

20 – 40 week project for student of technology / engineering:

Mammography research – Finite Element breast model

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this “compression” quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For ongoing mammography research, Sigmascreening is in need of a finite element model of the female breast to visualize strain and stresses during mammographic breast compression. The model needs to be compared to phantom measurements and/or clinical data. A preliminary study on a homogenous model has been performed at the Technical University of Eindhoven. Continuation of this project would consist of a heterogeneous model, ideally including friction boundary condition and viscoelastic component.

Profile

Student of technology or engineering (mechanical, physics, computer)

- Proven: experience with finite element modelling of biological material, in particular soft tissue
- Ideally: experience with a freeware / GNU-licensed FEM software package
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 20 weeks (can be extended to include more tasks up to a project of 40 weeks).

Contact

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