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

The University of Limoges is recruiting a

Post-doctoral fellow: Data analysis and image processing in the context of 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 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.

Website: https://www.unilim.fr

Position location

University of Limoges - Faculty of Science and Technology
Research institutes: XLIM / IRCER

Scientific context

The present position falls within the research project "BELENOS", dedicated to the development of a hybrid biomaterial (human cells / ceramic) by additive manufacturing and bioprinting for applications in bone repair. This project is co-funded by the Nouvelle-Aquitaine region and the Laboratory of excellence ∑-LIM. It gathers three research teams ("Bioceramics" group from IRCER, "Photonics" and "Image Synthesis and Analysis" groups from XLIM) and one company (Leukos).

More specifically, the main goal of BELENOS is to develop a **hybrid biomaterial** by coupling a mix of stem and/or precursor cells with a tridimensional porous scaffold made of calcium phosphate ceramic. The biological performances of the biomaterial will be evaluated by conventional methods used in cell and molecular biology, especially by **fluorescence microscopy** to follow the material colonization and the evolution of cell phenotype and behavior with time. Moreover, as these approaches are time, sample and money consuming, a key challenge of the project will be to characterize the interface between living and material using **hyperspectral CARS* microscopy**, which enables label-free and non-destructive analysis. In this context of multimodality, data acquired by fluorescence and CARS microscopy will be processed and cross-analyzed.

** coherent anti-Stokes Raman scattering*

Missions

The recruited person will have to bring a strong contribution to the characterization of the hybrid biomaterial in terms of biological performances. To this aim, he/she will be in charge of:

- conducting CARS measurement campaigns;
- processing and analyzing CARS datasets by means of multivariate [1] and deep learning [2] approaches (available within the project consortium);
- proposing strategies for the cross-analysis of fluorescence and CARS data (fluorescence microscopy experiments being mainly performed by a PhD student).

[1] Boildieu *et al.*, Front. Cell Dev. Biol., 2022 | Lien article
[2] Boildieu *et al.*, Computational Imaging Conference, IS&T Electronic Imaging, 2023 | Lien article

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Transverse activities:

- Keeping a laboratory notebook
- Analyzing and interpreting results
- Writing summary reports
- Presenting results, writing scientific publications
- 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 is desired.
- Any knowledge in biology would be a plus.
- Perfect knowledge of the English language is required.

Operational skills / know-how

- Mastering some techniques of imaging by optical microscopy is required, e.g. epifluorescence, confocal microscopy, vibrational microspectroscopy (Raman, FTIR), multiphoton microscopy, coherent Raman microscopy, etc.
- Skills in programming environments for data analysis and processing (Matlab, Python, etc.) are desired.

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 an interdisciplinary environment and to interact with specialists from other scientific disciplines (curiosity, open-mindedness).

Relationships

- With all researchers/engineers involved in the project consortium
- Close collaboration with the PhD student (cell biologist) in charge of the development of the hybrid biomaterial

Contract type	**FTC 18 months**
Starting date	**October 2023**
Application	CV + cover letter to be sent by email only and **at the latest on 15/06/2023** to: **Dr. Philippe Leproux & Dr. Amandine Magnaudeix** XLIM/IRCER associate professors philippe.leproux@unilim.fr amandine.magnaudeix@unilim.fr
Work quota	100 %