

## Research opportunities

Cognitive Neurophysiology Laboratory

Department of Neurology

New York University School of Medicine

### Project 1:

#### Development of non-invasive language mapping protocols for clinical use

This project will be concerned with the investigation and development of a clinical Magnetoencephalography (MEG, <http://en.wikipedia.org/wiki/Magnetoencephalography>) protocol for non-invasive language mapping in patients who are about to undergo brain surgery. Localization of brain areas involved in language processing provides important information to neurosurgeons who are planning the resection of brain tissue in neurological patients, for example in those suffering from focal epilepsy. Accurate identification of such areas is important to avoid post-operative language deficits.

MEG measures the magnetic fields associated with brain activity using superconducting sensors placed around the head. The basis of the MEG signal is the macroscopic current flow in neural assemblies. If these neurons are aligned in parallel and fire synchronously the signal summates and becomes detectable over the ambient noise at the level of the sensory or electrode. The distinct advantage of MEG is its high temporal resolution. The signal is directly related to neuronal activity and the transmission of neuronal currents through the brain and to the sensors is virtually instantaneous, and is only limited by the sampling frequency of the recording equipment. This renders MEG as ideally suited for testing hypotheses concerning the exact time course of brain processes. Because MEG measures neuronal activity directly unlike functional MRI, it is better suited for patients with tumors and irregular vasculature.

This project is conducted in collaboration with neurologists, neurosurgeons and neuroscientists at the Comprehensive Epilepsy Center at NYU and is an ideal opportunity to apply technical skills to a real-world medical problem whose solution may have a direct impact on patient's lives.

The ideal candidate should have programming experience, ideally in Matlab, be familiar with Unix and have an interest in cognitive neuroscience. The candidate will have opportunity to present the work at lab meetings, scientific conferences and in publications. Formal thesis supervision can be arranged.

For more information, please contact:

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