



## **Post-doctoral Fellow position for developing and using new family of MRI probe based on innovative additive manufacturing process**

A 2-years postdoctoral fellow position is available at the University Claude Bernard Lyon 1, Villeurbanne France. The postdoctoral fellow will participate in a multi-disciplinary research program ESTIMATE that develops novel MRI coils dedicated to tissue engineering 3D characterization<sup>i</sup>. The postdoctoral fellow will work as part of different research groups ( AMPERE<sup>ii</sup>, 3DFAB<sup>iii</sup> and LGEF<sup>iv</sup>) 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<sup>v</sup>.

### **General context of the project:**

The main objective of ESTIMATE is to democratize non-invasive imaging for the characterization of engineered tissues from the synthesis to the implantation stage. The developed technology has the potential to improve and optimize the fabrication process which could lead to a breakthrough in regenerative medicine.

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).

In this context, Magnetic Resonance Imaging is proposed as the modality of choice for this project in combination with Molded Interconnect Device technology. Thanks to its capability of integration in three dimensions, this one allows combining more functions, reducing the number of components, simplifying the assembly. The expected result is a turnkey preclinical MRI technology aiming to accurately monitor engineered tissues quality. The developed technology could lead to a breakthrough in regenerative medicine.

### **What you will do**

- 1) Integrating monitoring devices for *in vitro* and *in vivo* imaging of engineered tissue constructs: heating and gas administration systems, optical physiological sensor, smartly Interfacing RF coil and peripherals to control devices. Designing dedicated MRI coil for *in vitro* and *in vivo* imaging will be necessary.
- 2) Imaging with one multifunctional “MRI probe”: MRI acquisition (T2, T1, Diffusion...), coil characterization by imaging (B0/B1 mapping, SNR measurements) and comparison with measurements on bench. After validation of the MRI probe, the design will be replicated to be tested by non-expert on different platforms of the French network of *in-vivo* imaging<sup>vi</sup>.

### **Responsibilities**



All applicants will be expected to utilize and extend state-of-the-art MRI instrumentation to developed new tools to facilitate imaging of biological constructs *in vitro* and *in vivo*. Specifically, the main tasks could involve coil design/fabrication, integration of peripherals such as piezo-actuators for magnetic resonance elastography, 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, coil designed and fabrication is highly desirable as well as in innovative manufacturing process. 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](mailto:simon.lambert@univ-lyon1.fr)

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<sup>i</sup> <https://simonlambert29.wixsite.com/anreestimate>

<sup>ii</sup> <http://www.ampere-lab.fr/?lang=en>

<sup>iii</sup> <http://fabric-advanced-biology.univ-lyon1.fr/>

<sup>iv</sup> <https://lgef.insa-lyon.fr/en/>

<sup>v</sup> <http://www.plastronique.com/>

<sup>vi</sup> <https://www.francelifeimaging.fr/en/about/>