Direction des Ressources Humaines
Hôtel de l'Université
33 rue François Mitterrand
BP 23204 - 87032 Limoges cedex 01
T. 05 55 14 91 77
F. 05 55 14 91 01

Université de Limoges

The University of Limoges is hiring a

Post-doctoral engineer in biomedical imaging analysis

Catégorie A – ITRF / Post-doctorant

The University of Limoges

Created in 1968, the University of Limoges is a regional university, at human scale, which trains more than 16,000 students and employs more than 1,800 agents.
At the heart of Europe, it is an important center of multidisciplinary higher education, in an environment most conductive to scientific development. Open, it is a place full of interactions, with a multiple student population, efficient reception structures, close teams, training based on very high-level research and for clearly identified opportunities. Its scientific excellence, with cutting-edge laboratories and large-scale partnerships, is helping to invent the world of tomorrow.
The University is structured into 5 Research Institutes:
GEIST: Genomics, Environment, Immunity, Health and Therapeutics
XLIM: Electronics, Photonics and coherent sources, Mathematics, Computer science and Image
IPAM: Institute of Applied Materials Processes
SHS: Human and Social Sciences
GIO: Governance of Institutions and Organizations

Localisation

University of Limoges – XLIM Research Institute

Context

Intensive - Digital Intelligences at the Service of Engineering for the Living at the University of Limoges

Building on a multidisciplinary dynamic, the University is running an inter-institute project on Life Engineering, in order to integrate a complete value chain combining scientific and technological aspects with societal and legal dimensions.
The current challenges in Engineering for the Living cover very broad disciplinary fields which aim in particular to:
1. Improve prevention (i.e. earlier diagnosis, more inclusive, multimodal),
2. Improve the quality and sustainability of care (i.e. support for the practitioner, selectivity and traceability of treatments),
3. To increase the performance of the subjects (i.e. « augmented man »).
In this context, the Intensive project targets the fields of imaging as an exploratory approach including several modalities (multiphoton spectral imaging, CARS, electron microscopy, etc.) associated with clinical data. All of this data will be analysed using artificial intelligence approaches with the aim of isolating new specific signatures of pathologies and developing a tool at the service of practitioners, patients and researchers. This medicine, which tomorrow will be more predictive, personalized or precise, must be supported in the legal field to guarantee respect for fundamental human rights.
This project is based on a panel of recognised and complementary skills from the GEIST, IPAM, XLIM, IRSHS and IRGIO institutes of the University of Limoges and will allow the development of new tools and new skills at the interfaces between the institutes.

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In the context of the Intensive project, the different imagery modalities that will be used make it possible to feed machine learning algorithms with very large amounts of data and allow the definition of rich signatures of biological samples. This large volume of data that can be made available to A.I. poses the problem, in clinical application, of the choice of data to be acquired, since acquisitions have a significant cost.

Missions

In this project, the missions will be multiple.

We will be interested in determining the imaging modalities relevant to tasks of classification of labelled samples, for example healthy or pathological. To facilitate this classification, *a priori* knowledge may be provided by the experts but could also be inferred from the data, potentially very numerous.
Secondly, we will explicitly seek to generate signatures from multimodal samples. These signatures can be used to study the similarity between a new sample of other samples pre-integrated into the model.
Third, we will integrate non-imagery data. We will enrich the aforementioned procedures accordingly (classification and definition of signatures).

Essential interactions with all parties.

The hiree will work directly with the microscopy engineer from the GEIST Institute and the engineer in charge of the project for biological aspects. She or he will interact closely with the opticians / photonists of the XLIM Institute for the acquisition of images on the different technological modalities, the GEIST researchers in biology and more generally, with all the personnel involved in the project.

Profile, skills

We are recruiting a post-doctoral engineer for a period of 12 months. This person should have a PhD in biomedical image or data analysis, image processing or artificial intelligence.

KNOWLEDGE :

- Image analysis and processing, especially using spectral data
- Artificial intelligence (neural networks) with Python programming and data manipulation using the Numpy and TensorFlow libraries
- Fluent English or French

OPERATIONAL SKILLS :

- Collect and format the results, especially intermediate results, potentially numerous
- Analyse and interpret these results, derive graphs of values, trends
- Provide a technological and scientific watch
- Writing of scientific article(s)

SOFT SKILLS :

- An ability to work independently (sense of organisation, versatility, adaptability) as well as in a team (interpersonal skills) is essential.
- The candidate should be able to work in a transdisciplinary environment and interact with specialists from other scientific disciplines than his or her own (curiosity, open-minded).
- Internal relations:
  - With engineers and researchers in biology from GEIST
  - With photonic researchers from the XLIM Institute involved in the project
  - With all the members of the project, during scientific meetings and seminars
- External relations:
  - With researchers from the fields concerned by the project (during conferences, theme days)

Contract type	**12-month fixed term contract**

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Starting date	**October or November 2021**
Application	Resume and cover letter to submit **before July, 18 2021** to : **M. Frédéric Claux** Associate Professor at the University of Limoges /XLIM **Ms. Véronique Blanquet** GEIST Institute Leader, *Intensive* project coordinator E-mail : frederic.claux@unilim.fr veronique.blanquet@unilim.fr
Quotity	100%