



Internship: Measurement of the acoustic impedance of a piezoelectric material with an ultrasound imaging array.

Context: The overall project aims to develop a network of highly sensitive, wireless, and autonomous sensors to monitor physiological parameters, such as heart rate, glucose levels, or neuronal activity, in real time. While many similar sensors have been developed, few have been successfully applied in clinical settings due to challenges such as reliability, patient discomfort, and the potential for allergic or inflammatory responses. The goal is to overcome these barriers through the creation of miniaturized, comfortable, and wearable biosensors. Preliminary work has shown the potential of using an ultrasonic transceiver to measure physiological activity indirectly through the measurement of a piezoelectric element. The project's core is to evaluate the feasibility of simultaneously measuring electrical potentials variations on multiple transducers, using beamforming techniques, to indicate neuronal activity.

Mission: The aim of this master's or engineering's degree internship is to specifically measure a change in ultrasound reflectivity of a piezoelectric element and to evaluate how this parameter alters when the voltage applied to the material is changed.

Activities:

- Design and execute a series of experiments
- Data collection and analysis
- Valorize and disseminate scientific results through a research article

Requirements:

- Knowledge in general physics or acoustics
- Previous experience with the Verasonics ultrasound system **or** proficiency in programming (MATLAB)
- Appreciation for experimental work, and analysis of experimental datasets

Additional information: This project is funded under a France Life Imaging program and is a collaboration with the Grenoble Institute of Neuroscience. The successful candidate will work at the academic Laboratory of Therapeutic Applications of Ultrasound (LabTAU, Inserm U1032) located in the Grange-Blanche area, in Lyon, France. Duration of the internship can range from 4 to 6 months. Remuneration according to national standards: 3.90 euro per hour.

For application or additional information, please send CV and motivation letter by e-mail to Maxime Lafond (maxime.lafond@inserm.fr)