

The **Laboratory for Surgical Planning and Robotic Cognition (SPARC)** offers a

Position as Research Assistant (m/f/d) with the perspective of a doctorate

for a research project with the tentative title

Humanoid Robot Platform in the Operating Room

The Project:

The project aims to pioneer the integration of humanoid robotic systems into the operating room as intelligent clinical assistants. Unlike conventional surgical robots that directly perform surgical tasks, the envisioned humanoid platform will support the surgical team through a combination of physical assistance, scene understanding, human-robot interaction, and automated documentation. The research will investigate how humanoid robots can act as collaborative partners in complex clinical environments by assisting with instrument handovers, providing context-aware information, monitoring surgical workflows, and supporting intraoperative decision-making through advanced perception and AI technologies.

The successful candidate will contribute to establishing a unique research program at the intersection of humanoid robotics, surgical assistance, computer vision, and human-centered AI. The project combines methodological research with translational evaluation in realistic clinical settings through close collaboration with clinicians at University Hospital Erlangen and industrial partners. The long-term goal is to develop and validate novel humanoid assistance technologies that improve workflow efficiency, reduce workload for clinical personnel, and create the foundation for future intelligent robotic assistants in surgery.

Key Responsibilities:

The exact research focus will be refined during the project. Candidates are not expected to address all of the listed areas; the position may concentrate on a selected subset depending on expertise and project needs.

- Integrate a humanoid robotic platform for surgical assistance scenarios in the operating room.
- Implement and integrate perception algorithms for surgical scene understanding, including the recognition of deformable tissues, instruments, and workflow context.
- Develop human-robot interaction methods, including speech-based interfaces and context-aware assistance functions.
- Design and implement systems for automated surgical workflow monitoring and documentation.
- Conduct experimental evaluations and user studies in collaboration with clinical partners to assess usability, acceptance, safety, and ergonomics.
- Build and maintain laboratory and experimental infrastructure for humanoid robotic research in surgery.
- Publish research results in leading international journals and conferences in robotics, medical robotics, AI, and human-robot interaction.
- Contribute to the acquisition of external research funding and the development of strategic collaborations with academic and industrial partners.
- Supervise student researchers and support the development of a growing research program in humanoid robotics for healthcare.

Qualifications:

- Above-average university degree (Master's or Diploma) in Computer Science, Electrical Engineering, Mechanical Engineering, Mechatronics, or a related field
- Strong background in Machine Learning, Computer Vision, and Software Development; background in robot control and use/design of robot hardware is an advantage
- Experience in development and implementation of algorithms / software in Python or C/C++
- Experience with machine learning frameworks, preferably PyTorch (TensorFlow is also acceptable)
- Solid understanding of computer vision and human-robot interaction, demonstrated through independently implemented projects
- Good knowledge of robotics, including transformations, coordinate systems, and kinematics
- Ability and willingness to work both independently and collaboratively with a diverse team in a goal and solution-oriented manner
- Very good English language skills, both written and spoken; German language skills are advantageous
- High level of motivation, initiative, responsibility, and creativity, combined with strong communication and teamwork skills

Additional Descriptions:

- Aim for doctorate (Dr.-Ing.) at FAU
- A fully funded position (100%, TVL-E13) in a young, dedicated, and innovative team that addresses significant medical and technical challenges using scientific methods
- A creative and inspiring work environment where you collaborate with renowned partners from research, medicine, and industry to develop, implement, and analyze innovative projects
- Interdisciplinary project work and a top-tier national and international network
- An excellent starting position for an academic career or a career in leading industrial companies
- Development and experience in teaching, taking on leadership roles in student projects
- Possibility for (part-time) remote work (home office)

The SPARC Lab:

The laboratory for Surgical Planning and Robotic Cognition (SPARC) at FAU Erlangen-Nürnberg investigates cognition guided robots for surgical assistance in minimally invasive procedures, intelligent and flexible surgical instruments, and intuitive interfaces between humans and robots in the operating room. The SPARC laboratory conducts interdisciplinary research in close collaboration with national and international partners. We aim to contribute to building a healthcare system that enables optimal and personalized treatment of patients through targeted interactions between surgical experts and the next generation of minimally invasive surgical robots and assistance systems. You can find more information about the lab and our research on our website: www.sparc.tf.fau.de

FAU promotes equal opportunities. Female and non-binary candidates are specifically encouraged to apply. The position is open to start as soon as possible (presumably September/October 2026). Please send your application (until 10.7.2025) including cover letter with interests and background (max. 1 page), plus full CV and transcripts, **as one PDF document** via e-mail to Prof. Dr. Franziska Mathis-Ullrich (franziska.mathis-ullrich@fau.de), chair of the Laboratory for Surgical Planning and Robotic Cognition at FAU Erlangen-Nürnberg.

Please note that the candidate evaluation involves one or more scientific-technical presentations and interview appointments to be held in person or via teleconferencing. Furthermore, please note that applications not complying with the above requirements may neither be confirmed nor considered.

This includes generic AI-generated applications.