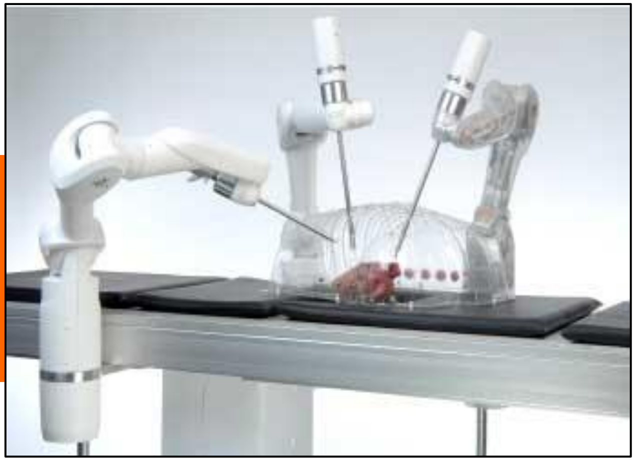
# *“Pose Estimation of Medical Instruments with a Robotic Vision System”*



Case Study Project

Summer semester 2024

Dortmund, 17.06.2024

Dr.-Ing. Tai Fei

Ruhr Master School
of Applied Engineering

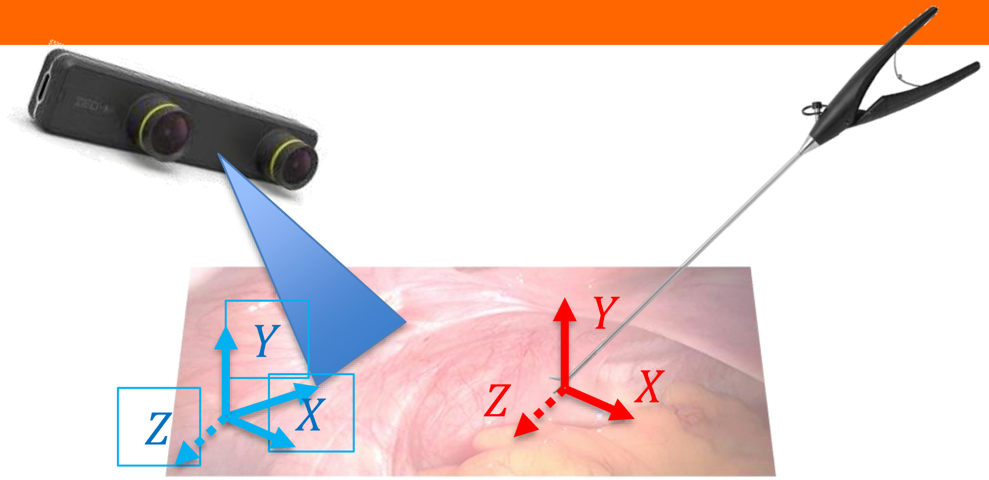
BMT

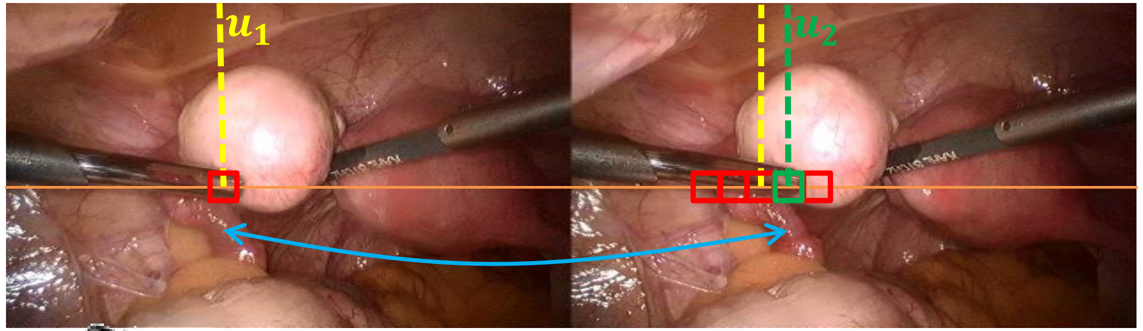
we focus on students

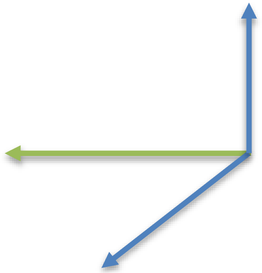
Fachhochschule Dortmund
University of Applied Sciences and Arts

## Project “Tracking of the Needle holder”

- 3D Tracking of Needle Holder Trajectory During Surgery.
- Primary Goal: Object Detection and Trajectory Tracking of the Needle Holder Tip
  - Data: Stereo images from an embedded vision system
  - Detection of colored objects within the surgical scene
  - 3D-Reconstruction, orientation of needle holder rod
  - Use marker on the plan of the medical scene picture as coordinate origin.
  - Track the trajectory of the needle holder tip and annotate the orientation vector of the rod at each position.
  - **Optional**: Is the pose of needle holder completely defined? What is missing? Any suggestion for solution?



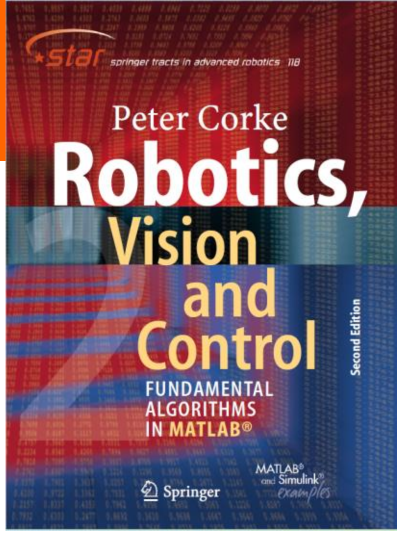



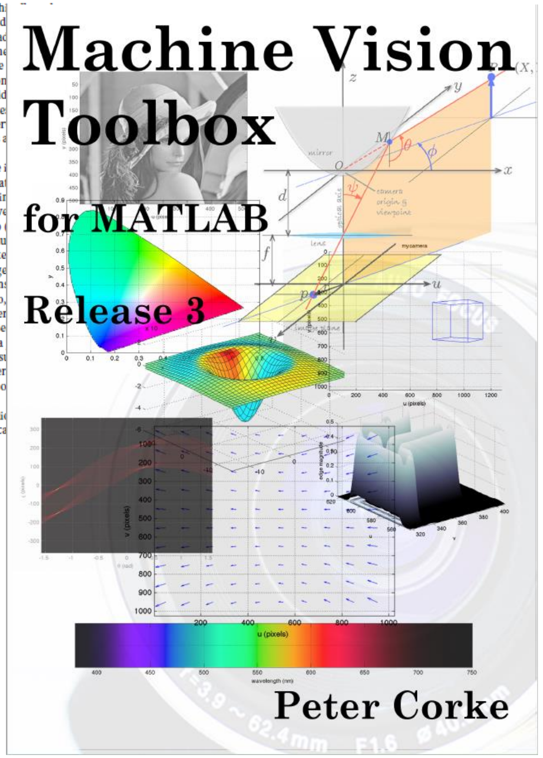
# <u>Robotic Vision</u> Project Topic Definition SoSe 2024

## Documentation: MATLAB, Stereo Vision

- **ZED with Matlab**
  - https://www.stereolabs.com/docs/matlab
- **ZED Camera calibration parameter**
  - https://support.stereolabs.com/hc/en-us/articles/360007497173-What-is-the-calibration-file
- **Assistance on the Topic of Stereo Vision**
  - Chapter 14, „Robotics, Vision and Control“, Peter Corke, 2nd Editor
- **Documentation Matlab Toolbox of Machine Vision (Peter Corke)**
  - https://www.petercorke.com/MVTB/vision.pdf
- **Matlab Tutorial for Stereo Vision**
  - https://de.mathworks.com/discovery/stereo-vision.html
- **40 rectified images reference to validate the rectification in folder “reference_rectifized”**










more videos: https://de.mathworks.com/videos/search.html

# Robotic Vision Project Topic Definition SoSe 2024

- Case Study Project (ESE, IT, BMIT, RMS)
  - Calendar week 25 ~ 28 → @Home/Remote or @A604 on Wednesday, 8.30am-13.30am
  - Oral exam → 15.07. - 26.07.2024 (tbd)
  - Submission (slides, files) → Saturday, 13.07.2024, 12:00