



# Virtual Reality Methods for Surgical Guidance

Project Management and Software Development  
for Medical Applications

## General Info

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## Project Abstract

The chair for computer aided medical procedures together with Balgrist University Hospital is offering a student project (Thesis/ HiWi) for an exciting project related to a virtual reality setup for surgical guidance. The student is supposed to work in a multidisciplinary team of engineers and orthopedic surgeons to develop AR/VR system for surgical guidance.

different information displays such as visual or auditory. The project will also focus on investigating the feasibility of auditory augmentation systems as an information source for surgeons. There is a potential to extend the project in terms of the design and implementation of auditory augmentation tools.

## Technical Prerequisites

- Strong Programming Skills (c++, c#)
- Experience in Unity Programming
- Audio Programming (preferred)

## Background and Motivation

There are different approaches for guiding surgeons by providing valuable insights into the patient's body. Despite these outstanding advances which are based on modern data acquisition, tool tracking, and real-time visual augmentation technologies, surgeons are still confronting perceptual challenges in order to make the optimal decisions during surgery. The focus of this thesis project is on exploring the potentials of AR/VR to improve surgical tasks

## Student's Tasks Description

The aim of this project is to design, develop, and validate a multimodal feedback system for guiding surgeons during interventional tasks in orthopedic surgery. The project includes the development of a realistic virtual environment which is supposed to be used as a general platform for evaluation of

Please send the completed proposal to [javier.esteban@tum.de](mailto:javier.esteban@tum.de), [ardit.ramadani@tum.de](mailto:ardit.ramadani@tum.de), [mf.azampour@tum.de](mailto:mf.azampour@tum.de) and [zl.jiang@tum.de](mailto:zl.jiang@tum.de). Please note that this proposal will be evaluated by the BMC coordinators and will be assigned to a student only in case of acceptance.