

## PhD student in 3D ultrasound multiparametric imaging

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<b>Position</b>	PhD
<b>Duration</b>	3 years
<b>Project Context</b>	<p>Breast cancer is diagnosed today using tissue samples called biopsies, so as to precisely characterize the tumour and determine the appropriate treatment. However, biopsies are costly and represent a major source of stress and discomfort for the patient. ERC project MUSCAD proposes a novel approach for characterizing breast tumour non-invasively, applying machine learning to multiparametric images of the tumour. Existing clinical imaging techniques are not sufficient for a precise diagnosis, but the recent development of advanced ultrasound techniques may change this paradigm. In particular, recently developed ultrasound imaging techniques can now capture fiber structure, tissue stiffness and vascularization, which are known to be abnormal in tumours. These techniques have never been applied in 3D together for the clinic. This PhD project focuses on the development of a new clinical machine integrating these different techniques in an optimized and automated way for use in hospitals.</p> <p>Within a multidisciplinary team composed of physicists, engineers and medical doctors, the PhD student will be responsible for developing, optimizing and validating the different imaging protocols for the new machine, and integrating them together into a prototype for the clinic.</p>
<b>Missions</b>	<ul style="list-style-type: none"> <li>• Analysis of the literature and state of art in the field</li> <li>• Development of novel imaging algorithms</li> <li>• Design of reference in-vitro setups and in-vivo experiments</li> <li>• Conduction of optimization and validation experiments</li> <li>• Analysis and reporting of results</li> <li>• Communication of results in scientific articles and conference</li> </ul>
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Wave physics (ultrasound)</li> <li>• Programming (Matlab, Python, R)</li> <li>• Instrumentation and electronics</li> <li>• Image processing</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Experience in conducting experimental work</li> <li>• Ability to work in a multidisciplinary team</li> <li>• Proficiency in English</li> <li>• Drive and initiative</li> <li>• Rigor and precision</li> </ul>
<b>Degree</b>	Masters degree in acoustics, biomedical engineering or physics
<b>Salary</b>	2077 euros/month (gross)