

# *Postdoctoral Position Available at the Montreal Neurological Institute*

**Multimodal Functional Imaging Laboratory, Biomedical Engineering Dpt,  
Montreal Neurological Institute, McGill University, Montreal, Canada**

The candidate will join a multidisciplinary team composed of neurologists and methodologists within the Multimodal Functional Imaging Laboratory and in close collaboration with the epilepsy group of the Montreal Neurological Institute. A brief description of the project can be found below. The main role of the candidate will be to recruit patients, to assist data acquisition and to identify epileptic events on recorded signals. (S)he will be trained to contribute to data acquisition and to use dedicated source localization and data fusion techniques developed locally. Initial appointment is for 1 year, with possibility of renewal up to 3 years.

**Supervisor: Christophe Grova Ph.D.**

Assistant Professor, Biomedical Engineering

Assistant Professor, Neurology & Neurosurgery

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Multi FunkIm Lab: <http://www.bic.mni.mcgill.ca/ResearchLabsMFIL/HomePage>

***Project: Multimodal investigation of epileptic activity using simultaneous  
EEG/MEG and EEG/NIRS acquisitions.***

The proposed project aims at localizing and characterizing the generators of epileptic activity using simultaneous acquisitions of ElectroEncephaloGraphy (EEG) with Magneto-EncephaloGraphy (MEG), as well as simultaneous acquisitions of EEG with Near Infra-Red Spectroscopy (NIRS). ElectroEncephaloGraphy (EEG) and Magneto-EncephaloGraphy (MEG) are respectively measuring on the scalp electric and magnetic fields generated by neuronal activity at a millisecond scale, providing a detailed description of brain activity using 275 MEG sensors and 56 EEG electrodes. Combined with EEG measuring brain electric activity on the scalp, NIRS allows studying hemodynamic processes at the time of spontaneous epileptic activity. The specificity of NIRS data is its ability to measure local changes oxy-hemoglobin (HbO) and deoxy-hemoglobin (HbR), exploiting absorption properties of infrared light within brain tissue using optic fibers placed on the surface of the head (temporal resolution: 10 ms, 16 sources x 32 detectors, penetration: 2-3 cm from the surface of the head). The candidate will be trained to use the first Brainsight NIRS device developed by Rogue-Research Inc, with which we were able to record promising preliminary data.

While methodological developments in the lab will consist in 3D reconstruction of the generators of EEG, MEG and NIRS signals and assessing multimodal concordances between bioelectrical neuronal signals and hemodynamic processes, the purpose of this Postdoctoral project will be to assess the **integrity of neurovascular coupling processes at the time of epileptic discharges**, using a unique multimodal environment involving EEG/MEG, EEG/NIRS and also EEG/fMRI recordings. Close collaborations with the epilepsy group of the Montreal Neurological Institute, involving notably Dr E. Kobayashi MD-PhD, Dr F. Dubeau MD-PhD and Dr. J. Gotman PhD, will provide access to patient populations and additional clinical expertise for this project.

**Requirements:** The candidate should be an MD (neurologist) with previous training in epileptology and neurophysiology (EEG). Expertise in analyzing MEG or NIRS signals and/or computational skills including neuroimaging softwares are appreciated additional qualification. The candidate should be fluent in English (and if possible French) due to the patient population studied.

Please send your CV and motivation letter to [christophe.grova@mcgill.ca](mailto:christophe.grova@mcgill.ca)