# Post-doctoral Fellow position on MR acquisition at low field (0.3T)

# on tissue constructs (cancer model)

A 18 month postdoctoral fellow position is available at the University Claude Bernard Lyon 1, Villeurbanne France, but could be renewed for the same amount of time. The postdoctoral fellow will participate in a multi-disciplinary research program ESTIMATE that develops novel MRI coils dedicated to tissue engineering 3D characterization[i]. The postdoctoral fellow will work as part of different research groups ( AMPERE[ii], 3DFAB[iii] and LGEF[iv]) as well as a group of graduate students, postdoctoral fellows, faculty and scientists in the AMPERE lab as many of the work will be developed on its "plastronic" platform[v].

**3D non-invasive imaging of engineered tissues models for cancer research**

The concept of ESTIMATE is that the different elements performing the various functions of the MRI probe have to be manufactured into a single compact device easy to handle. To do so, the manufacturing process must be capable of printing 3D complex coil geometries on the different types of material used to perform the different functions of the MRI probe (signal detection, temperature measurement and monitoring, drug administration. This approach, unique at this time, will allow better integration, for instance, of a cryocooling microfluidic channel (needed for improving the sensitivity of the RF coil) with a mechanical transducer (needed for magnetic resonance elastography measurements). The expected result is a turnkey preclinical MRI technology aiming to accurately monitor engineered tissues quality.

➔ Today, one prototype has been designed for a 7T that integrates an MRI coil, a fluidic system, temperature and CO2 sensors. It has been used to characterize the cellularity of tumor tissue model over a 3 weeks period (**#POSTER 2003 ISMRM 2022**)

**What you will do**

1) Imaging with our 0.3 T system, tissue constructs fabricated by 3D printing by the 3DFAB platform over 3 weeks of tissue maturation. The idea will be to characterize the morphological evolution of the tissue and specifically the scaffold or "tumor cell aggregates" generation. It will be also necessary to image flow distribution of nutrients as well as temperature and CO2. One optical microscope will be also implemented to follow viability of the sample in surface. Other sequence could be explored such as diffusion, elastography or fast MRI acquisition for contrast agent detection (13C for metabolism characterization etc …)
2) Designing dedicated MRI coil with high sensitivity for tissue construct MR-microscopy. One PhD student will help you to design and built the setup. He is actually developing a cryogenic coil to increase the spatial resolution capabilities of our system.
3) Development performed on the tumor tissue model could be applied to other tissue models of collaborators (scars skin tissues, embryos, brain slices, spheroids etc …)

**Responsabilities**

All applicants will be expected to utilize and extend state-of-the-art imaging tissue constructs in 3D with MRI at low field. Specifically, the main tasks could involve, sequence design, MRI data collection, management and analysis, image post-processing, multi-parametric cohort analysis.

**Eligibility Requirements**

Applicants must have a PhD in biomedical imaging, engineering, instrumentation or related fields. Experience in MRI/NMR acquisition, is highly desirable. The ideal candidate will be highly motivated, reliable, and will be equally productive when working independently or cooperatively.

**How to apply**

Applicants should email a CV along with two references and recent research interests and activities to be sent to simon.lambert@univ-lyon1.fr

[i] https://simonlambert29.wixsite.com/anrestimate
[ii] http://www.ampere-lab.fr/?lang=en
[iii] http://fabric-advanced-biology.univ-lyon1.fr/
[iv] https://lgef.insa-lyon.fr/en/
[v] http://www.plastronique.com/