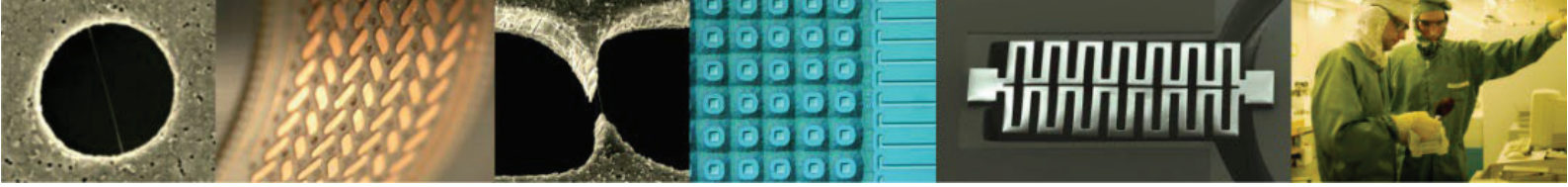

Bonding process development in a biomedical acoustic sensor

Motivation

Titanium bone prostheses are commonly used to promote bone healing in patients. However, infections-related complications can arise and ultimately lead to necrosis and amputation.

We have developed an acoustic patch which is able to passively monitor small temperature gradients in-vitro.

Our next objective is to transfer the patch on titanium and assess its sensitivity to strain. In this way, it will be possible to apply a new sensing concept which could potentially be used in biomedical applications (e.g. bone healing monitoring).

Project

This project will be focused on the bonding process optimization between the patch and the titanium substrate. Further mechanical tests to assess the adhesion combined with ultrasonic measurements will be implemented to assess and quantify the outcome of the bonding process.

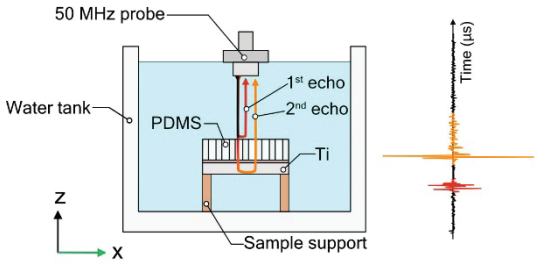

Figure 1: Experimental ultrasonic set-up and sample

Your Task

You will have the opportunity to work in the CMi-Center of MicroNanotechnology of EPFL to perform the fabrication process.

In the second part of your project, you can access ETH Zurich and EMPA to perform ultrasonic characterization.

Your Profile

- You are a student with a background in mechanical engineering/physics, looking for an experimental **Master Thesis**.
- You have a good overview and preferably preliminary experience with fabrication processes.
- You are good or interested in an **experimental** work.
- You are interested in gaining experience in an **interdisciplinary** project at the edge with **medicine, acoustics** and **microtechnologies.**

You will learn how to:

- Work in a top class cleanroom
- Mechanical and acoustic testing to validate your process optimization findings
- Work in different research labs (ETH Zurich and EMPA Dubendorf)
- Work in an interdisciplinary project with engineering and medical requirements

Contains: **Experimental work in cleanroom facilities (50%), Acoustic and mechanical measurements (25%), Analysis and presentation of your data (25%)**

Contact:

Lucrezia Maini
CLA G13
Micro and Nanosystems
lucrezia.maini@micro.mavt.ethz.ch

+41 (0) 44 632 24 13

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Empa
Materials Science and Technology

Micro and Nanosystems
http://www.micro.mavt.ethz.ch/

Transport at Nanoscale Interfaces Laboratory
http://www.empa.ch/tnilab