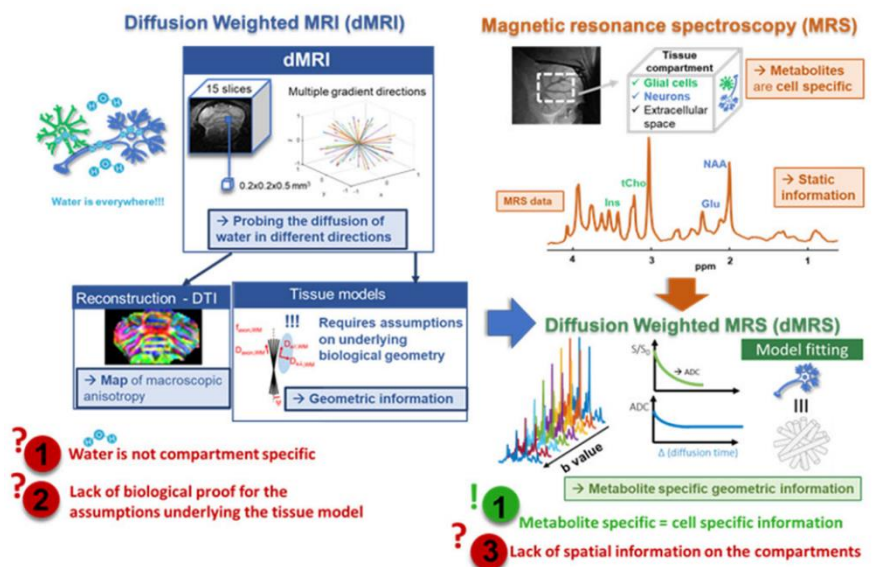


Two postdoctoral positions in diffusion MRS/MRI modeling

BACKGROUND: Non-invasive methods to advance our understanding of brain metabolism and microstructure concomitantly would be instrumental in characterizing brain physiological and pathological processes. Diffusion MRI (dMRI) combined with tissue biophysical modeling provides information about microstructure non-invasively. In addition, diffusion of brain metabolites measured by MR spectroscopic imaging (dMRSI) provides cell type-specific microstructure information exploiting metabolite localization within neurons or glia.

Here, we propose to develop new methodology for quantification and validation of microstructure through water and metabolites mobility at cellular and sub-cellular scales across the brain, by combining novel dMRSI acquisitions and diffusion modeling techniques, with two-photon microscopy and mass spectrometry validation and application to 3D organotypic brain cell cultures and rodents.

This multi-disciplinary project is a collaboration between Drs. Cristina Cudalbu (EPFL), Olivier Braissant (CHUV), Stéphane Sizonenko (HUG) and Ileana Jelescu (CHUV).



PROJECT DESCRIPTION: The two postdoctoral positions involve the development of novel dMRSI fitting approaches, notably by leveraging joint spectral-diffusion fitting, joint water-metabolite fitting and machine learning on realistic numerical substrates. Algorithms will be validated and applied on experimental data acquired in the context of the consortium.

START DATE: September 2024. The two positions are open until filled. Candidates are encouraged to apply early.

HIRING CONDITIONS: The project is funded by the Swiss National Science Foundation. Salaries follow the University of Lausanne scale. Contracts are renewed yearly, for up to four years.

REQUIREMENTS:

- PhD in physics, electrical engineering, biomedical engineering, computer science, or related field.
- We look for an ambitious scientist with initiative, curiosity, rigor and a strong background in MRS or MRI.
- Proficiency in programming (Matlab or Python) is mandatory. Experience with C++, bash and typical neuroimaging software is a plus.
- Excellent written and oral communication skills in English. French is a plus.

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 will actively collaborate with the groups of Drs. Cudalbu, Braissant and Sizonenko. The CHUV and UNIL are founding partners of the CIBM Center for Biomedical Imaging, along with the EPFL, UniGE and HUG, constituting a broad community in a variety of disciplines ranging from MRI to signal processing, EEG and PET.

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