

Postdoctoral position in diffusion functional MRI

BACKGROUND: The functional integrity of white matter withholds tremendous diagnostic and prognostic value for neurodegenerative diseases, psychiatric diseases and stroke. Non invasive mapping of activity within white matter fibers is currently out of reach, including for functional MRI (fMRI) techniques whose contrast relies on the hemodynamic response to neural activity. Diffusion fMRI (dfMRI) relies instead on activity-dependent dynamic fluctuations in neuron and astrocyte microstructure. Our recent work supports the detectability of genuine dfMRI contrast in the human gray matter. We propose FIREPATH, a dfMRI-based method that can fill the gap of detecting activity also in the brain white matter and enable a first-of-its-kind comprehensive mapping of brain function across gray and white matter on clinical MRI scanners.

PROJECT DESCRIPTION: This postdoctoral position involves the development and validation of FIREPATH on clinical MRI systems. Your mission will include novel sequence implementation, task and resting-state fMRI experiments in highly controlled conditions, and innovative data analysis methods. The project will use state-of-the art neuroimaging equipment.

START DATE: Sept – Dec 2022. The position is open until filled. Candidates are encouraged to apply early.

SALARY: The project was approved as an ERC Starting Grant and is funded by the SEFRI (Swiss relay to Horizon Europe), following University of Lausanne salary guidelines. Funding is available for two years, with possible extension.

REQUIREMENTS:

- PhD in physics, electrical engineering, biomedical engineering, or related field.
- The successful candidate will be an ambitious scientist with initiative, curiosity, rigor and a strong background in fMRI or diffusion MRI, as well as experimental work.
- Proficiency in programming (either Matlab or Python) is mandatory. Experience with bash and typical neuroimaging software is a plus.
- Experience with Siemens MRI systems is a plus.
- Excellent written and oral communication skills in English. French is a plus.
- Adherence to the principles of open research, as defined by the funding agency.

ENVIRONMENT: You will be part of the Microstructure Mapping Lab, a research group of engineers, physicists and neuroscientists within the Department of Radiology at the Lausanne University Hospital (CHUV) and the University of Lausanne (UNIL), led by Dr. Ileana Jelescu. The group has access to state-of-the-art clinical MRI scanners (CHUV), preclinical MRI scanners (EPFL) and ample GPU computing. You may actively collaborate with clinicians, biologists and Siemens Healthcare engineers. The CHUV and UNIL are founding partners of the CIBM Center for Biomedical Imaging, along with the EPFL, UniGE and HUG, with over 50 affiliate members – including our group – in a variety of disciplines ranging from MRI to signal processing, EEG and PET.

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