



Opportunities
for Talents

Lehrstuhl für Schaltungsentwurf
Fakultät für Elektrotechnik und Informationstechnik
Technische Universität München



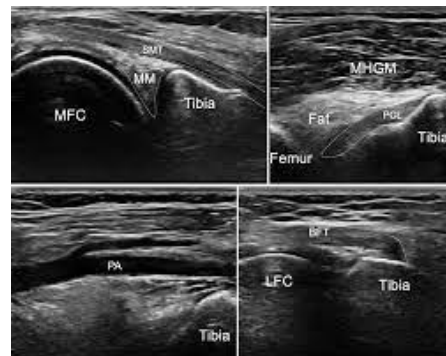
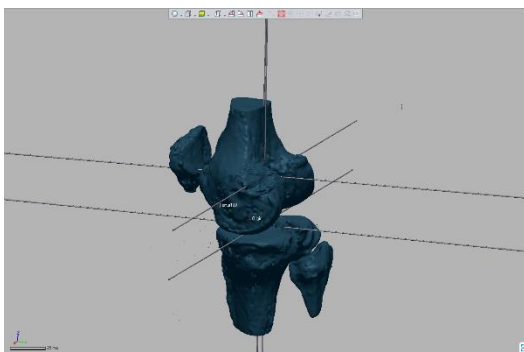
Design and Verification of a FEM-Model for Ultrasonic Imaging

Masters Thesis at the Chair of Circuit Design

Motivation:

A common risk in many sports are injuries to the ligaments of the knees. Often, these injuries are induced by learned movement patterns or sudden overload. One way of preventing such injuries is to monitor the knee while engaging in sporting activities and detect these situations before damage occurs. This can be done with a wearable bandage. An ultrasonic sensor array collects image data and local pre-processing with artificial intelligence can be used to analyze movement patterns and detect overloading of the ligaments.

The goal of this work is to develop a model representing the human knee which can be used to estimate the electrical output signal of an ultrasonic sensor system.



How does the work look like:

The work will be done at the chair of circuit design over a duration of 6 months (full time). Your work starts with research on ultrasonic sensors and the structure and materials of the human knee. You will design a three-dimensional FEM-model which outputs the electrical signal of an ultrasonic sensor array using COMSOL. The next step is the verification of the system by comparison with real-life measurements using an ultrasonic sensor array.

What are good prerequisites to start with this work?

- Experience in COMSOL (or very good learning abilities for new software)
- Basic understanding of analog circuits
- Basic understanding of wave propagation and reflections

Interested?

→ melde dich bei:

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