

The University of Limoges is recruiting a

Post-doctoral fellow in multimodal optical microscopy

Category A - Post-doctoral fellow

Presentation of the University of Limoges

Founded in 1968, the University of Limoges is a local university on a human scale that trains more than 16,000 students and employs more than 1,800 permanent staff.

At the heart of Europe, it is a major center of multidisciplinary higher education in an environment that is highly favorable to scientific development. Open, it is a place teeming with interaction, with a multiple student population, efficient welcoming structures, close teams, training based on very high-level research and for well-identified outlets. Its scientific excellence, with cutting-edge laboratories and large-scale partnerships, contributes to invent the world of tomorrow.

The University is structured into 5 Research Institutes:

GEIST : Genomics, Environment, Immunity, Health and Therapeutics

IPAM : Institute for Processes Applied to Materials

XLIM : Electronics, Photonics, Mathematics, Computer Science and Image

SHS : Science of Man and Society

GIO : Governance of Institutions and Organizations

Position location

University of Limoges - Faculty of Science and Technology

Context

Intensive - INTElligences Numériques au Service de l'Ingénierie pour le Vivant à l'Université de LimogEs (that stands for Digital Intelligence at the Service of Engineering for Life at the University of Limoges)

Thanks to its multidisciplinary dynamics, the University is running an inter-institute project hotel on Life Engineering, in order to integrate a complete value chain associating scientific and technological aspects with societal and legal dimensions.

The current challenges in Engineering for Life cover very broad disciplinary fields which aim in particular at:

- 1. Improving prevention (i.e. earlier, more inclusive, multimodal diagnosis),*
- 2. Improving the quality and sustainability of care (i.e. support for the practitioner, selectivity and traceability of treatments),*
- 3. Increasing the performance of the subjects (i.e. augmented human).*

In this context, the Intensive project targets the use of advanced microscopy and spectroscopy techniques as an exploratory approach, including several complementary modalities (multiphoton fluorescence spectral imaging, second and third harmonic generation, coherent Raman scattering, electron microscopy, etc.). The data acquired by means of these innovative methods will be associated with clinical data. All of these data will then be analyzed using artificial intelligence approaches with the aim of identifying new specific signatures of pathologies and developing a tool for practitioners, patients and researchers. This medicine, which in the future will be more predictive, personalized or accurate, must be accompanied from the legal standpoint to guarantee respect for fundamental human rights.

This transdisciplinary project is based on a panel of recognized and complementary skills from the GEIST, IPAM, XLIM, SHS and GIO institutes of the University of Limoges and will enable the development of new tools, methods and skills at the interfaces between institutes.

In the frame of the Intensive project, **the University of Limoges is recruiting a post-doctoral fellow** in charge of contributing to the development of an advanced optical imaging instrument and setting/executing the methodology of data collection and analysis corresponding with the different biological models to be studied. The latter will comprise on one side cell cultures realized on ceramic biomaterials, in the frame of research activities undertaken by IRCER (Institute of Research for Ceramics) about bone tissue engineering. On the other hand, GEIST institute will provide biological models related to the core competencies of its laboratories: models of immunoglobulin deposition disease, cancer, neuropathy, bacterial biofilms, wood.

Missions

Microscopy/spectroscopy:

- The post-doctoral fellow will participate to the development of a multimodal* and versatile** microspectroscopy instrument.
- He/she will be in charge, in close collaboration with the actors of Intensive project, of setting and executing the methodology of data collection and analysis that will be the most adapted to each biological model.

* *Multiphoton/vibrational modalities: SHG/THG/TPF/CARS (second harmonic generation, third harmonic generation, two/three photon fluorescence, coherent anti-Stokes Raman scattering)*

** *Use of different laser pulse regimes and scanning methods*

Transverse activities:

- Keeping a laboratory notebook
- Gathering and editing results
- Analyzing and interpreting results
- Participating to protocol writing
- Writing summary reports
- Presenting results
- Writing scientific publications
- Ensuring technological and scientific intelligence
- Applying health and safety instructions in the various laboratories

Profile

REQUIRED PROFILE:

The candidate should hold a PhD in physics or chemistry. Experience in optical microscopy/spectroscopy and in data/image analysis/processing is highly desired.

KNOWLEDGE:

- Holder of a PhD degree, the candidate should have a background in physics or chemistry. He/she should have solid experience in optical microscopy and/or spectroscopy.
- Knowledge of programming environments and instrument control is desired.
- Any knowledge in biology would be a plus.
- Perfect knowledge of the English language.

OPERATIONAL SKILLS / KNOW-HOW:

- Mastering the techniques of imaging by optical microscopy is required: epifluorescence, confocal microscopy, vibrational microspectroscopy (Raman, FTIR), multiphoton microscopy, coherent Raman microscopy...
- Skills in programming environments for data analysis and processing (Matlab, Python...) are desired.
- Mastering at least one software for experimental system control will be appreciated as well (for instance LabVIEW).

SOFT SKILLS:

- Ability to work independently (organizational skills, versatility, adaptability) as well as in a team (interpersonal skills) is essential.
- The candidate should be able to work in a transdisciplinary environment and to interact with specialists from other scientific disciplines (curiosity, open-mindedness).

Relationships:

- Internally:
 - With researchers/engineers in biophotonics (Photonique axis) and in data processing / artificial intelligence (ASALI axis) from XLIM institute, who are involved in the project;
 - With researchers/engineers from the "Bioceramics" team of IRCER;
 - With researchers/engineers from GEIST institute, who are involved in the project;
 - With all the members of the project, during scientific meetings and seminars
- Externally:
 - With researchers/engineers from the fields concerned by the project (during congresses, thematic days)

Contract type	FTC 14 months
Starting date	September 2021
Application	<p>CV + cover letter to be sent by email only and at the latest on 13/06/2021 to:</p> <p>Mrs. Chantal Damia - Mr. Philippe Leproux IRCER/XLIM scientific managers</p> <p>Mrs. Véronique Blanquet Head of the GEIST institute, coordinator of the Intensive project</p> <p>Mail addresses: chantal.damia@unilim.fr philippe.leproux@unilim.fr </p>
Work quota	100 %