# MASTER IN PHOTONICS – "PHOTONICS BCN"
# ERASMUS+ "EUROPHOTONICS-POESII"

## MASTER THESIS PROPOSAL

**Dates: April - September 2018**

**Laboratory:** Center for Sensors, Instruments and Systems development (CD6) – Universitat Politècnica de Catalunya (UPC)
**City, Country:** Terrassa, Spain.
**Title of the master thesis:** Improving diagnosis of skin cancer through visible and infrared spectral imaging systems
**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.

**Keywords:** multispectral imaging science, light-emitting diodes, skin cancer, InGaAs cameras

**Summary of the subject (maximum 1 page):** The use of multispectral imaging systems in biomedical applications is growing fast as they provide spectral information pixel by pixel. Multispectral systems based on light-emitting diodes (LEDs) are already being studied for skin cancer diagnosis. However, they often have spectral sensitivity limited within the visible range. Recently, a visible multispectral system for the imaging of skin cancer lesions including LEDs from 415 to 985 nm and a CCD camera has been setup at the CD6 as well as another one with sensitivity in the infrared (IR) range, which includes wavelengths from 970, 1050, 1200, 1350, 1450 and 1550 nm, and an InGaAs camera.
Clinical measurements of real skin lesions with this experimental systems are being carried out at the Hospital Clínic i Provincial de Barcelona with the supervision of expert physicians.
The student in charge of the project will help in the development of algorithms to combine and process visible and infrared images of the skin lesions analyzed in collaboration with CD6 engineers. The goal is to improve skin cancer diagnosis overcoming some of the limitations that current tools such as dermoscopy have, which consists of the observation of the lesion through a magnifying glass an a polarizer. Furthermore, the long time and pain caused by biopsies should be reduced as much as possible taking into account the new spectral information available.

**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.