



Offer #2019-01683

Post-Doctoral Research Visit F/M R&D POSITION FOR INTEGRATION OF AN MRI-COMPATIBLE NIRS SYSTEM TO EXPLORE ONLINE BRAIN FUNCTION

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

About the research centre or Inria department

Inria, the French national research institute for the digital sciences, promotes scientific excellence and technology transfer to maximise its impact.

It employs 2,400 people. Its 200 agile project teams, generally with academic partners, involve more than 3,000 scientists in meeting the challenges of computer science and mathematics, often at the interface of other disciplines.

Inria works with many companies and has assisted in the creation of over 160 startups.

It strives to meet the challenges of the digital transformation of science, society and the economy.

Context

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.

Assignment

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.

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.

Main activities

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.

Skills

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.

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.

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.**

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Social security coverage

Remuneration

Monthly gross salary amounting to 2653 euros.

General Information

- **Town/city** : Rennes
- **Inria Center** : [Centre Inria de l'Université de Rennes](#)
- **Starting date** : 2019-09-02
- **Duration of contract** : 12 months
- **Deadline to apply** : 2019-06-30

Contacts

- **Inria Team** : EMPENN
- **Recruiter** :
Coloigner Julie / julie.coloigner@irisa.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Please submit online : your resume, cover letter and letters of recommendation eventually.

For more information, please contact julie.coloigner@irisa.fr.

Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.