



University  
of Basel

Department of  
Biomedical Engineering



Selected research topics in Biomedical Engineering:

## **Robot- & Computer-Assisted Surgery**

Location: DBE, Hegenheimermattweg 167B, Lecture Hall 02.097

Date & Time: Thursday 07.12.2023 13:15 – 15:00

# **Human-Machine Collaboration in Surgery - Bridging the Gap between Robotics and Data Science**

***Prof. Stefanie Speidel***

*TU Dresden*

## **Abstract**

Increasingly powerful technological developments in surgery such as modern operating rooms (OR), featuring digital and interconnected as well as robotic devices provide a huge amount of valuable data which can be used to improve patient therapy. Although a lot of data is available, the human ability to use these possibilities especially in a complex and time-critical situation such as surgery is limited and is extremely dependent on the experience of the surgical staff. This talk focuses on AI-assisted surgery with a specific focus on analysis of intraoperative video data. The goal is to democratize surgical skills and enhance the collaboration between surgeons and cyber-physical systems by quantifying surgical experience and make it accessible to machines. Several examples to optimize the therapy of the individual patient along the surgical treatment path are given. Finally, remaining challenges and strategies to overcome them are discussed.

## **Biosketch**

Stefanie Speidel is a full professor for “Translational Surgical Oncology” and director at the National Center for Tumor Diseases (NCT/UCC) Dresden since 2017 as well as one of the speakers of the DFG Cluster of Excellence CeTI since 2019 and the Konrad Zuse AI school SECAI since 2022. She received her PhD from Karlsruhe Institute of Technology (KIT) with distinction in 2009 and had a junior research group “Computer-Assisted Surgery” from 2012 – 2016 at KIT. She is an elected board member of the Medical Image Computing and Computer Assisted Interventions (MICCAI) society, a MICCAI fellow and an appointed member of the German Council for Scientific Information Infrastructures (RfII). She has been (co)-authoring more than 130 publications and regularly organizes workshops and challenges including the Endoscopic Vision Challenge@MICCAI. She has been general chair and program chair for a number of international events including the International Conference on Information Processing in Computer Assisted Interventions (IPCAI) and MICCAI conference. Her current research interests include machine learning for image- and robot-assisted surgery, data-driven surgical training and context-aware human-machine collaboration in the future sensor operating room.