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

MASTER THESIS PROPOSAL

Dates: April - September 2018

Laboratory: Optoelectronics
Institution: ICFO
City, Country: Barcelona, Spain

Title of the master thesis : Nano-structured optical surfaces for antireflective and superhidrophobic properties.

Name of the master thesis supervisor: Prof. Valerio Pruneri
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Keywords: CMOS, biosensor, point-of care, cytometry

Summary of the subject (maximum 1 page):

Advances in CMOS technology has been fundamental for the development of optical sensors aimed at biological and industrial applications. Over the past few years, both academic and industrial research groups have dedicated efforts in designing, developing and validating different optical sensors using CMOS image sensor technology either to improve antiquated detection techniques or to create novel systems that allow studying processes previously unmeasurable. The applications of CMOS-based optical sensors expand across sectors, including medical diagnosis, environmental monitoring and quality assurance in production lines. In the optoelectronics group at ICFO, we have ample experience working with this technology, developing systems from inception to product validation. We are currently exploring the interactions between engineered surfaces and biological samples and are looking to expand the applications of our technology. We have control over the complete system, the design of the optical sensor (including optics, mechanics and electronics), the engineering of the surfaces with nanofabrication techniques, and the processing of the samples captured with computational imaging techniques. As part of this thesis, the students will be able to develop their research skills in a multi-disciplinary environment.

Additional information :

* Required skills:
    - Medium to high programming skills (Python in particular)
    - Medium to high skills on electronics (Semiconductor devices in particular)
    - Medium to high skills in optoelectronics and optomechanics
    - High level of English both written and spoken
* Miscellaneous:
    - Basic knowledge of biomedical engineering
    - Basic knowledge of nanofabrication techniques
    - Good communication skills
    - Comfortable in multi-cultural work environments