Ben’s over break EEG work

* The current issue with the alpha analysis is that we have an unstable measure of alpha power. After encountering some original issues with Yuqi’s strategy a few months ago, we moved to taking the spectrogram of each trial and “carving out” power 1 hz on either side of the IPAF, and calling that the alpha power trace for that trial. The first thing we noticed about this strategy is that there was smearing in time due to the width of the window used in spectrogram (we observed a rise in alpha power before time zero). Reducing the window size avoids this time smearing, but at the cost of using fewer cycles of alpha in each window to calculate power, and leading to weird results (alpha only rises and falls over 200 ms after cue onset, when the cue lasts 500 ms? Quite odd).
* Barb brought up that the purpose of the spectrogram is to visualize, and we are building in a lot of assumptions by using the “spectrogram” function in MATLAB. Instead, we should use Yuqi’s strategy of using a narrowband filter (2 Hz wide FIR filter centered on IPAF) to get the alpha trace for a given trial. The order of the filter should reflect the number of cycles of alpha we want to use in the power calculation (I’ve gone for at least 6), which gives us lots of control over the signal processing and if there is time smearing, we know how much to expect (namely, the order of the filter divided by the sampling frequency).
* I’ve obtained Yuqi’s code, and will now (12/19) attempt to use her narrow filter instead of the spectrogram. Then, I will plot the time trace average over all trials and channels for each subject.
* I will also plot the topographic layout of z-scored alpha power (NOT normalized again a. la. Wostmann because we don’t need that) and the time resolved alpha power in each condition. I will also plot total alpha during the cue period for each condition.
* Godspeed to me.

REMAINING TO DOS:

* Alpha power and alpha lateralization during cue period as a function of overall d-prime on the task
* Repreprocess first 4 subjects