

UNIVERSITY OF TWENTE.

**MURAB**

MRI and Ultrasound Robotic Assisted Biopsy

Radboudumc

**SIEMENS**



**EU H2020 MURAB**

Combining MRI and Ultrasound for robotic  
assisted biopsy

**KUKA**



Coordination:

Project lead:

Johannes Lachner (KUKA / Univ. of Twente)

Prof.dr.Ir. Stefano Stramigioli (Univ. of Twente)

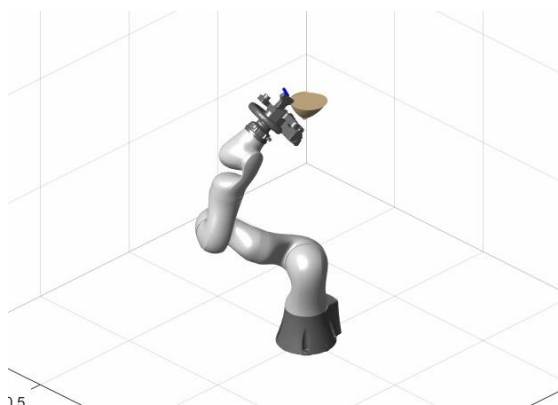
Dr. Françoise J. Siepel (Univ. of Twente)



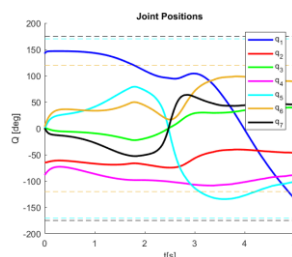
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688188"

# Offline Motion Planning and Control

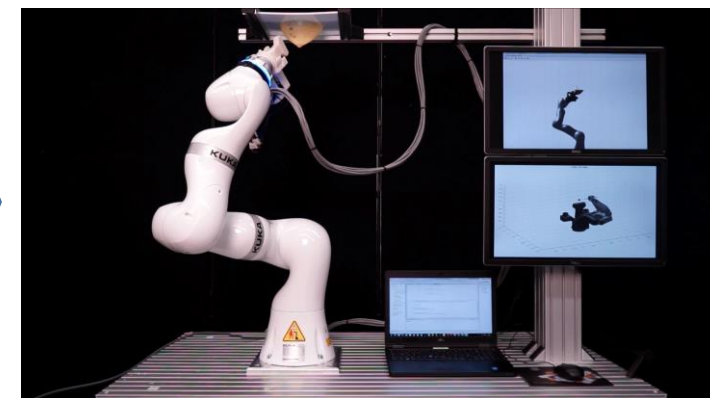
- Offline motion planning using Operational-Space-Control
- Online motion with KUKA Cartesian Impedance Control



Matlab simulation environment



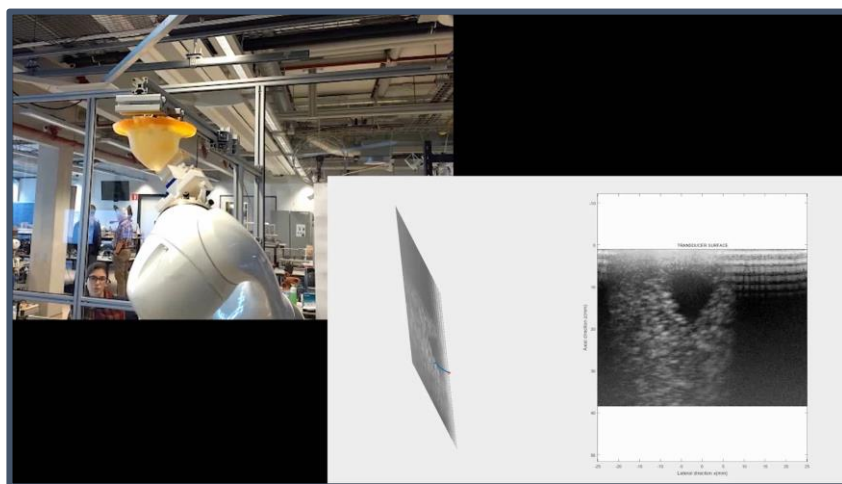
Joint positions as a  $f(t)$



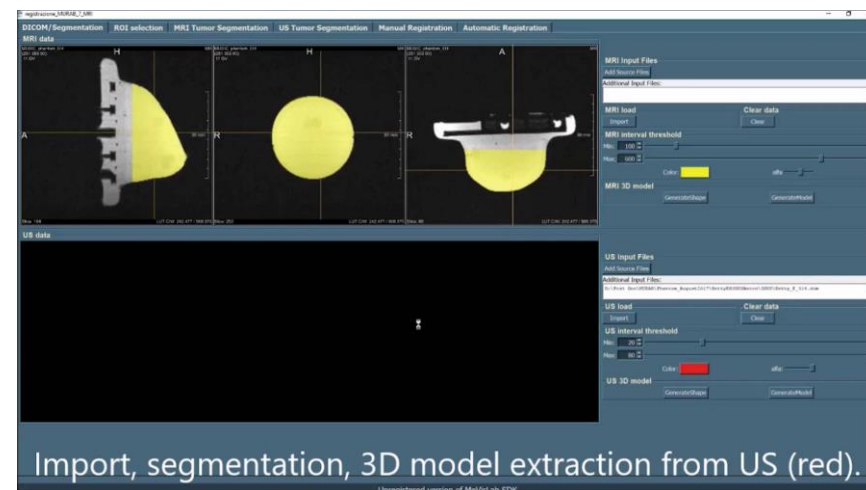
Motion with Cartesian Impedance Control

# US-scanning and US/MRI-matching

- Online acquiring of 2D-images and 3D-reconstruction
- Matching of US- and MRI-Data



Test set-up with beast phantom



Simulation software MeVisLab

# Intervention planning

- Intervention plane can be adapted → Output: intersection points
- Surgeon selects intervention point → IK for tool configuration



Matlab simulation environment

# Any Questions?