**Postdoctoral Position**

**Computational Optics and Optical Computing**

The « optical imaging in biological and complex media » group at LKB (ENS Paris) is looking for a motivated and experienced candidate, to work in a challenging project, combining Signal Processing, and Computer Science with Optics for new and exciting applications.

**Context and project:**

The context: Scattering of light in complex environments has long been considered a nuisance and an inescapable limitation to imaging and sensing alike, ranging from astronomical observation, biomedical imaging, spectroscopy, etc. In the last decade, wavefront shaping techniques have revolutionized this view, by allowing light focusing and imaging even deep in the multiple scattering regime. This principle is embodied in the possibility –pioneered in the group- to access the transmission matrix of a complex medium. **Generalized imaging and sensing:** Rather than tediously focusing and imaging through a scattering material, we have recently shown that computational approaches can significantly improve and simplify the imaging process or even bypass it for direct information extraction. **Optical computing:** Thanks to the highly multimode nature and the strong mixing properties of complex material, we have also investigated complex media as a platform for (analog) high performance optical computing.

The project: The project will aim at pushing these concepts further, and develop novel computational methods for microscopy deep in scattering media, with application in biomedical imaging, exploiting concepts such a (but not restricted to) phase-retrieval, compressive sensing, machine learning, etc. Correspondingly, the candidate will be involved in developing new optical computing applications exploiting randomized algorithms.

The candidate:

We are looking for a skilled researcher, with prior experience in signal processing, machine learning, computer Science, and/or computational optic. Prior training or experience in physics is not required, but the candidate will be embedded in an interdisciplinary physicist environment, and the ability to interact with scientist from different background is definitely a must. The candidate will have the opportunity to develop new algorithms and methods for optical imaging and/or computing in complex media. He/she will work in close collaboration with experimentalists of the team to implement his ideas on real-life systems. He/she will also have the opportunity to interact with our signal processing/ML collaborators, most notably the nearby team of Prof. F. Krzakala and startup company LightOn (www.lighton.io).

**conditions** : The Project is supported by a ERC Consolidator Grant. The expected duration is for 2 years (+1 year possible extension). Start date from Apr. 1st 2017.

Contact (PI): Prof. Sylvain Gigan - sylvain.gigan@lkb.ens.fr


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2. A. Liutkus, et al., Imaging With Nature: Compressive Imaging Using a Multiply Scattering Medium, Scientific Reports 4, 5552 (2014) [link](http://www.lkb.upmc.fr/opticalimaging/)