Butorina Anna

PhD student of Moscow state university of psychology and education.

My practical training was held in MRC Cognition & Brain Sciences Unit in Cambridge from May 4th to June 29th (2013).

The main goal of my training was to learn methods and techniques of magnetoencephalography (MEG) data analysis.

For the training I had already collected set of MEG data. The set contained records from 25 healthy subjects.

Three sessions of MEG recordings were conducted in all subjects. Two of theme were a control sessions, in which the subjects were asked to simply perform the motor task with both hands simultaneously in the first one and with right hand only in the second. The third session was the experimental one, in which subjects were asked to perform the motor task with right hand only in front of the mirror placed between two hands so that subjects could not see their left hand but saw the reflection of the right hand in a place where the left hand should be.

During the training I've learned:

- How to prepare and preprocess the data for farther frequency and time-frequency analysis.
- How to construct analysis pipeline (sequence of calculation steps) with multitapers for spectral analysis and frequency band analysis in time domain.
- The usage of multitaper parameters and drawbacks they can result.
- How to deal with different types of channels to perform an adequate statistics on it.
- Statistical parametric methods built on random field theory for correction of the family wise error which appears in multiple comparison cases. (and MEG data is the case)
- Haw to construct analysis pipeline for Dynamical Imaging of Coherent Sources beamformer method (spacial filter).

- Haw to construct analysis pipeline for Linearly Constrained Minimum Variance beamformer method which necessitate the use of second layer statistic for group analysis.
- Haw to construct analysis pipeline for Bayesian model selection method.

As a result of training I can consider several things:

- At the end of the training period I've got a significant result on a group level which can be published. I observed the significant rise of a gamma (60-90 Hz) band in illusion condition where subject performed the motor task with the right hand in front of the mirror compared to the condition with the simple right hand movement. The difference occurred at the sensor located above the the left sensory-motor cortex. This finding can sustain the actual activation of local parts of the sensory-motor cortex during mirror illusion of movement without the implementation of real movement.
- I've made a report on my data at MEG weekly meeting.
- And I've prepared the draft of methods and results sections for the further paper.

This training was very useful for me. I'm going to use my new skills in my further work in Russia. My practice was sponsored by BioN network.