

Post-doc on high-speed computational Raman microscopy

Background. Raman microscopy is a label-free chemically-selective technique with superb spatial resolution. Even though technological developments in Raman microscopy are impressive in terms of speed [1], there is still the issue of overwhelmingly large data sets generated, an aspect that fundamentally precludes video-rate microspectroscopy. In recent years, we developed a set of new computational microscopy tools exploiting paradigm shifts in signal processing (Compressive Sensing) in order to achieve chemically selective imaging at high speeds. We coin the set of methods compressive Raman microspectroscopy [2-6]: we design an experiment which retrieves the same outcome as in traditional sensing, however performing considerably fewer measurements. For that purpose, we develop novel spectrometers layout using fast digital micromirror devices (DMD). Exploiting this emerging technology, we have shown record acquisition speeds [3,4] and sensitivity [2] in various biomedical systems. Nevertheless, the speeds are not compatible with highly dynamic specimens.

As a next step, we will further increase the acquisition speed to tackle motile biological systems. The successful applicant will work on a new programmable spectrometer layout, in order to increase the throughput of compressive Raman imaging, therefore reaching the necessary speed to observe the formation of bacterial biofilms [7-8] in real time.

Candidate profile. In order to be successful in this interdisciplinary project, the candidate must be highly motivated, independent and with a taste for interdisciplinary research. He/she should have a PhD in Physics or Chemistry, preferable involving any of the following topics: optical imaging, computational microscopy, optical computing, soft matter physics. Programming skills are compulsory regardless of the language. Candidates from Life Sciences are also welcome to apply, provided that the candidate has sufficient background in any topic of computational microscopy, with additional hands-on experience with optical layouts.

Offer details. Initially, we will provide 1-year contract with potential for extension depending on the evaluation of the project development. The position covers all social benefits in France (health care, pension system, etc.). Gross salary starts at 2500€ and will vary depending on the experience. The position is to start as soon as possible.

How to apply. Applicants should submit CV, a brief motivation statement, and at least one contact detail for requesting a recommendation letter, to: Dr. Hilton Barbosa de Aguiar, [Complex Media Optics Lab](mailto:h.aguiar@lkb.ens.fr), Laboratoire Kastler-Brossel, 24 Rue Lhomond, 75005 Paris, h.aguiar@lkb.ens.fr

References

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