PROSPECT: optical spectroscopy for prostate cancer diagnosis

Many diseases (e.g. cancer) cause changes in the organization of tissue, such as increased blood perfusion or abnormal layered architecture. Visible light can be cleverly used to diagnose these diseases. White light (broad wavelength spectrum) can enter tissue under investigation from an optical fiber. The photons travel through the tissue, and depending what structures they encounter, the fraction of photons reaching the surface again is changed. These 'lucky photons' are then collected with another fiber. The goal of such a measurement is to derive from the measured 'spectral fingerprint' the underlying tissue organization thus disease state. In one of our project we collaborate with ErasmusMC and several companies to use this technology for the diagnosis of prostate cancer (PROSPECT).

There are, however, issues. In order to derive that tissue structure adequate mathematical models are needed to describe the interaction of light with the tissue. Fortunately, these models are readily available. Unfortunately, they do not always agree. One key difference is their estimation of the *path length* the light has travelled in the tissue. Longer path lengths, generally speaking, mean that deeper lying tissue has been probed. The goal of this assignment therefore is to setup a simple experiment, shining light on samples with known properties and verify the different models. By including specific "disturbences" at known depths, the accuracy of path length estimation can be determined.

This project will be supervised by Dr. Ir. D.J. Faber and Dr. D.M. de Bruin.

http://www.amc.nl/web/Research/Who-is-Who-in-Research/Who-is-Who-in-Research.htm?p=1159