



## Thesis Project Form

**Title (tentative):** Design, fabrication, and test of an array of soft ultrasound generators for in vitro applications

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### Description

#### Motivation and application domain

Ultrasound represent an efficient strategy for the controlled mechanical stimulation of cells and tissues both in vitro and in vivo. It has been proven that such stimulation activate/inhibit intra-cellular pathways, thus modulation cell differentiation, growth, and functions.

#### General objectives and main activities

The objective of the thesis project is to develop an array of ultrasound (US) generators, made of a soft elastomer (PDMS) doped with piezoelectric nanoparticles, that can be coupled and operated with standard multiwell plate for cell culture.

The development will consist in both fabricating the transducers and the electronics to drive them, as well as in testing and characterizing the generated US in water solution.

#### Training Objectives (technical/analytical tools, experimental methodologies)

The thesis will provide experience in:

- laboratory techniques/procedures to fabricate composite materials
- CAD design and 3D printing
- electronic circuit design and testing
- microcontroller programming
- measurement of the generated US field in water

**Place(s) where the thesis work will be carried out:** DIBRIS

### Additional information

**Pre-requisite abilities/skills:** attitude toward experimental work

**Maximum number of students:** 1