

## *Multimodal neuroimaging in epilepsy and sleep*

### *Two postdoctoral positions available in the MultiFunkIm Lab - Montreal Canada McGill University / Concordia University*

I am happy to announce that there are **two postdoc positions** available in my lab, the Multimodal Functional Imaging Lab located both at Concordia University (PERFORM Centre) and in Biomedical Engineering Dpt at McGill University, Montreal Canada. The fellow will join a multidisciplinary team and have the opportunity to get involved in projects involving multimodal data application (EEG/MEG, high density EEG, simultaneous EEG/fMRI, prolonged EEG/fNIRS recordings, intracranial EEG) for applications in epilepsy presurgical mapping and sleep studies, advanced methodological and statistical analysis developments, and contributions in neuroimaging software implementations.

**Position 1: MEG and high density EEG analysis in epilepsy and sleep studies:** we are looking for a postdoctoral fellow with solid **engineering background** and expertise in EEG/MEG source modeling, to join our team to get involved in advanced development of source localization techniques, contribution to our Maximum Entropy on the Mean package (<https://neuroimage.usc.edu/brainstorm/Tutorials/TutBEst>), evaluation of source localization methods for resting state connectivity and advanced computational modeling. In close collaboration with the epilepsy team of the Neuro (Montreal Neurological Institute), the fellow will have access to MEG, high density EEG and intracranial EEG recordings of epilepsy patients, aiming at developing and validating methods localizing epileptic discharges (spikes, seizures) but also studying ongoing resting state patterns, providing new biomarkers to predict surgical outcome (<https://pubmed.ncbi.nlm.nih.gov/32191632/>). Applicants must have a PhD (or close to completion) in a related field (e.g., neurosciences, computer science, biomedical engineering, physics). Applicants should have strong knowledge of Matlab and or Python and/or experience in analysis of neuroimaging, excellent organizational skills, an aptitude for teamwork, good writing skills and a productive publication record. Experience in one or more aspects of the research themes will constitute an asset.

**Position 2: Multimodal investigation of epileptic activity using simultaneous EEG/MEG and whole night EEG/NIRS monitoring:** we are looking for an **MD candidate (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. Combined with EEG measuring brain electric activity on the scalp, NIRS allows studying hemodynamic processes at the time of spontaneous epileptic activity. The candidate will join a team of engineers and methodologists who will provide access in 3D reconstruction of the generators of EEG, MEG and NIRS signals and methods to assess 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 and interaction** using a unique multimodal environment involving EEG/MEG, EEG/NIRS and EEG/fMRI recordings, while benefitting from whole night personalized EEG-NIRS monitoring ([Pellegriano et al Frontiers in Neurosc. 2016](#)) to study interaction between sleep and epilepsy. The candidate will directly benefit from our new software package dedicated to NIRS data analysis NIRSTOR: <https://github.com/Nirstorm/nirstorm>.

Data acquisitions will take place either at PERFORM centre at Concordia University (<http://www.concordia.ca/research/perform.html>) or at the McConnell Brain Imaging Centre of the Montreal Neurological Institute at McGill University (<https://www.mcgill.ca/bic/>). Collaborators include expert epileptologist from the Montreal Neurological Institute (Dr. F. Dubeau, Dr. B. Frauscher, Dr. J. Gotman and Dr. E. Kobayashi), expertise in sleep and neuroimaging (Dr. T.T. Dang-Vu, PERFORM / Concordia, Dr Frauscher) and expert methodologists in neuroimaging and signal processing (Dr. J.M. Lina, Ecole de Technologie Supérieure, Dr. H. Benali, PERFORM / Concordia)

Both positions are available now. Review of applications will begin as they are received and will continue until the position has been filled. If interested please send your CV, a brief research statement and two references letters to myself: [christophe.grova@concordia.ca](mailto:christophe.grova@concordia.ca)

Please note that I am attending OHBM conference, so will be happy to meet you at your poster available and to schedule interviews.

Cordially  
Christophe Grova

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For more information about our current research programs, please visit the lab website:  
<https://www.concordia.ca/artsci/physics/research/grova-research-group.html>