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

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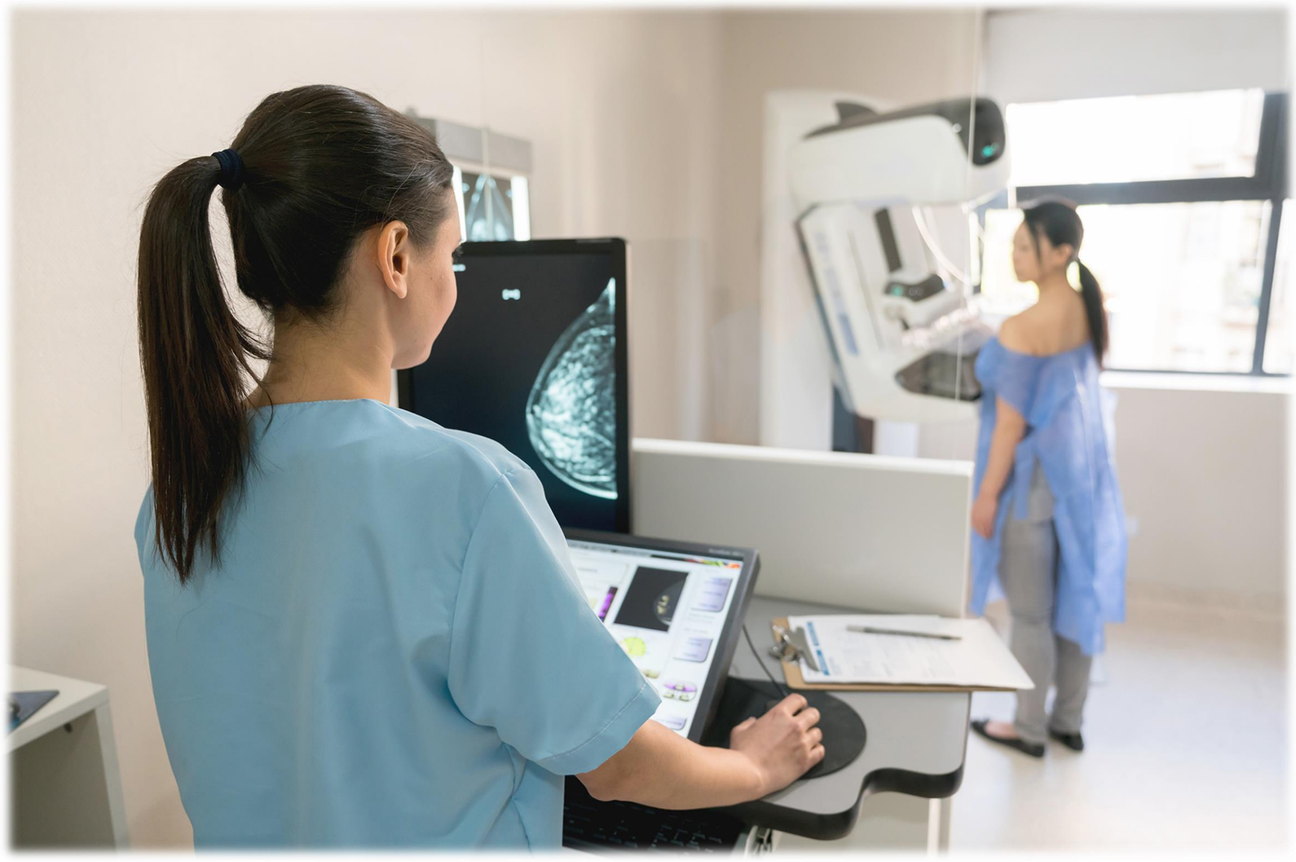
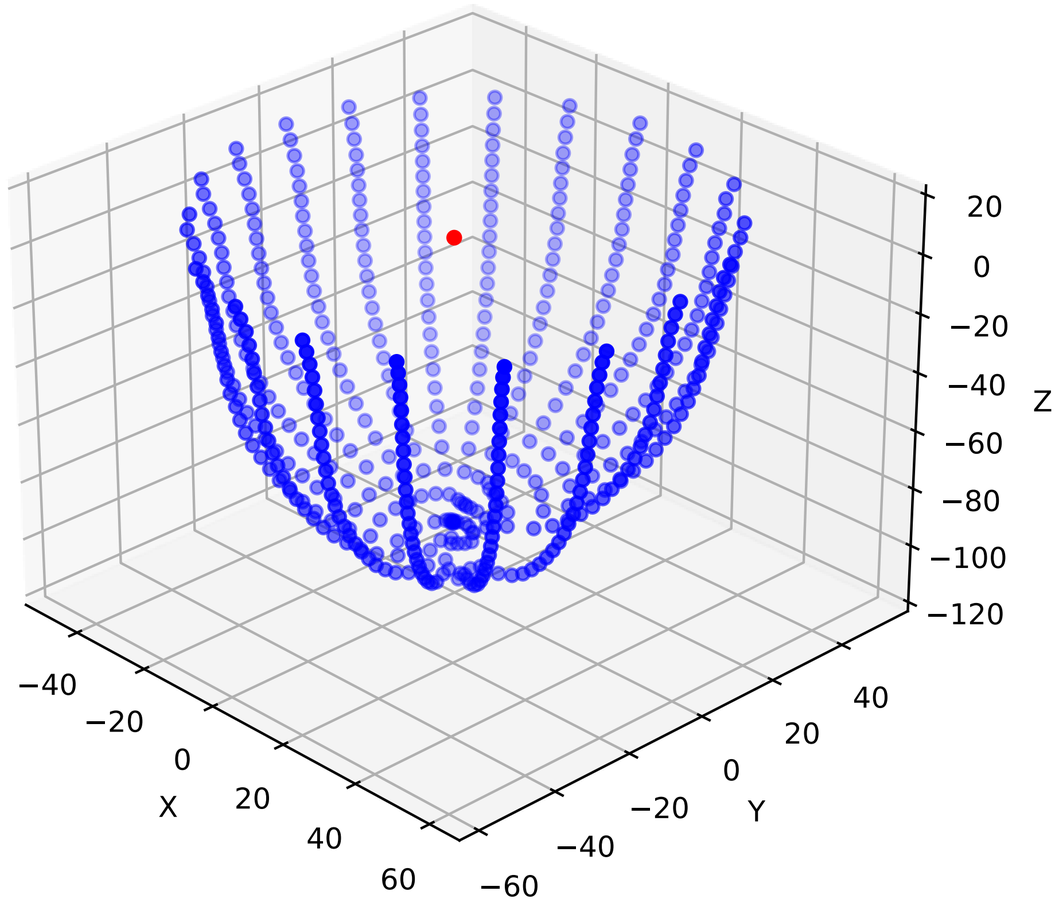
Motivation:

- Breast cancer is one of the most common forms of cancer in women and the number of cases is increasing
- Important to develop safe and comfortable methods for early detection
- Microwave Imaging (MWI) for breast cancer detection:
  - ✓ Potential complement to mammography
  - ✓ Contribution to a new research field
  - ✓ Non-ionizing
  - ✓ Non-contacting





Goals:

- Automated measurements on a breast phantom:
  1) With **known** geometry
  2) With **unknown** geometry
- GUI to control the measurements and visualize the results
- Distance measurements using a laser
- Surface reconstruction from the laser-based measurements
- Microwave measurements based on the 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***