Postdoctoral position in diffusion MRI microscopy

BACKGROUND: None of the current microscopy techniques is suited for human living subjects. Yet characterizing the microstructure of human brain over the course of development, aging and disease withholds tremendous value for neurobiology and diagnostics. Diffusion magnetic resonance imaging (MRI) has emerged in recent years as a highly promising “super-resolution” technique which can provide sub-pixel information about tissue microstructure in vivo. The ultimate goal is to bring MRI to the level of a non-invasive in vivo microscope.

PROJECT DESCRIPTION: Biophysical models of diffusion in brain tissue can provide an estimate of cell membrane permeability, which is a unique biomarker of myelination, cell integrity and activity. This postdoctoral position involves the validation of membrane permeability estimates against complementary techniques, and its application to physiological and pathological brain conditions, in the rodent and human brain. The project will combine state-of-the-art MRI hardware, acquisition techniques and processing tools. It will involve protocol optimization and MRI data acquisition on preclinical and/or clinical systems, and developing dedicated processing pipelines.

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

SALARY: The project is funded by the Swiss National Science Foundation (SNSF) and funding is available for two years, with possible extension. Salary is in compliance with SNSF guidelines.

REQUIREMENTS:
- PhD in physics, electrical engineering, biomedical engineering, or related field.
- The successful candidate will be a motivated scientist with self-initiative, curiosity, appeal for novelty and a strong background in MRI physics and experimental work.
- Proficiency in programming (either Matlab or Python) is mandatory. Experience with bash is a plus.
- Experience with Siemens and/or Bruker MRI systems and pulse sequence programming are 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 SNSF.

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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