



# INSTRUCTIONS TO PROCESS AND ANALYZE cGICA RESULTS

To analyze the results of RSN extraction with cGICA, the following steps will be followed:

1. cGICA rs-networks Denoising
2. Non parametric statistical test for the two groups with SnPM
3. Identification of statistically significant areas
4. Signal extraction (sFC and dynFC matrix)
5. Extraction of graph metrics
6. Mixed ANOVA for the dyn-FC graph metrics

All the scripts and guidelines are in:

[https://github.com/keveenrodz/gruneco\\_rsfMRI\\_connectivity](https://github.com/keveenrodz/gruneco_rsfMRI_connectivity)

## Tools:

### Programming languages

1. Matlab
2. Python 3.x

### Matlab toolbox:

1. SPM (<https://www.fil.ion.ucl.ac.uk/spm/software/spm12/>)
3. SnPM (toolbox for SPM) (<http://www.nisox.org/Software/SnPM13/>)
4. XjView (<https://www.alivelearn.net/xjview/>)
5. GREYNA (<https://www.nitrc.org/projects/gretna/>)

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## Python packages:

1. Install requirements.txt

**NOTE:** Install all Python packages in a virtual environment

We will give some tutorials and some scripts to work with, in this document the instructions of which steps goes first will be given.

## First steps:

This commands only work under UNIX/Linux  
It is similar for Windows

```
python3 -m venv /path/to/new/virtual/environment
git clone
https://github.com/keveenrodz/gruneco_rsfmri_connectivity.git
cd path/gruneco_rsfmri_connectivity
source /path/to/new/virtual/environment/bin/activate
python3 -m pip install -r requirements.txt
```

## 1. DENOISING

Jupyter NB should be run [Denoising\\_rsn-fMRI.ipynb](#)

## 2. NON PARAMETRIC STATISTICAL TEST

SnPM is a SPM toolbox that must be installed and an script named [SnPM\\_TwoSampT](#) will be given to use in Matlab.

## 3. IDENTIFICATION OF STATISTICALLY SIGNIFICANT AREAS

A link and instructions for XjView installing will be given in the tutorial: "[Identification of the statistically significant areas protocol](#)", this has the step by step of the process.

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#### **4. SIGNAL EXTRACTION (FUNCTIONAL CONNECTIVITY MATRICES)**

An script will be give to be run in Python with Jupyter.  
(Comming soon)

#### **5. EXTRACTION OF GRAPH METRICS**

A link and instructions for GRETNA installing will be given in the tutorial: tutorial with the step by step of the process will be given, the name of the tutorial is: “Graph metrics extraction protocol”, this has the step by step of the process.  
(Comming soon)

#### **6. STATISTICAL ANALYSIS OF GRAPH METRICS WITH MANOVA**

An script will be give to be run in Python with Jupyter.  
(Comming soon)