



# Internship/Study Project

Laboratory for Biomedical Microtechnology – Prof. Dr.-Ing. Thomas Stieglitz

## Topic: Comparative Analysis of Time-of-Flight Methods for Echo Extraction

### Introduction

Ultrasound plays a crucial role in medical diagnosis and treatment. This research examines how algorithms impact ultrasound accuracy, particularly in signal analysis and post-processing. It focuses on various Time-of-Flight (ToF) extraction methods in ultrasound imaging. The straightforward threshold method for echo detection may have limited resolution, while the cross-correlation method shows potential by measuring signal delays using peak time indexes. However, there is a lack of comparative research on the accuracy of these algorithms.

### Objectives

Comprehensive analysis and comparison of different ToF extraction techniques.

### Your tasks

- Analysis of the data provided from in-vitro and ex-vivo experiments.
- Application of different methods (Hilbert-Transform, cross-correlation, short-time Fourier Transform) to the echoes and determination of arterial diameter and arterial thickness.
- Determination of the blood pressure from the data above. Which is the most accurate method? Which are the errors introduced?
- Presenting results and writing the report.

### Your profile

- You have experience with programming and enjoy it (programming language can be discussed).
- You are motivated.
- You can work in a concentrated, focused and structured way.

### Logistics

- Location: Campus for Intelligent Machine-Brain Interfacing Technology (IMBIT)
- Earliest starting date: October 2023 (can be discussed)

### Contact

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