Medical UltraSound Image Center – Radboudumc

The **M**edical **U**ltra**S**ound **I**mage **C**enter (MUSIC) at the Radboudumc is an international expertise center on functional imaging using ultrasound for medical applications. MUSIC develops ultrasound-based techniques for improved diagnosis, guided intervention and monitoring treatment

One of these techniques is strain imaging. With strain imaging, the deformation of tissue can be determined. To calculate strain, two ultrasound datasets are acquired and the tissue displacements between these two images are calculated. Previously, most datasets contained 2D images, but, with the current state of the technology, acquiring 3D datasets became feasible.

This 3D data challenges the algorithms used in calculated the displacements and strain. In 2D, normalized cross correlation is used to calculate the displacement. This displacement algorithm is responsible for a large amount of the computation time needed. In 3D this is even worse. So that is the reason we are constantly looking for new and faster methods to calculate displacement. In collaboration with dr. Vanja Nikolić and prof. Gabriel Lord of the Department of Mathematics of the Radboud University we will study this problem.

The following questions arise:

- What is the optimal strategy for 3D displacement estimation instead of cross-correlation based displacement estimation
- Fast Implementation of a possible algorithm. I.e. using parallel techniques on a standard multicore computer or on a GPU
- Is it possible to speed up the existing 3D normalized cross correlation algorithm?

The student(s) may work on one of these topics.

If you are interested, please contact

- Prof C. L. de Korte - chris.dekorte@radboudumc.nl
- Jan Menssen – jan.menssen@radboudumc.nl

Or visit our webpage: www.music.radboudimaging.nl

Other opportunities are also available for a student internship. For instance, working on algorithms for faster 3D beamforming. Beamforming is creating an image from raw acquired ultrasound data. Or the development and implementation of a fast 3D clutter filter to separate blood flow from tissue without a large time lag. If you are interested, please contact one of the above-mentioned persons.