

# Postdoctoral fellowship

## A-Eye: an Artificial Intelligence large-scale Magnetic Resonance Imaging model of the Eye

### Location:

Lausanne University Hospital (CHUV)  
Centre de recherche en Radiologie  
Rue Centrale 7, 4ème étage  
CH-1003 Lausanne, Switzerland

### Starting/Duration:

As of March 2022, 2 years

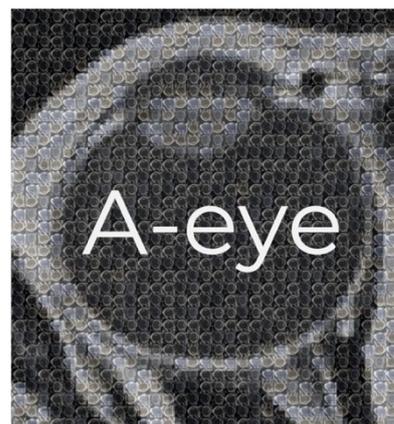
### BACKGROUND:

Computer-aided clinical tools constitute an exciting growing field. With the decision support they provide, they complement diagnosis, treatment planning and intervention in many clinical areas. Recent successes have been guaranteed by the application of machine learning techniques Wernick et al. (2010); Erickson et al. (2017); Giger (2018). When it comes to the eye, image processing methods tailored for automatic eye MR image analysis are effective, and constitutes a field of expertise in which the CIBM Center for Biomedical Imaging at UNIL and CHUV developed pioneer research Ciller et al. (2015), Ciller et al. (2017), Nguyen et al. (2018a), Nguyen et al. (2018b), Nguyen et al. (2019). The robust and accurate delineation of the eye-structures (lens, vitreous humour, eye-ball and optic nerve) plays a central role in tissue characterisation in MRI and quantitative analysis in ophthalmic MRI (**MReye**) Niendorf et al. (2021).

In the two-year A-eye project, funded by the Gelbert Foundation, we aim at a breakthrough towards AI-system for the **MReye** based assessment, establishing the basis to study how different structures degenerate during disease, or in the field of personalised medicine, to build up targeted and accurate surgery plans. The project will be led in close collaboration with experts in eye MR microscopy and ophthalmology at University of Rostock, Germany.

### PROJECT DESCRIPTION:

The aim of this project will be to develop a comprehensive eye model where all eye structures will be depicted starting from a large scale (~3K subjects) ophthalmic MRI dataset. To handle such big numbers, recent advancements promoted by our groups will be generalised. Furthermore, new machine learning techniques will be tested and used, for the first time, in the field of **MReye**. The candidate will be also expected to work towards translational and dissemination of the developed tools by following open science guidelines and through the implementation of a web-platform for the segmentation and extraction of eye-structures, present the work at conferences and in journal publications. Finally, the candidate will collaborate with local and international researchers, coordinate data curation for the project, help supervise junior researchers (eg. Master students).



## Supervisors

**Main Supervisor:** [Dr. Meritxell Bach Cuadra](#), Head of CIBM Signal Processing CHUV-UNIL Section & Director of Medical Image Analysis Laboratory (MIAL), UNIL, Department of Radiology CHUV, Lausanne, Switzerland, [meritxell.bachcuadra@unil.ch](mailto:meritxell.bachcuadra@unil.ch)

**Co-Supervisor:** [Dr. Benedetta Franceschiello](#), Research Staff Scientist, CIBM EEG CHUV-UNIL Section & Laboratory for Investigative Neurophysiology (LINE), UNIL, Department of Radiology CHUV, Lausanne, Switzerland, [benedetta.franceschiello@chuv.ch](mailto:benedetta.franceschiello@chuv.ch)

#### Collaborators:

- Prof. Dr. Soeke Langner, MD, Privat Dozent, Professor of Neuroradiology at University of Rostock, Germany, Soenke.Langner@med.uni-rostock.de.
- Prof. Olivier Stacks, MD, Experimental ophthalmology, University of Rostock, Germany. oliver.stachs@uni-rostock.de.

## Your profile

- You have a PhD in computer science, informatics, biomedical engineering, or related field.
- Strong background and experience in image processing and deep learning techniques is a must.
- Strong IT and software development (including graphics user interface) skills.
- You certify proficiency in programming (Python, Matlab), PyTorch/Keras, Javascript, bash;
- You are a motivated individual with self-initiative, curiosity.
- A strong will to develop clinically actionable methods and to interact with clinicians.
- You commit to travel across institutions to foster exchanges.
- You are eager to supervise and transfer your knowledge to master and PhD students and promoting a collaborative environment within the labs.
- Prior exposure to medical imaging and specifically in MRI is a plus.
- You have excellent written and oral communication skills in English; German is a plus.
- Rigorous work habits, a curious and critical mind, and a good sense of initiative.
- A high-level perseverance and a strong personal commitment are expected.

## We offer

- a multidisciplinary project between cutting-edge brain imaging and advanced image processing, machine learning, and clinical context.
- an extremely stimulating field of research within a highly specialized and qualified scientific environment.

**How to apply:** Please apply via [this link](#) by December 15th, 2021

Should you have any questions on the position, please contact Dr. Meritxell Cuadra ([meritxell.bachcuadra@unil.ch](mailto:meritxell.bachcuadra@unil.ch)) and Dr. Benedetta Franceschiello ([benedetta.franceschiello@chuv.ch](mailto:benedetta.franceschiello@chuv.ch)).

## About CIBM

The CIBM Center for Biomedical Imaging was founded in 2004 and is the result of a major research and teaching initiative of the partners in the Science-Vie-Société (SVS) project between the Ecole Polytechnique Fédérale de Lausanne (EPFL), the Université de Lausanne (UNIL), Université de Genève (UNIGE), the Hôpitaux Universitaires de Genève (HUG) and the Centre Hospitalier Universitaire Vaudois (CHUV), with the generous support from the Fondation Leenaards and Fondation Louis-Jeantet.

CIBM brings together highly qualified, diverse, complementary and multidisciplinary groups of people with common interest in biomedical imaging.

**We welcome you in joining the CIBM Community.**

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