

Post-doctoral position in Photo-acoustic imaging project at Institut Fresnel (Marseille)

Background

PhotoAcoustic imaging is an emerging imaging technique that can be used for probing biological tissues in a non invasive way because of the radiations involved are non ionizing. It consists in illuminating the tissues (skin, breast, muscles...) with a pulsed light, in the red or near-infrared wavelength range where light penetrates well the tissues. The locally absorbed energy will be dissipated into heat producing an ultrasonic wave that will propagate through the tissues and collected with ultrasound detectors (transducers). The present project is dedicated to the quantitative validation of a new protocol of data acquisition in PhotoAcoustic Tomography.

The project is developed under a close collaboration between two research laboratories of Marseille (France): Institut Fresnel (CNRS UMR 7249 Aix-Marseille Université, Centrale Marseille) is a laboratory specialized in Optics and Laboratoire de Mécanique et d'Acoustique (CNRS UPR 7051, Aix-Marseille Université, Centrale Marseille) and funded by SATT Sud-Est, SAS at the interface between public research laboratories and the industry world, affiliate of the 5 universities of Provence Alpes Côte d'Azur and Corsica, of Ecole Centrale Marseille, of CNRS and INSERM. The applicant will be hired by SATT Sud-Est, SAS.

Description of the position

Within this project, the applicant will have in charge:

- the orientations of the instrumental modifications of an existing photoacoustic prototype in order to include the new protocol;
- to conduct the validation study of the new data acquisition protocol first on tissue mimicking phantoms and then on small animals. This includes numerical forward and inverse problems simulations and design of biological phantoms and controlled measurements of their physical properties (both optical and acoustic).

To this purpose, the applicant will be aided by two research engineers specialized in physical instrumentation and scientific computing, under the supervision of the SATT project manager and scientific director at Institut Fresnel.

Proficiency

The applicant should have already worked in the context of development of a laboratory bench and should be aware of experimental constraints.

He should hold a PhD in Physics, Biomedical engineering, Signal processing or Applied Mathematics with affinity for Physics and Biology, with some expertise in:

- Working with intense pulsed lasers and their constraints;
- Interest for experimentation ;
- Knowledge of models of propagation of optical and acoustic waves ;
- Knowledge in applied mathematics (inverse problems resolution, image reconstruction algorithms) and signal processing;
- Programming skills : C/C++ and Matlab
- English read, written and spoken
- Autonomous, curious, sense of responsibility, rigor and compliance with commitments
- Teamwork

Place : Marseille, Institut Fresnel

Contract : research fellow

Duration : 16 months

Starting date : immediately

Send CV + lettre of motivation to anabela.dasilva@fresnel.fr and julien.piasecki@sattse.com