



Research Engineer / Post-Doc position:

R&D POSITION FOR INTEGRATION OF AN MRI-COMPATIBLE NIRS SYSTEM TO EXPLORE ONLINE BRAIN FUNCTION

Deadline for application: July 1st, 2019

Research teams: Empenn Team / Neurinfo Platform, IRISA Rennes (<http://www.irisa.fr/>)

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Keywords: Neuroimaging, Brain Function, NIRS, Real-time Signal and Image Processing, MRI

Description:

The Neurinfo platform and the Empenn research team at IRISA (UMR CNRS 6074) are seeking a highly qualified young researcher with engineering experience and motivation in neuroimaging and real-time medical image processing for set-up and operation of a software platform for integration of a NIRS system in an MRI and EEG compatible environment design in a high technological environment.

This position is open by CNRS at Irisa, Rennes, France. The objective of this project is to extend our technological capabilities toward NIRS-EEG-MRI simultaneous imaging by the exploitation of a new portable device (NIRS-EEG systems) for recording simultaneously the brain activity, allowing long term clinical monitoring of brain functions in and outside MRI. In the scope of the project, novel computational/statistical models, signal processing, empirical protocols and visualizations will be proposed and studied, partly via their computational implementations and tested on ambitious clinical protocols.

The selected research engineer / post-doc will collaborate with the other members of the team in specifying and designing an integrative software architecture that allows the integration of NIRS measurements potentially acquired jointly with fMRI and EEG. The significance and the effectiveness of the computational platform will be tested through a large set of home-made in-vivo experiments (normal controls, psychiatric disorders, stroke patients...). Further, the selected tenure may be requested to implement additional data processing algorithms, software components and computational improvements as needs arise from the research progress.

Research environment

The NIRS-EEG system consists of two devices, one for electroencephalography (EEG) to measure cerebral physiological activity and the other for functional near infrared spectroscopic imaging (NIRS or fNIRS) to indirectly measure the brain activity through hemodynamic responses associated with neuron behaviour. This EEG-fNIRS system is a portable device that can be used outside of MRI in individuals in free movement. A wearable multichannel fNIRS-EEG device can provide a continuous, real-time feedback of brain activity. Thus, in addition to the MRI devices available on the Neurinfo platform, these fNIRS-EEG devices will provide two simultaneous and complementary measurements of brain

activity when used outside MRI. It will be the first equipment of its kind in western France, and even a unique set of equipment in France (and probably also in Europe), combining EEG-NIRS outside and under MRI

This work will benefit from research-dedicated 3T MRI and EEG/MRI compatible system provided by the NeurInfo platform on which these new research protocols will be set up (<http://www.neurinfo.org>). The experimental part will be conducted in close collaborations with the Engineering staff of Hemisfer and Neurinfo, and the clinical departments of Radiology, Rehabilitation and Psychiatry of the Hospitals of Rennes.

Skills and applicant profile

The ideal applicant should have a strong background in computational sciences, image and signal processing, biophysics and statistics. A very good practice in programming, especially in Matlab and in object-oriented programming (C++) and/or Python is required. The applicant should have obtained the PhD degree prior to take the position. The position is opened for an initial period of 12 months with a range of gross salary starting from 2500€ per month, according to experience.

Application package

Applicants should send their complete application package by email. It will include:

- Motivation letter
- Complete CV with publication list
- PDF of **one** representative paper (or slideshow) of the candidate in connection with this project.
- Recommendation letters (preferably directly sent by the mentor)
- **Incomplete applications will not be processed.**