PhD Position at EPFL:
Mid-IR Nanophotonics for Biosensing

The position:

BIONanophotonic Systems (BIOS) laboratory at EPFL Switzerland (headed by Prof. Hatice Altug) is looking for a talented & motivated PhD student to work on the development of cutting-edge Mid-IR nanophotonic biosensors and bioimaging devices for real-world applications such as diagnostics and pharmaceutics.

In a well-established laboratory, the PhD student will explore next-generation bioanalytical devices operating within the infrared band of the electromagnetic spectrum for chemical specific & conformational sensitive detection of biomolecules and biological samples. The newly developed devices will exploit novel concepts including surface enhanced infrared absorption spectroscopy (SEIRA) enabled by nanophotonic metasurfaces, hyperspectral imaging, state-of-the-art infrared equipment such as quantum cascade lasers and focal-plane array detectors as well as AI-based data science techniques. They can find applications for the study and diagnosis of diseases triggered by protein misfolding, such as Parkinson's & Alzheimer's, and drug discovery. Anticipated tasks include preparing a research plan, designing and nanofabricating nanophotonic chips, reconfiguring optical set-ups through incorporation of novel microscopy and spectroscopy techniques, microfluidics integration, optimizing bioassays, handling biological samples, performing optical/biological experiments, data analysis, reporting and disseminating research outcome.

Candidate profile:
The candidate is expected to hold a BS or MS degree in Electrical Engineering, Bioengineering, Biophysics, Photonics, Nanotechnology or closely related disciplines with outstanding academic record (excellent grades) & research experience (publications in peer-reviewed scientific journals/conferences). Additionally, following qualifications are desired, although we don’t expect having experience in all of them:

- Solid background and training in optics, photonics and electromagnetics.
- Hands-on experience in optical microscopy, spectroscopy and optical/electronic instrumentation.
- Experience in nanophotonics including electromagnetic design through optical simulations (e.g., CST, Lumerical, COMSOL), nanofabrication and nanostructure characterization.
- Hands-on experience with biosensors, biological sample handling and/or bioassay development.
- Experience in cleanroom (micro/nanofabrication).
- Experience with microfluidics.
- Experience in programming user interfaces for devices/instrumentation, optical set-up automation, data extraction (e.g., Python, Matlab, LabVIEW).
- Experience in data analysis using signal processing tools (e.g AI, DNN).
- Fluent in English (both written and spoken) and excellent communication and interpersonal skills.
- Independent, self-driven, creative, solution-oriented, open-minded, team-player & collaborative.
We offer:

- Opportunity to work on multidisciplinary and cutting-edge projects using nanophotonic biosensors, bioimaging, spectroscopy and lab-on-a-chip systems for bioanalytical and biomedical applications.
- Opportunity to access state-of-the-art research facilities and laboratory resources.
- Opportunity to collaborate with world-leading research groups.
- EPFL is an international and top ranking engineering university. It offers a dynamic, stimulating, interdisciplinary, international and friendly working environment, a broad range of scientific training and networking events and also hosts a vibrant entrepreneurial community.
- EPFL is an equal-opportunity employer. Candidates will be recruited based on merit.

Keywords:
Nanophotonics, infrared spectroscopy, optical nanobiosensors & bioimaging systems, lab-on-a-chip devices, microfluidics, biological samples, diagnostics

Group website:
https://www.epfl.ch/labs/bios/
Group leader: Prof. Hatice ALTUG

Relevant recent papers from our lab:

Start date: As soon as possible

Contact:
Please send your application with the subject line « 2023 Mid-IR PhD Position» to bios@epfl.ch in a single pdf file containing following information: cover letter, CV, transcript, list of publications, and contact details of at least three referees.