

Master project proposal ECO group

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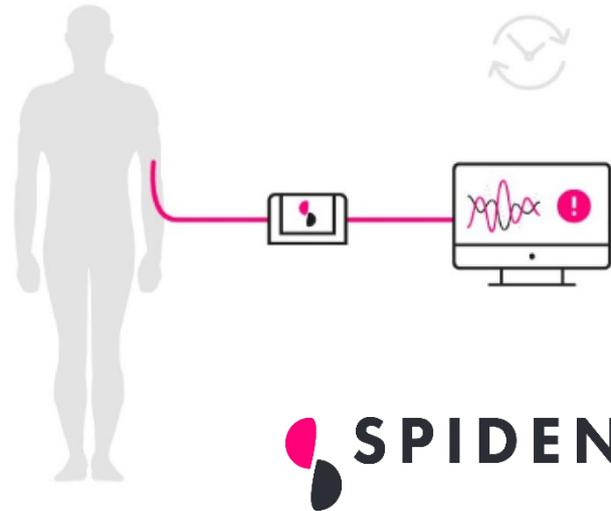
Continuous monitoring of human biomarkers for real-time health monitoring

The Mission

The future of health will require radical new techniques and approaches to bring forward the required improvement in accuracy and timeliness of monitoring and diagnostics of patients. There is a growing scientific, commercial and societal interest in using light for carrying out such monitoring functions alleviating the need of invasive methods such as micro-needles.

The use of light offers the ability to perform spectral measurement and to detect subtle small changes/quantities in different bodily fluids.

The ECO group in the TU/e is partnering with a Swiss med-tech start-up company Spiden AG, to leverage their proprietary spectroscopy methods by exploiting the knowhow in laser modulation and signal processing at the ECO group.



The MSc graduation task

The MSc graduation task will be to investigate the use of laser modulation and their electronic drive, in combination with advanced signal post-processing to extract valuable health markers and establish feasibility for the detection of various biomarkers and compounds in different body fluids. The work will be carried mostly in TU/e ECO labs but will include a period on site in Switzerland¹, to compare the developed lasing drive schemes with state-of-the-art bench-top laser systems. The student will be supported from the TU/e by staff members (Dr. Chigo Okonkwo and Dr. Oded Raz) as well as get guidance from the start-up company (Dr. Jens Hofrichter, Dr. Jean-Christophe Blancon). We expect that by the end of the project, the student will be able to report on the feasibility of using modulated laser light (with carefully designed modulation signal) with robust signal processing algorithms to detect desired analytes in human fluids. It is further expected that the student will be able to evaluate the attractiveness of obtained solution in terms of its scalability and cost effectiveness to assess its market potential (in collaboration with Spiden's Strategy & Operations team). A truly unique opportunity for a student to gain experience from scientific research to commercial impact.

The candidate

- Basic understanding of electronic modulation techniques
- Basic understanding of laser physics and optics
- Programming skills in Matlab and/or FPGA based platforms
- Enthusiasm to push the frontiers of research by using light for medical diagnostics and healthcare

Apply now!

- Dr. Oded Raz o.raz@tue.nl
- Dr. Chigo Okonkwo cokonkwo@tue.nl

¹ In case a period of work will be required in Switzerland, Spiden will compensate the student for cost of accommodation and travel for the required period.