EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April 1st, 2016 – September 30th, 2016

Laboratory: Center for Sensors, Instruments and Systems development (CD6) – Universitat Politècnica de Catalunya (UPC)
City, Country: Terrassa, Spain.
Title of the master thesis: Multispectral system for the imaging of skin cancer lesions in the infrared
Name of the tutor of the master thesis: Meritxell Vilaseca
Email address: meritxell.vilaseca@upc.edu
Phone number: 937398767
Mail address: Rambla Sant Nebridi, 22 - 08222 Terrassa.

Summary of the subject (maximum 1 page):
The use of multispectral imaging (MI) systems in biomedical applications is growing fast for the possibilities they show. MI systems based on light-emitting diodes (LEDs) are already being studied for skin cancer diagnosis. However, there are still open questions regarding their use in metrological purposes as they show problems in terms of color consistency and emission stability. Recently LEDs emitting up to the infrared (IR) have appeared on the market, which might provide valuable information beyond the visible (VIS) also useful for diagnostic purposes. This opens new lines of research with promising applications although many steps need to be surpassed to improve the reliability of the results. The aim of this master thesis is to expand the capabilities of a MI system already developed within the framework of the European Project DIAGNOPTICS "Diagnosis of skin cancer using optics" (ICT PSP seventh call for proposals 2013) beyond the VIS range. The current system includes LEDs and a conventional CCD camera covering the VIS-NIR range (415 nm to 985 nm). The goal is to include LEDS emitting in the IR and an InGaAs camera to increase sensitivity up to 1500 nm. This technology is envisaged to improve the detection ratio and the evaluation of the prognosis of skin cancer at earlier stages, compared with the conventional approach based on simple naked-eye inspection or digital dermoscopy. A hand-held prototype will be developed and a step-by-step procedure will be executed to grant a systematic and complete collection of the patient information. Clinical measurements will be conducted at a clinical site (Hospital Clínic i Provincial de Barcelona).

Keywords: multispectral imaging science, light-emitting diodes, infrared.

Additional information:
* Required skills: MATLAB and laboratoty skills are essential. Self-motivated, objective-driven and capable of autonomous working within a multidisciplinary team is also important, including the performance of clinical measurements.