Multiparametric analysis of tumor development using ultrafast ultrasound imaging

2-6 months

Physics for Medicine, Paris

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Context

Ultrafast Ultrasound has revolutionized the use of ultrasound imaging, giving rise to various new quantitative state of the art imaging modalities. These include high sensitivity Doppler imaging and superresolution imaging, Shear Wave Elastography (SWE) and Backscatter Tensor Imaging (BTI). These techniques respectively capture the blood vasculature with high sensitivity and high resolution, the elasticity of tissues and the fiber structure in 3D. All these parameters are highly modified during tumor development, and it is therefore hypothesized that combined imaging capturing all these aspects may provide crucial information on tumor development and response to treatment.

With this project we aim to confirm this hypothesis on a preclinical series of 20 tumor-bearing mice, imaged throughout tumor development. The data has been acquired as part of an ongoing PhD project, and is ready for analysis. Histology data will also be available for validation.

Objectives

The objective of this internship is to take on the data analysis corresponding to the preclinical acquisitions:
The candidate will :

- Become familiar with the image acquisition protocol and different imaging modalities investigated
- Develop and apply quantitative analysis of the data obtained for each modality, especially quantitative analysis of vascular development
- Correlate the quantitative parameters to the tumor evolution and to each other using statistical analyses and image processing

We are looking for a candidate with an interest in medical imaging, ideally some knowledge of ultrasound imaging and/or image processing and strong Matlab skills.

Please send your CV and cover letter to beatrice.walker@espci.fr