Microwave Imaging for Breast Cancer Detection: A Non-Contacting Approach:

Ihsan Haidari, Joel Josefsson, Märta Krönström, Dennis Landré, Filip Lindhe, Jiantao Shen, Samuel Wågbrant

Mälardalen University

Motivation and goal:

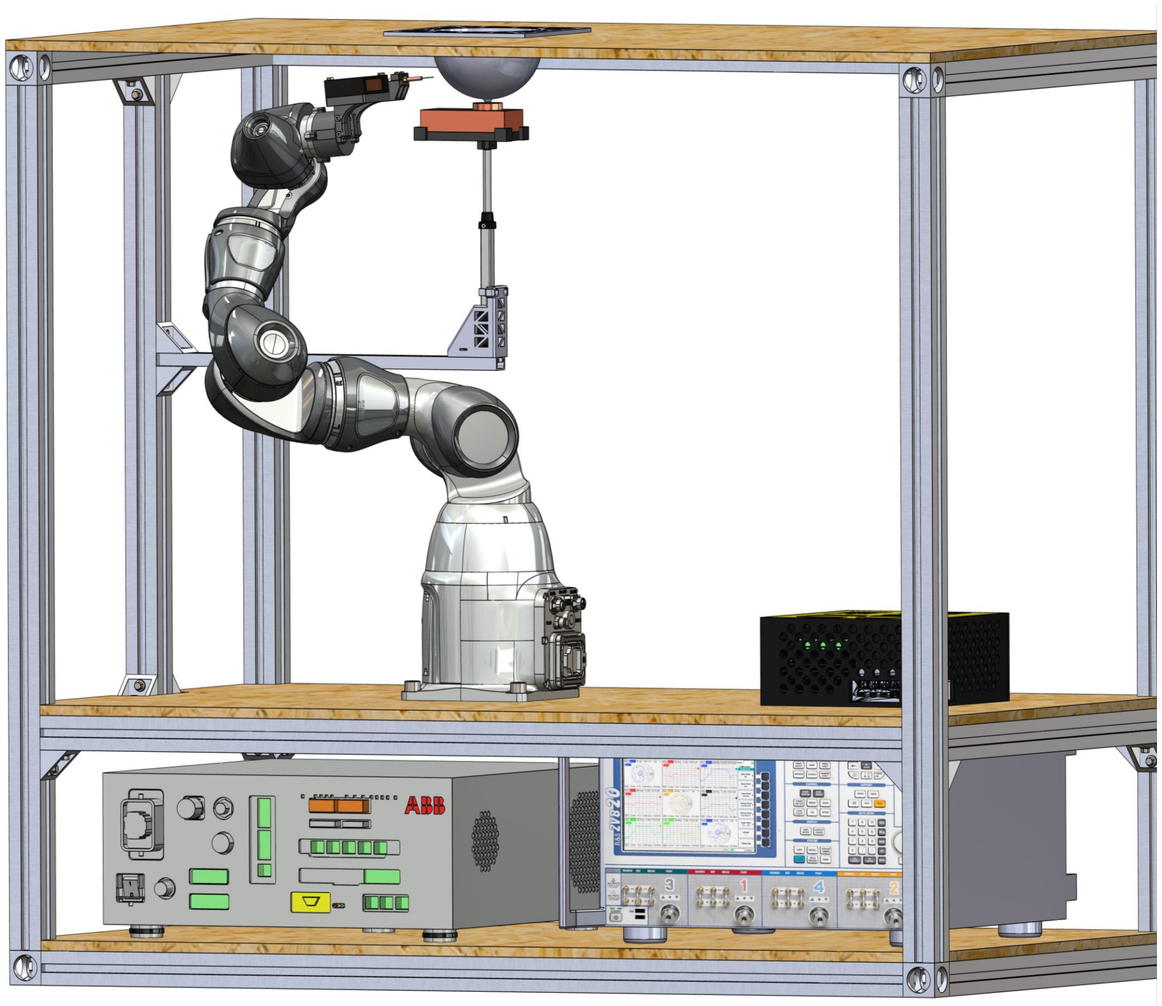
Breast cancer is one of the most common forms of cancer in women and the number of cases is increasing

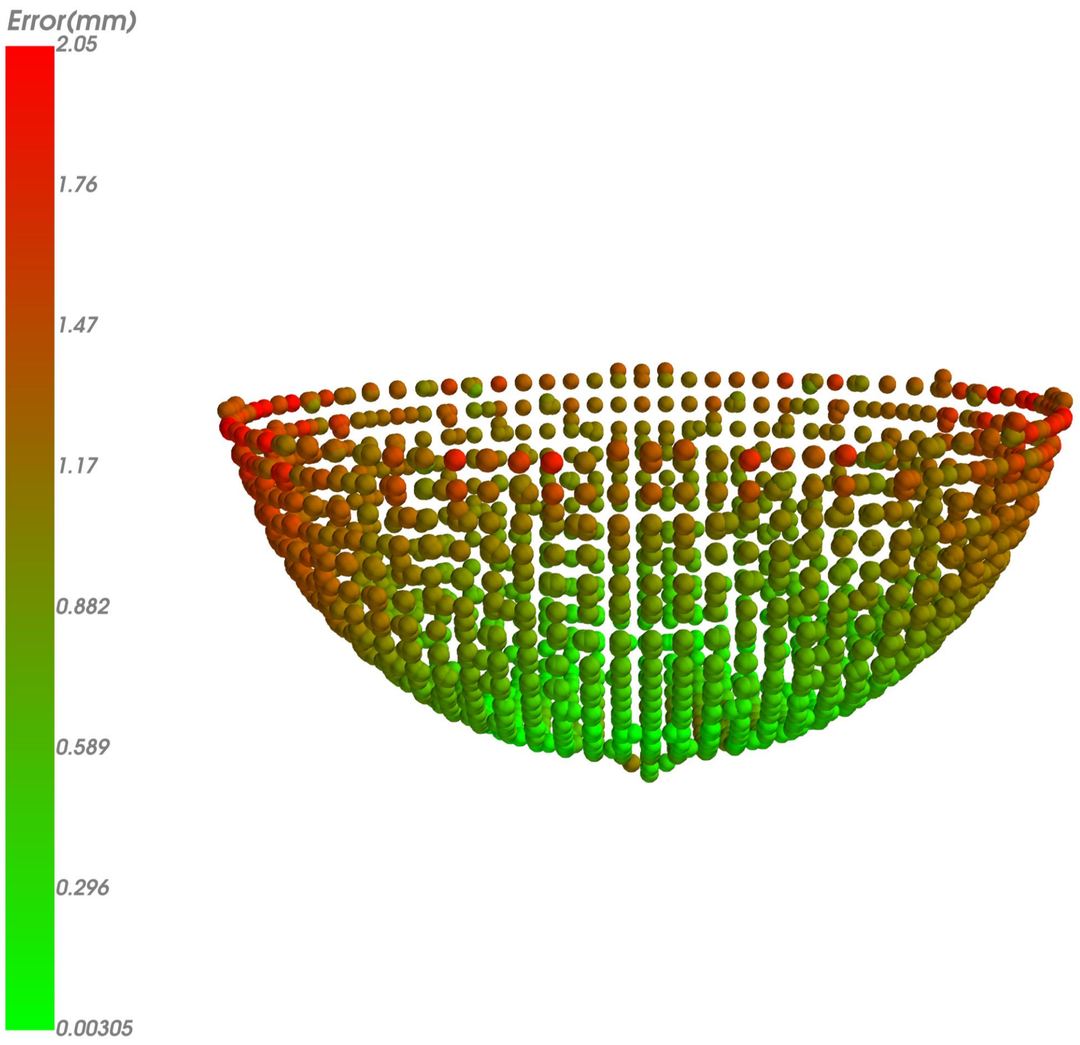
Microwave Imaging (MWI) for breast cancer detection:

- ✓ Potential complement to mammography
- ✓ Contribution to a new research field
- ✓ Non-ionizing
- ✓ Non-contacting
- ✓ Early detection

Goals:

- ❑ Automated measurements on a breast phantom
- ❑ GUI to control the measurements and visualise the results
- ❑ Distance measurements using a laser
- ❑ Surface reconstruction from the laser-based measurements
- ❑ Microwave measurements based on surface reconstruction





Method:

- ➢ Single Arm Yumi (SAY) collaborative robot - Automatisation and precision
- ➢ Breast phantoms - Symmetrical and asymmetrical
- ➢ Laser - Distance measurements
- ➢ 3D reconstruction algorithms - Pattern for microwave measurements
- ➢ Microwave sensors and network analyser - Data for cancer detection
  - ✓ Simulation using ***RobotStudio***
  - ✓ Controlling ARMs device using ***Python***
  - ✓ CAD modelling using ***SolidWorks***

Outcome: