**Notes on NIRx and spm\_fnirs data processing:**

1. Do preprocessing using nirx commands I’ve supplied. See example script called script\_optode\_corrections.m.
2. Use modified spm\_input on newer Matlab versions than 2013
3. Convert the final output from step 1 using spm\_fnirs\_read\_nirscout.m. You get a NIRS.mat file.
4. Open your \_chstats.mat file in matlab (output from line 1), click into the structure ch\_stats and double click the“dist” variable, then copy the column of S-D distances
5. Start spm\_fnirs. In the graphic menu, select Convert. Select the NIRS.mat file. Answer questions.
   1. For wavelengths, enter 760 850 with a space between the numbers
   2. For distances, Ctl+V or Opt+V paste the numbers from step 4.
   3. Accept defaults
6. In temporal processing button option, select:
   1. MARA yes: Enter 5 seconds for window, keep other defaults.
   2. Resample no.
   3. Bandstop filter no.
   4. Detrending: yes, accept default = 128
   5. Smoothing: no
7. In spatial processing button, you have to fool spm\_fnirs into thinking that your data are individual coordinates, not already MNI. To do so, follow the directions for the individual registration in the manual, not the MNI registration, **even if you are supplying MNI coordinates!** In other words, give it the reference\_positions.csv, optode\_positions.csv and ch\_config.txt files.
8. Before 1st level stats, use the nirx\_condition\_gui.m script to save a convenient file for the statistical design. Answer “seconds” not “scans” for units.
9. For 1st level stats:
   1. Select NIRS.mat and a directory for the SPM output
   2. Select HbO, HbR, or HbT to analyze
   3. Choose to specify your design from a file – select the name of the .mat file you saved from step 8.
   4. Select regressors if you have them, otherwise leave 0
   5. Select AR(1) to reduce autocorrelation, or not if you are not concerned (NOTE: this will decrease your power at the first level AND will increase the time of the estimation step significantly)
   6. Select hrf for response function (FIR may be appropriate for event-related designs)
10. Estimate your design, selecting the SPM.mat file in the appropriate directory.
11. When you select results button and the appropriate SPM.mat file the first time, you will experience a long delay before getting much visual feedback. Don’t be tempted to click around. Just check the matlab command window to make sure there isn’t an error. It should say something like “Interpolate parameters & estimate smoothness...” for a while, then it will say “Spatial non-sphericity (over scans) : …done”, but it is still not done! Be patient. In fact, it will repeat this message 5-6x. Eventually, it will read “Completed.” Then it will pop up a graphic window with a brain for you to proceed. With over 100 channels, expect this step to take 20-30 minutes. After this is done the first time, it will not need to recompute in order for you to see results the next time around.
    1. When you get the graphic popup window, enter your contrasts
    2. Contrast weights should sum to 0 (e.g., [0 0 1 -1 0 -1 1]). Every column of your design matrix needs a weight.
    3. Enter the contrasts in the same order for every subject or you will hopelessly screw up your ability to do group level statistics
12. To generate Nifti-1 format images (2d or 3d) for use in SPM12 second-level statistics, you will need to use the function calls spm\_fnirs\_2dtopo.m and spm\_fnirs\_con3d.m from the Matlab command interface as there is no graphical interface to them yet. This doesn’t have to be done until you are ready for group-wise statistics.