Multimodality Ultrasound–Fluorescence Tomography system

Background

During recent years a lot of interest has been given to optical techniques to localize and quantify fluorescence inclusions inside small animals. This particular field has been given the name ”Molecular Imaging”. Here specific fluorophores are developed to fluoresce whenever a biological reaction takes place. The gain in contrast is believed to revolutionize biological, medical and pharmaceutical research over the coming decades. Many methods exist where only optical instrumentation is used to tomographically reconstruct the fluorophore. One of these systems has been developed at the Medical Laser Physics Group in Lund. Due to the diffuse nature of light the reconstructions show low contrast with no particular structure. In order to gain information about the anatomy of the volume under study there has been proposals to combine several imaging techniques. We aim to develop a combined Ultrasound-Fluorescence Tomograph where the ultra sound retrieves the structure of the region. This information is then put into the optical reconstruction scheme in order to increase robustness, resolution and the ease of interpreting the reconstructed image.

Project scope

The project is managed in collboration with the Ultrasound Group at the Department of Electrical Measurements in Lund. The aim is to investigate the potential and possibilities of a Multimodal Ultrasound-Fluorescence Tomograph. In particular work should be devoted into develping a probe where Ultrasound and Fluorescence measurements can be made simultaneously. This is of great importance since the volume under study should be the same for the two modalities.
Further discussions will be preformed with interested Master thesis students.

Student requirements

Interest in Ultrasound and optical techniques.
Preferably taken the courses in Ultrasound techniques and Tissue Optics

Contact

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