

## PHOTONICS - EUROPHOTONICS MASTER COURSE

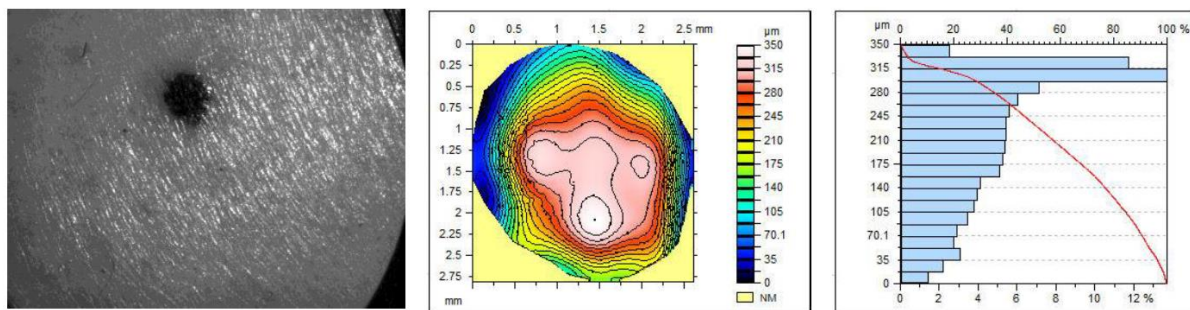
### PROPOSAL FOR A MASTER THESIS

Dates : April 1<sup>st</sup>, 2016 – September 31<sup>st</sup>, 2016

Laboratory : Centre for Sensors, Instrumentation and systems Development (UPC-CD6)  
City, Country : Terrassa, Spain

Title of the master thesis :

**Novel melanoma diagnosis and prognosis methods based on 3D fringe projection**



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**Summary of the subject (maximum 1 page):**

Melanoma is becoming a pandemic disease because of the combination of the novel sun exposure habitudes and the depletion of the ozone layer. In countries like Australia, with large sun exposures and most population coming from the British immigration one century ago, the sun is already perceived as an extremely harmful menace, and melanoma as a major public health problem.

Currently, 90% of the lesions identified as potential melanomas and derived to surgery are not really melanomas, due to the limitations in the diagnosis methods. The search for novel diagnostic tools which complement classic dermoscopy is thus a relevant public health problem, due to the high emotional and economic cost of unrequired surgical procedures performed on patients.

At CD6, in cooperation with a network of Spanish and Italian public hospitals, we are developing a research project to identify relevant diagnostic parameters for a more accurate detection of skin cancer based in photonic techniques. The student in charge of the project will analyse 3D topographies of real skin lesions in collaboration with CD6 engineers and medical doctors, and will propose and statistically validate novel parameters and identifiers out of the processing of the 3D images. The final goal will be to provide a set of parameters which may be validated in the clinical testing of the 3D device carried out in the last part of the project, and to support the development and installation of medical devices in clinical settings.

See <http://www.diagnoptics.eu> for general information on the project

**Keywords :** Melanoma, skin cancer, biomedical photonics, fringe projection, metrology

**Additional information :**

\* Amount of the monthly allowance (if it is the case):

To be discussed depending on the value of candidate.

\* Required skills :

Interest in application-driven experimental work for solving real-world innovation needs.

Basic concepts in optical metrology and optical engineering

Programming (C++, MatLab) and scientific software packages (Sigmaplot,...)

Search of resources, both scientific and technical

Self-motivated, objective-driven, capable of autonomous working within a multidisciplinary team.

\* Miscellaneous :

This thesis contents will be considered confidential due to its closeness to market.

International team with several years of experience in the technique proposed.

Multidisciplinary environment with electronics and mechanics workshops, and specialists and technicians in metrology, optics, mechatronics, and electronics.

Possibility of joining the Centre for a PhD/Project Manager career in case of common interest.

Early incorporation welcome.