

## Student Research Assistant (HiWi) position

# Systematic error investigation in diameter measurement using QFA

### Motivation

In patients undergoing vascular surgeries (e.g., bypass grafting), the use of intraoperative blood flow measurement has proven to be effective in reducing recurrence rate. This is made possible by quantitative fluorescence angiography (QFA), which is a camera-based method. Therefore an end-to-end workflow from the input of clinical video data to the output of quantitative flow values has been developed at the Institute.

This project aims to analyze and improve this pipeline in terms of investigation in the vessels' diameter measurement.

### Task description

A core element in QFA is the measurement of vessel inner diameter for calculating the cross-sectional area of the blood vessel.

However, it has been found that QFA often examines the outer diameter of vessels, which may introduce systematic errors in volume flow measurements. This project seeks to analyze and quantify these induced errors on volume flow.

This can be theoretically calculated or practically tested using flow phantoms. Additionally, it is worthwhile to investigate potential error compensation methods. Specifically, whether the inner diameter can be calculated from the available information.

**In this project, previously recorded tube models will be analyzed. Existing methods for diameter extraction will be applied and optimized. If required, new recordings of the silicone tubes will be conducted.**

### Requirements:

- Programming experience in MATLAB or a similar language
- Studying and understanding existing code
- Basic knowledge in signal processing and algorithms
- Knowledge in optics

### Area of Research

Optical Technologies in  
Medicine and Life Science

### Project

Quantifying Blood Volume  
Flow Using Optical Methods

### Research Orientation:

Signal Processing, Software  
Development, Algorithmics,  
and Experimental Studies

### Course of Study

Computer Science  
Electrical Engineering

### Starting Date

starting immediately



### Contact person

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