Master/Candidate thesis proposal

Laser spectroscopy for diagnostics of the human sinuses

If you are interested in medical technology, physics, especially laser spectroscopy and hands-on measurements on humans, this is the perfect master/candidate thesis project for you!

The project is a collaboration between the Department of Biomedical Engineering, LTH and GPX Medical AB in Lund.

The method of GASMAS, GAs in Scattering Media Absorption Spectroscopy, was developed at the Department of Atomic Physics, LTH and is now applied in industry in a diverse number of applications. The technology utilizes tunable diode laser spectroscopy for gas concentration measurement. One medical application is the diagnostics of the human sinuses where the method can provide valuable information on the ventilation stage of the sinus and potentially also measure oxygen gas concentration. Resistance to antibiotics is a severe and increasing threat for humanity. A medical device assessing the ventilation stage may potentially aid in the doctor's assessment of patients with sinusitis which may lead to reduction of the prescription of antibiotics relating to sinusitis.

GPX medical in Lund is a company that explores the possibilities of using the GASMAS for the sinus application, but also for monitoring the lungs of neonatal babies and developing a medical device. The current measurement system for lung measurements can be used for measurements on sinuses using new measurement probes that are being developed adopted for sinuses.

This thesis project is a hands-on project to design and conduct a measurement campaign on healthy volunteers. The work includes:

- Participation in probe development at GPX Medical
- Design and perform a study measuring sinus volume and oxygen gas concentrations of the sinuses. Variables to explore are probe geometries and positions, left/right comparison, comparison on same individual during one day, consecutive days and variations over a month.
- Evaluate and summarize data

The scope and content of the work can be discussed and adopted to the interest of the student(s).

Does this seem interesting? Please do not hesitate to contact either Monica Almqvist at the Department, monica.almqvist@bme.lth.se 0768 15 66 48 or Sara Bergsten at GPX Medical AB, sb@gpxmedical.se 0765 25 79 96

This project could start in September 2019 or later.