Charité – Universitätsmedizin Berlin - Department of Surgery, Experimental Surgery, Digital Surgery Lab

The Digital Surgery Lab identifies needs from the field of emerging health technologies and translates them into concepts for digital healthcare. Our research and development activities helps hospitals, surgeons, researchers and students to expanding their digital expertise and integrate digital technologies into their workflows. As an enabler between research, development and clinical practice, our team brings together interdisciplinary approaches from medicine, technology, humanities and design.

Hardware Prototyping & Sensors for XR Medical Simulation

Student Assistant at Digital Surgery Lab

City: Berlin; Starting date (earliest): At the earliest possible; Duration: 31.03.2028; Remuneration: TV Stud III; Reference number: 8437; Closing date: 31/10/26

Tasks

The project: IMPACT (Immersive Medical Practice and Competency Training) is developing a Mixed Reality trainer for chest tube insertion. This is a life-saving emergency procedure that medical students usually see explained but rarely get to perform. Students work on a physical manikin with real instruments, and the headset overlays step-by-step guidance and anatomy. The project is based at the Digital Surgery Lab, Charité – Universitätsmedizin Berlin, in collaboration with emergency medicine and medical education.

You will help to build the physical side of the system: the sensors and tracking that connect real objects to the MR application.

Build sensor modules for the training manikin. This means wiring microcontrollers (Arduino, ESP32), cameras and IR sensors, and integrating them into custom enclosures.
Prototype tracking for surgical instruments using active IR LED markers or passive retroreflective markers, and test how accurate they are.
Evaluate sensors for measuring force and contact during the procedure.
Design and 3D-print mounts and housings.
Document your builds so the team can reproduce and extend them.

Requirements

What you bring

- You are enrolled in Mechatronics, Electrical or Computer Engineering, Biomedical Engineering or a related field (Bachelor from 3rd semester or Master).
- You have hands-on experience with Arduino, ESP32 or Raspberry Pi and basic circuit design.

- You can read sensor data, filter it, and pass it to another system (serial, Bluetooth, Wi-Fi).
- You work independently and document what you do.
- You speak English and some German

Nice to have (we'll teach the rest)

- CAD and desktop 3D printing
- Optical tracking systems (e.g. OptiTrack) or VR hardware
- Unity or another game engine

What we offer

Das bringt die Charité mit:

- The chance to write your Bachelor's or Master's thesis within the project, with supervision
- A permanent workstation/desk at Campus Virchow-Klinikum
- An interdisciplinary team of researchers, surgeons, developers and designers
- Hands-on work on a clinically relevant MR application, not just a look at one
- Free access to Charité's training and continuing education programmes
- Flexible hours that fit around your studies

Informationen zur Stelle:

- Entgeltgruppe TV Stud III. Den Tarifvertrag finden Sie hier
- Der Stundenlohn beträgt charitéweit 15,08 Euro.
- Arbeitszeit: 40 Monatsstunden
- Befristung: 31.03.2028
- Bewerbungsfrist: 31.10.2026
- Kennziffer: 8437

Application

https://karriere.charite.de/stellenangebote/detail/8437
Reach out via email if you have any question to Prof. Dr. Moritz Queisner, moritz.queisner@charite.de
Send your CV, a few lines about yourself, and links or photos of things you've built.

More information at https://stellenticket.de/208118/HTWB/
Offer visible until 18/11/26