

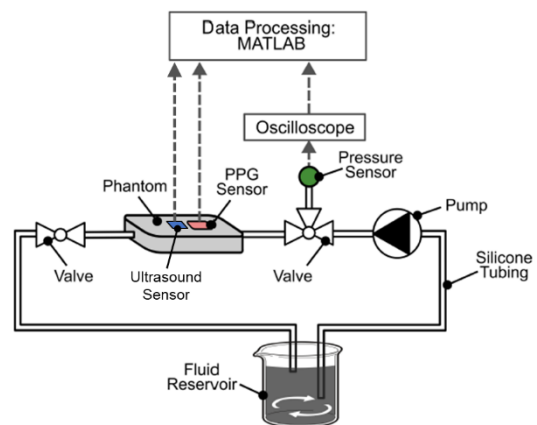
# Bachelor's Semester Project

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

## Comparison of photoplethysmography and ultrasound for cardiovascular health monitoring

### Introduction

Various methodologies are available for the estimation of blood pressure and cardiovascular health monitoring. Among these, photoplethysmography (PPG) stands out as a widely used non-invasive and low-cost method. However, ultrasound offers distinct advantages, such as multi-site application capabilities and deeper penetration into tissues. It is important to investigate whether ultrasound also exhibits higher estimation accuracy compared to PPG. Therefore, a novel study comparing both methodologies is warranted to gain deeper insights into their performance.



### Objectives

Comparison of a PPG sensor system to ultrasound in a custom cardiovascular phantom of the wrist.

### Your tasks

- Fabricate a phantom of the wrist and incorporate it into a mock circulatory loop (MCL);
- Integrate the PPG sensor system and the ultrasound system (separately) in the MCL;
- Compare both PPG and ultrasound systems' results;
- Presenting results, discussing progress and next steps, while documenting the process;
- Writing a report.

### Your profile

- You have to do a mandatory internship as part of your bachelor's studies.
- You are interested in working in the lab.
- You are comfortable with programming in MATLAB and/or Python;
- You can work in a focused, structured, and independent way;

### Logistics

- Duration: 6-8 ECTS
- Location: Campus for Intelligent Machine-Brain Interfacing Technology (IMBIT)
- Earliest starting date: June 15th, 2026 (can be discussed)

### Contact

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