**PyNetStim: *Brain Network Stimulation in Python***

*Pynetstim* is aiming to create an integrated framework for brain network stimulation and stimulation targeting.

**Major goal**

The main goal of *pynetstim* is to provide an integrated framework for individualized brain network stimulation by **combining multimodal imaging, computational modeling and simulation.**

**Minor goals:**

1. Visualization
   1. Stimulation targets
   2. TMS coil stimulations post TMS session
   3. Overlaying multimodal maps to guide brain stimulation
2. **Post stimulation session analysis**

**Implementation goals:**

1. The imaging analysis should be implemented using ***nipype*** to make the pain of going back and forth between different software less and make the package more seamless and standalone.
2. Let’s first start from the most important features and then go into fancy implementations.

# Visualizations

## Implemented features

Pynetstim heavily depends on Pysurfer and Mayavi for its visualization. Up to now, several features have been implemented:

1. Visualization of target points on brain surfaces generated using Freesurfer.

**TMS electrical field simulation**

## Simnibs

## I have been successful in making automatic simulation with simnibs to work. Simply, download simnibs. Under Python\_module/src install simnibs using “pip install .”. Then go to simulation/getdp and try to find solve function. Change getdp\_bin to the location of where simnibs getdp lives ( for instance: /Users/stadayon/simnibs\_2\_1\_1/bin/getdp).

## Follow the instructions under python\_examples to set up your simulation. You can use “S.map\_to\_surf = True, S.map\_to\_vol=True” to map the results to surface and volume.

* + - 1. **Post stimulation session analysis**

Brainsight gives all the data regarding TMS stimulation coordinates after the session. These data can be used and several measures can be extracted. These measures can be used to (i) give a summary of TMS session, (ii) give a summary of accuracy for different stimulation sites, (iii) give a summary of experimenter performance, …

**Modules**

* **TMS session**
* **Experimenter**

## Experimenter

For an experimenter, these measures can be extracted:

* Distance from target site
* Number of attempts to correct oneself
* How long does it take to correct oneself?
* How picky is the experimenter to correct inaccuracies (obsession measure)?
* Effect of exhaustion on stimulation accuracy

Based on such measures, we can:

Classify the experimenter to a certain group (e.g. novice or expert, obsessive or non-obsessive)

Classify stimulations into groups based on possible guess of experimenter

Provide a summary of experimenter performance

Provide a learning curve and improvement of experimenter performance.