**How to install fMRI Toolbox in Matlab**

**Please perform the following 5-Steps in order.**

1. Download 2014\_07\_30\_fmriTB.zip (from website …..)
   1. (Linux/Mac) E.g.: /home/user\_B/jess/test/
   2. (Windows) E.g.: C:\home\jess\test\
2. Unzip in saved folder
   1. (Linux/Mac) E.g. From Bash shell type: unzip 2014\_07\_30\_fmriTB.zip
   2. (Windows) unzip with installed software to decompress zip archive.
3. Start up Matlab
4. At Matlab command prompt (>>) change directory into folder fmriTB\_v1 unzipped into.
   1. (Linux/Mac) E.g. From Matlab prompt type: >> cd /home/user\_B/jess/test
   2. (Windows) E.g. From Matlab prompt type: >> cd c:\home\jess\test\
5. At Matlab command prompt add toolbox to Matlab PATH
   1. E.g.: >> addpath(genpath(pwd));

**Using newly installed fMRI Toolbox**

**All the functionality in this toolbox is executed using the run\_fMRI\_ts function. To fully understand how to use all the functionality the fMRI toolbox please use the help command.**

1. **E.g. from the Matlab command prompt type: >> help run\_fMRI\_ts**

**For example, you would like to calculate the modularity consensus values for a group of 4 subject IDS. For this calculation the number of iterations is 100 and tau is 0.5 (number of iterations and tau are required values). Additionally, you want to filter the timeseries data. For this operation you want to use and FIR 10-tap Bandpass filter, and you know the cutoff frequencies (lower and upper) are 0.01 and 0.1.**

**First, load into Matlab your group timeseries data. The data must be in the following format:**

1. **Must be a Matlab cell (i.e. array), where the number of elements equals the number of subjects. For instance, if you have 4 subjects, the Matlab cell should have 4 elements (i.e. its length should equal 4).**
2. **Each Matlab cell defines a structure with the following fields:**
   * **ID (unique id that identifies the subject)**
   * **TS (timeseries data)**
   * **Nodes (number of timeseries nodes)**

**Notes:**

* **The timeseries data defined by the TS field may be filtered or unfiltered. In this example we filter the raw data, however the data may already be filtered, therefore filtering may not be required.**
* **The TS field defines a matrix (i.e. m x n, where m = # of rows and n = # of columns).**
* **Each column in the TS matrix represents a node (i.e. region in the brain)**
* **Each row in the TS matrix represents a discrete time point.**
* **If any column vector in the TS matrix has all zeroes, then this column will be removed prior to any calculation. Furthermore, If after this all zero column is removed the TS matrix *has any* *other zero values* (i.e. random zero values throughout the matrix), the function will immediately error and terminate.**
* **The Nodes field value must equal the number of columns in the TS matrix.**

**Second, let’s create a Matlab structure named** **opts (short for options) that defines the filename and filter parameters for our calculations. From the Matlab command prompt type:**

**>> opts.f\_l=0.01;**

**>> opts.f\_h = 0.1;**

**>> opts.type = ‘fir’;**

**>> opts.n = 10;**

**Third, let’s create a Matlab structure name concensus (this can be named anything – i.e. doesn’t have to be consensus. For more information use help function referenced above) that defines the type of calculation and its required parameters.**

**>> consensus.name = ‘consensus’;**

**>> consensus.reps = 100;**

**>> consensus.tau = 0.5;**

**Lastly, execute the run\_fMRI\_ts function from the Matlab command prompt as follows:**

**>> run\_fMRI\_ts( data, opts, consensus );**

**Where data is a Matlab cell that contains the subject information. For instance, from the Matlab command prompt if you type data and hit return something similar to what is shown below will be displayed.**

**>> data**

**data =**

**[1x1 struct] [1x1 struct] [1x1 struct] [1x1 struct]**

**Likewise, from the Matlab command prompt if you type data{1} and hit return something similar to what is shown below will be displayed.**

**>> data{1}**

**ans =**

**ID: 'ts\_RQ8147'**

**TS: [225x156 double]**

**Nodes: 156**

**When the run\_fMRI\_ts function completes, you will see a file named**

**consensus\_spreadsheet\_07-28-2014\_13-36-56.csv**

**on your file system.**

**The name of this newly created file includes: 1. the name of the measure, and 2. the data and time the measure was calculated. In this example, consensus is the measure and the calculations were performed on July 28th 2014 at 1:36:56 pm.**

**Note: if multiple measures were calculated (i.e. consensus, betweenness, and strength), a spreadsheet would be created for each one, i.e. on the your file system you should see the newly created csv files.**

**consensus\_spreadsheet\_07-28-2014\_13-36-56.csv**

**betweenness\_spreadsheet\_07-28-2014\_13-36-57.csv**

**strength\_spreadsheet\_07-28-2014\_13-36-58.csv**