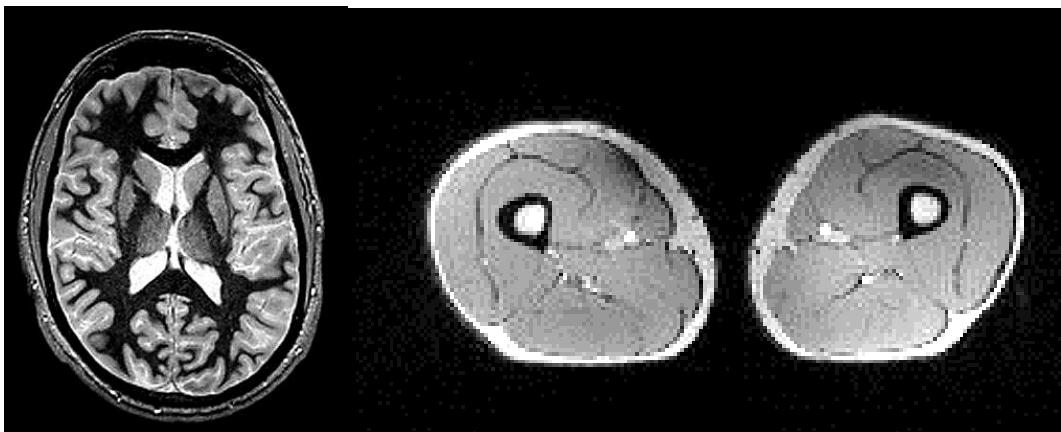


# Master or Semester project

**Location:** EPFL, Lausanne  
**Dates:** Autumn semester 2022,  
Spring/Autumn semester 2023

## Optimization of signal contrast of MRI images

Magnetic Resonance Imaging is nowadays an important imaging technique, currently used in hospitals for diagnostic purposes, in a wide range of diseases. Applications of MRI include investigation of the brain, liver, muscle, breast, and other organs/tissues. One ongoing challenge is to obtain images with improved spatial resolution, in a shorter acquisition time and with improved contrast between healthy and diseased tissues. In particular, to identify a pathological state (for instance a tumor, a lesion in multiple sclerosis, etc.) it is a necessary condition that the signal of healthy tissue differs from the signal of diseased tissue. In other words, it is necessary to have images with high contrast between tissues. Furthermore, high-contrast images also are important when performing segmentation analysis (for instance, for measurements of brain structures). The current project is dedicated to investigating novel methods to obtain MR images with high contrast. The first part of the project involves numerical simulations to determine, using MRI physics, the best parameters to obtain high-contrast images. The second part of the project is to validate the novel method by acquisitions of MR images from volunteers.



### Skills:

Your qualifications, previous experience and background:

- Basic knowledge of MR physics.
- Programming skills in C/C++, MATLAB or Python are required.

### Supervisors:

- Prof. Dimitri Van de Ville, CIBM MRI EPFL-AIT
- Dr. Lijing Xin, CIBM MRI EPFL-AIT <https://people.epfl.ch/lijing.xin>

### Collaborators:

- Prof. Giulio Gambarota, Université de Rennes 1

## We offer:

- A dynamic, interdisciplinary, and international team of very motivated people.
- A stimulating working environment
- Access to cutting-edge technology and state-of-the-art resources.

## How to apply:

Please send your CV to [lijing.xin@epfl.ch](mailto:lijing.xin@epfl.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.**

[cibm.ch](http://cibm.ch)