

Postdoctoral Researcher for the Advanced Stroke Analytics Platform (ASAP) Project

As part of the Innosuisse project Advanced Stroke Analytics Platform (ASAP) between the Inselspital, the Advanced Clinical Imaging Technology group of Siemens Healthineers, and the CHUV Radiology Department, we are recruiting a motivated post-doctoral researcher for three years to develop predictive algorithms for MRI stroke imaging. The position will be hosted at the Support Centre for Advanced Neuroimaging, a multidisciplinary research group embedded in the University Clinic for Diagnostic and Interventional Neuroradiology which unites MDs, physicists, engineers and computer scientists in the development and evaluation of novel MRI-based techniques for neuroimaging.

Deep learning algorithms are now a staple of medical imaging. While some network architectures can generalize surprisingly well even in the low-sample regime, the key to high performance and convincing evaluation, in particular in a clinical context, remains dataset size. However, acquisition in medical imaging is costly, and data sharing remains a difficult proposition due to ethical and privacy constraints. In this project, we will leverage recent advances in algorithms and tooling to develop federated deep learning algorithms that enable joint training of high-capacity deep neural networks while allowing each hospital to keep their data private. Our focus will be on developing robust and explainable 3D/4D segmentation models and GANs applied to stroke imaging, where both the CHUV and Bern hospitals have very high expertise and available data (several thousands of patients). Because stroke imaging workups rely on several protocols, an important and exciting challenge will be to develop algorithms that can deal with spatio-temporal differences in images between hospitals in terms of contrast, voxel size, slice thickness, repetition time, etc. Effective solutions to these challenging domain gap problems would also constitute important contributions to machine learning at large.

The candidate will be expected to develop and implement new algorithms, present work at conferences and in journal publications, collaborate with local and international researchers, help supervise junior researchers including PhDs and Master students, participate in grant submissions, and to interact fruitfully with radiologists, clinicians, and our industrial R&D partners.

Profile

- PhD in computer science, electrical engineering, biomedical engineering, statistical physics, statistics, or related field
- Good training in linear algebra, calculus, statistics
- Good knowledge of Python and relevant deep learning packages such as PyTorch or TensorFlow
- English proficiency, German knowledge an asset
- Demonstrated previous experience in machine learning and deep learning is required

Experience in medical imaging, optimization, distributed computing, signal processing, statistics are all an advantage. Previous knowledge of stroke or neuroanatomy is not required, but a willingness to become knowledgeable in these fields is essential.

As a member of the project, you will work in close collaboration with the CHUV radiology team, which is also hiring a postdoctoral fellow in the project. You will be part of a team of scientists from multiple partners, which requires a strong team spirit and professionalism. Excellent

communication and inter-personal skills are as important as technical skills. This project will also require creative spirit and the ability to work autonomously.

For more information, please contact Dr Richard McKinley (richard.mckinley@insel.ch).

Please, send your full application, including motivational letter, CV, publication list, and relevant documents to Dr Richard McKinley (richard.mckinley@insel.ch).