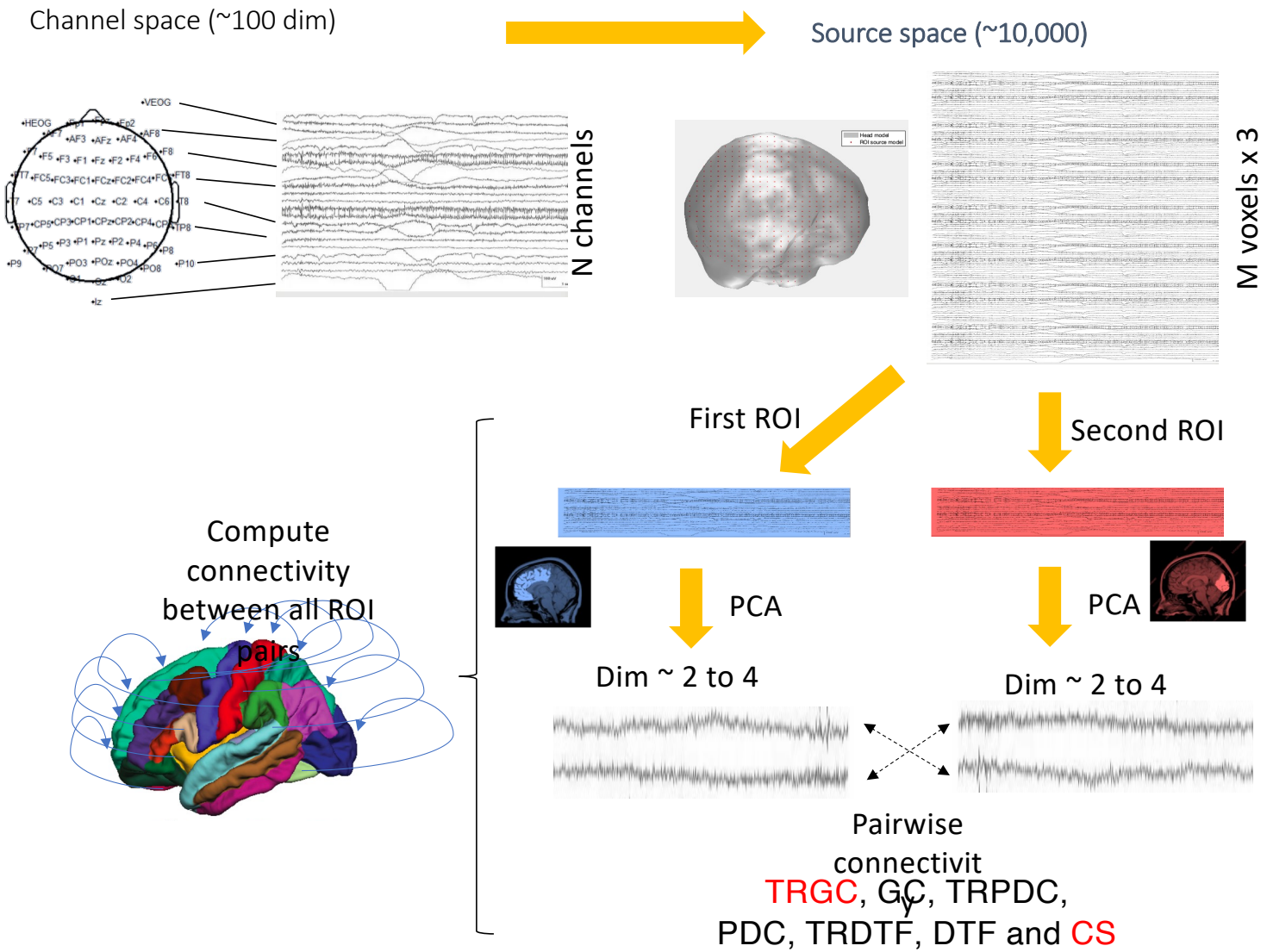


Destrieux

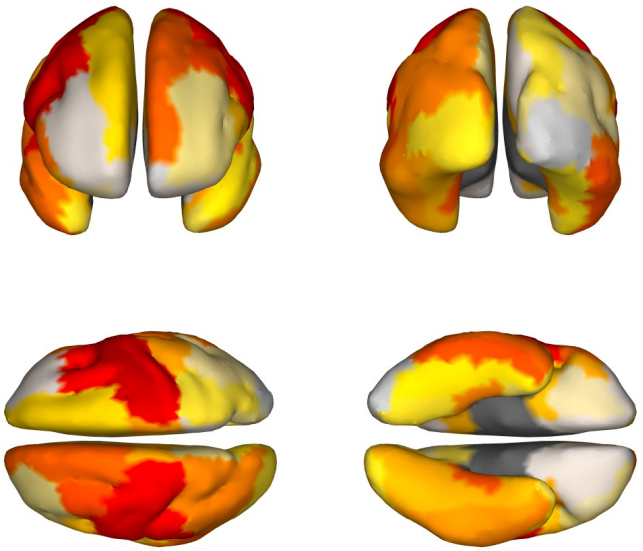


PrAGMATiC

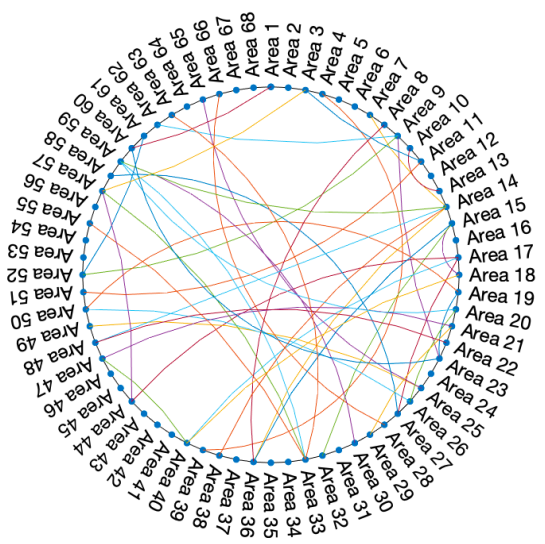



Channel space (~100 dim)
Source space (~10,000)
N channels
M voxels x 3
First ROI
Second ROI
PCA
PCA
Dim ~ 2 to 4
Dim ~ 2 to 4
Compute connectivity between all ROI pairs
Pairwise connectivit
TRGC, GC, TRPDC,
PDC, TRDTF, DTF and CS

Red regions are highly interacting

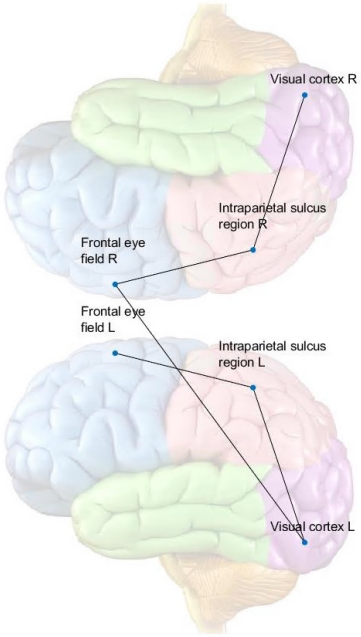


Connectivity matrix between 68 ROIs

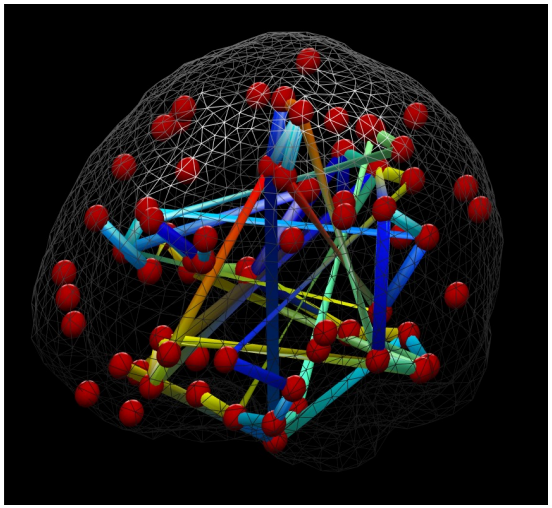


https://github.com/arnodelorme/roiconnect

2-D representations



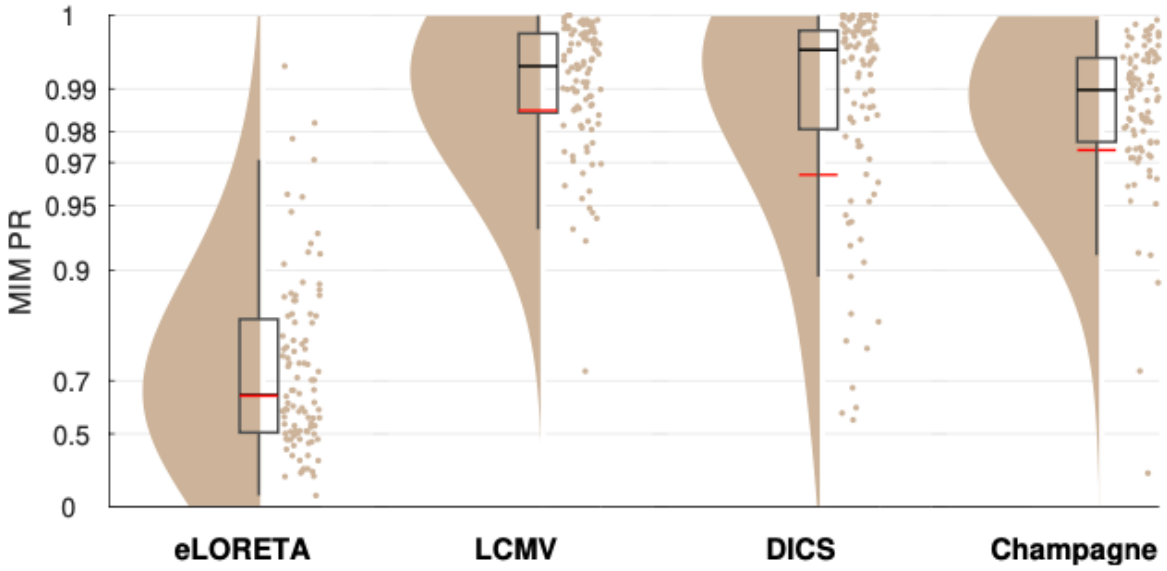
3-D representations



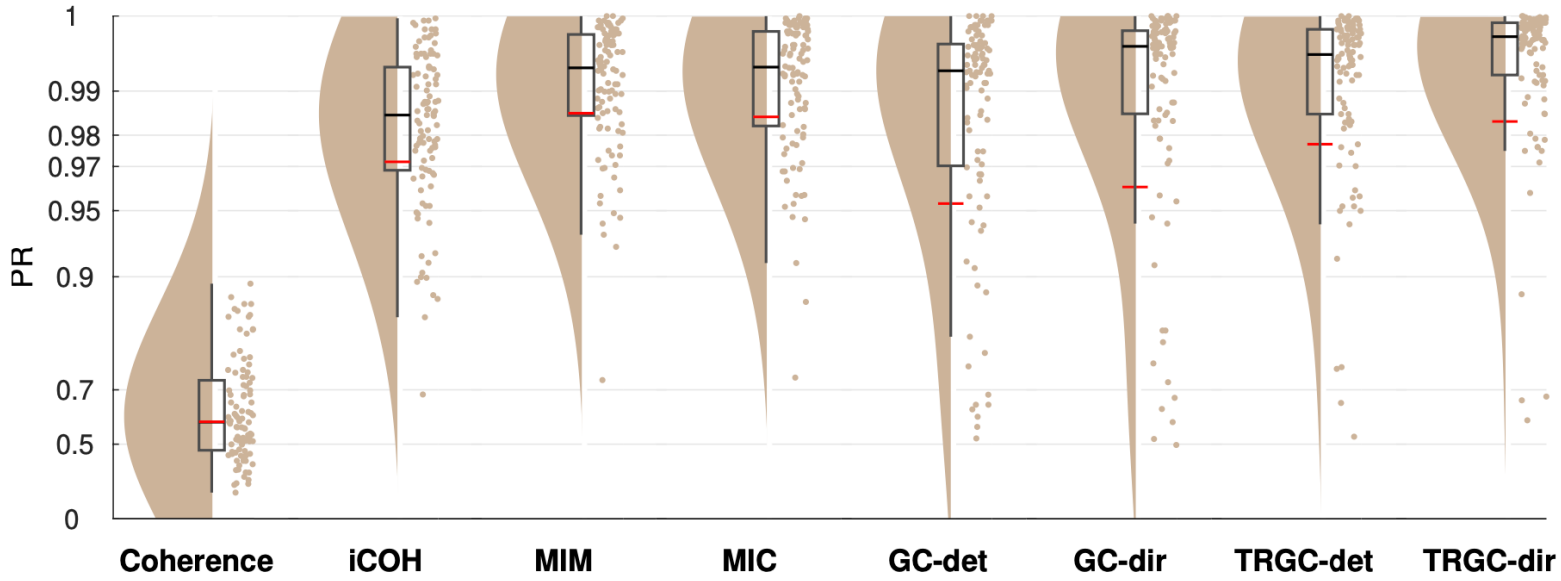
Data intake

- Stationary continuous data
- About 100 Hz
- 2 second data chunks (or epochs)
- Same length of data for each condition
- No dynamics – static image

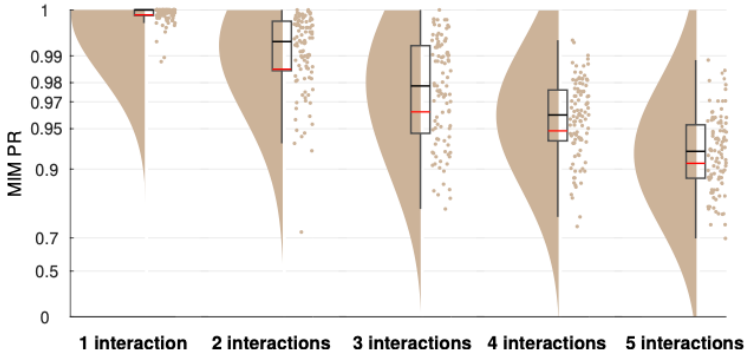
Inverse method



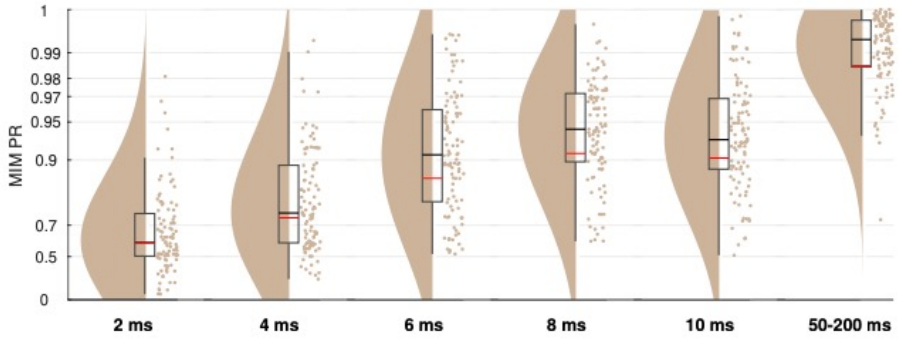
Connectivity method



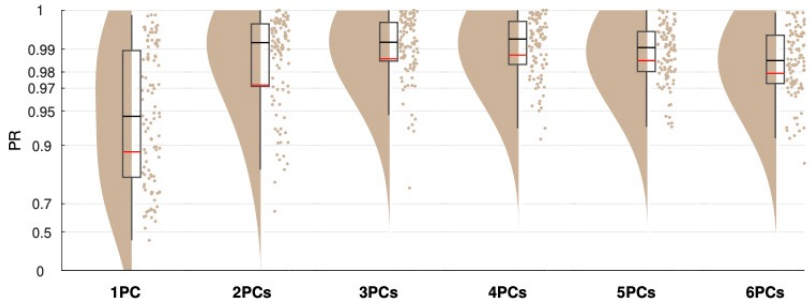
Number of interactions



Delay between sources

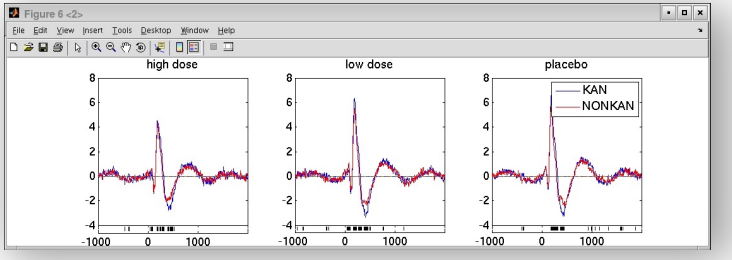


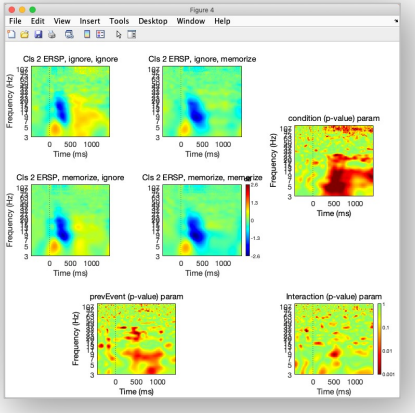
Number of PCA comp.



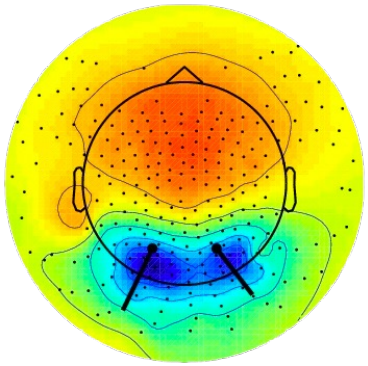
ROIconnect future

- STUDY & statistics





- More validation
- Comparison with SIFT



The END