

## Teaching

Teaching forms a large part of the activities that take place in the NARVIS Laboratory where students at all levels of their studies have the opportunity to work on interesting projects. This allows them to have hands-on experience while applying their theoretical knowledge gained from their lecture courses. Student projects include topics in image processing, computer graphics, human-computer interaction and augmented reality. See our web site for the most up to date information on projects running.

Since the NARVIS laboratory is based in a hospital, there is a strong collaboration with doctors and surgeons who provide a valuable input into the work undertaken at the lab. Students at the lab have the opportunity to form an understanding of the challenges that exist in bringing new applications into a clinical environment and they are able to see first-hand how surgeries are performed.

Facilities at the lab include a video conferencing system that allows our researchers in different laboratories to have meetings on short notice and a smart board for presentations.

## Contact

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## NARVIS Laboratory

### Computer Aided Medical Procedures

In parternship with:

**Klinikum Innenstadt (LMU)**



## NARVIS Laboratory



The NARVIS laboratory is our research laboratory at the hospital Klinikum Innenstadt Universitätsklinikum der LMU. It provides an interdisciplinary working environment for our research activities. The NARVIS laboratory focuses on developing medical applications using augmented reality technologies.

The two main research interests at the lab are the Camera Augmented Mobile C-Arm and in-situ visualization using a stereo video see-through head mounted display. Furthermore, we have some projects looking at endoscope augmentation and we have a tabletop system which facilitates collaborative analysis of medical imaging data. The NARVIS lab is the ideal space for interdisciplinary meetings, teaching events and research.



### Scientific Research Director

Prof. Dr. Nassir Navab is the head of Chair for Computer Aided Medical Procedures & Augmented Reality, Fakultät für Informatik, Technische Universität München.

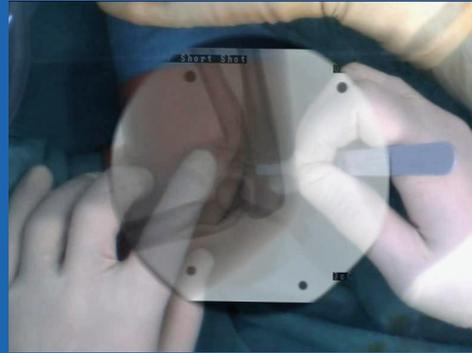


### Medical Director

Prof. Dr. med. Wolf Mutschler is the head of Chirurgische Klinik und Poliklinik - Innenstadt, Klinikum der Universität München.

## Projects at NARVIS

### Camera Augmented Mobile C-Arm



Mobile C-arms are an everyday tool used to acquire X-ray images in the operating room during surgery. The Camera Augmented Mobile C-arm (CamC) system enhances a regular mobile C-arm with a video camera that overlays a video image onto the X-ray image. Using a mirror construction and a one time calibration routine, the acquired X-ray images are co-registered with the video images without requiring any further calibration or registration. The CamC system has a wide range of potential clinical applications, such as needle guidance, interlocking of intramedullary nails and pedicle screw placements.

### A Multi Sensory Table Top System for Medical Procedures

A tabletop system in medical environments can be used both for interactive and collaborative analysis of patient data, and also as a multimedia user interface in sterile areas. For pre-operative planning, physicians in charge of a particular patient meet to discuss the medical case and to plan further steps for therapy. They could collaboratively view and browse through all kinds of available medical imaging data using the tabletop system.

Alternatively such a system could be a central interaction device for various kinds of equipment within the operating room which require user input but can currently not be operated by a sterile surgeon. We believe that the projection of a user-interface on a sterile glass plane could benefit the clinical workflow.

### Augmented Reality using a Stereo Video See-Through Head Mounted Display

Different research projects focusing on navigated augmented reality visualization have been established and they use a head mounted display augmented reality system in our lab to provide users with a 3D in-situ visualization of volumetric imaging data. A promising medical application for the system turned out to be minimally invasive procedures in spinal surgery.



The project 3D user interfaces for medical interventions focuses on practical user interfaces for 3D imaging when working in an augmented reality environment.

The usual monitor based visualization and mouse based interaction with 3D data does not present acceptable solutions. Here, we study the use of head mounted displays and advanced interaction techniques as alternative solutions.

