Surface reconstruction in Fluorescence Tomography

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.

A system capable of recosntructing fluorophores inside tissue volumes has been developed at the Medical Laser Physics Group in Lund. The reconstruction has a lot in common with X-ray tomography routinely applied in the hospitals. The main difference is that the mathematical model of light propagation needs to have a geometry defined in order to solve the reconstruction problem. Hence it is of great importance that the shape of the geometry under study can be retrieved.

Project scope

The project aims to develop a scheme that should be able to reconstruct the surface of an object using one (or several) projection(s) with sufficient spatial resolution. Recent papers on this subject uses structured
illumination which should be the way to start.

Student requirements

The project will be managed in collaboration with the Mathematical Imaging Group at the Department of Mathematics, Lund.

Interest in computer vision.

Taken the course in Computer Vision.

Contact

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