Optics / Photonics Engineer

Context:

Optical metasurfaces represent a disruptive technology in the field of optics. These components, based on micro/nanostructures, promise unprecedented control over light, enabling entirely new functionalities. The IREIS subsidiary of the HEF group and the Hubert Curien Laboratory (Université Jean Monnet, CNRS, IOGS) have joined forces within the joint laboratory COMETA to develop this technology and bring it to market. Among their many promising applications, metasurfaces can improve microscopy — for instance, by enabling quantitative phase imaging with a conventional microscope. Although this concept has been demonstrated in scientific literature [1,2], its technological maturity remains low.

As part of the MetaBio project, we aim to reproduce this demonstration locally in Saint-Étienne and bring the innovation to Technology Readiness Level 5 (validation in a relevant environment). The project involves designing, fabricating, characterizing, and using a metasurface capable of phase imaging of biological cells. The project is a collaboration between IREIS, the Hubert Curien Laboratory (via COMETA), and the Sainbiose laboratory (UJM, INSERM).

Job Description:

The recruited engineer will be responsible for carrying out the MetaBio project, funded by the Graduate School Manutech-SLEIGHT. After reviewing the state of the art and assessing the local micro/nanofabrication and characterization capabilities, the engineer will propose a metasurface design that meets the project's goals and can be fabricated within the existing infrastructure. They will then implement the appropriate fabrication methods to produce a demonstrator.

The demonstrator will be characterized and then used with the microscopes available at Sainbiose and the Hubert Curien Laboratory to image living cells. These same cells will also be observed using a phase contrast microscope at the Hubert Curien Laboratory to benchmark the demonstrator's performance.

Alongside these technical aspects, the engineer will coordinate communication between project partners and ensure active participation and knowledge-sharing within the consortium. Project results may lead to intellectual property filings, scientific publications, and conference presentations, all of which the engineer will be involved in.

Selection Criteria:

Candidates should hold a Master's degree, engineering degree, PhD, or equivalent, with a specialization in optics. Familiarity with the concept of metasurfaces and microscopy techniques is required. Knowledge of micro/nanofabrication technologies is desirable.

The ideal candidate will demonstrate autonomy and motivation to work at the intersection of academic research and industry.

Working Conditions:

- 12-month fixed-term contract
- Weekly working hours: 38h05

- 49 days of paid leave per year
- Salary according to UJM pay scales
- Commuting expenses covered
- End-of-contract bonus (“précarité” allowance)

Application Procedure:

Applicants should send the following documents by email to maxime.darnon@univ-st-etienne.fr (subject: “MetaBio Application”):

- A CV (max 2 pages) detailing relevant experience and skills
- A cover letter (max 2 pages) explaining interest in the position and fit with the profile
- Two letters of recommendation

Applications will be reviewed on a rolling basis. Shortlisted candidates will be invited for an interview to discuss their motivations and ask questions.

The position will start as soon as the recruitment process is complete. Note that the Hubert Curien Laboratory is in a restricted security area, so final hiring is subject to approval by the defense security officer.

More Information:

- Hubert Curien Laboratory: https://laboratoirehubertcurien.univ-st-etienne.fr/en/index.html
- Sainbiose Laboratory: https://sainbiose-lab.fr/
- HEF Group : https://hef.group/
- Graduate School Manutech-SLEIGHT (France 2030 – ANR Funding): https://www.manutech-sleight.com/

Scientific References:

1. Wesemann, L., Rickett, J., Song, J., Lou, J., Hinde, E., Davis, T. J., & Roberts, A. (2021). Nanophotonics enhanced coverslip for phase imaging in biology. *Light: Science & Applications*, *10*(1), 98.
2. Ji, A., Song, J. H., Li, Q., Xu, F., Tsai, C. T., Tiberio, R. C., ... & Brongersma, M. L. (2022). Quantitative phase contrast imaging with a nonlocal angle-selective metasurface. *Nature Communications*, *13*(1), 7848.