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## Master in Photonics – “PHOTONICS BCN” ERASMUS+ “EUROPHOTONICS”

### MASTER THESIS PROPOSAL

**Dates: April - September 2020**

**Laboratory : Applied Optics (Engineering Department)**

**Institution: IRIS TECHNOLOGY SOLUTIONS**

**City, Country : Castelldefels, Barcelona (SPAIN)**

**Title of the master thesis: "*Simulation and Development of Hyperspectral Imaging Illumination Systems*"**

**Name of the master thesis supervisor:**

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**Keywords :** Hyperspectral imaging, monitoring, spectroscopy, simulation,

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

IRIS is an advanced engineering company that specializes in process monitoring and control solutions & novel technologies for process optimization. We are a multidisciplinary team of scientists and engineers involved in different R&D projects related with optical monitoring technologies, circular economy and industry 4.0. We operate in a demanding high performance environment where you will be continually stimulated and you will grow a lot. Up for it?

Hyperspectral imaging (HSI) is an emerging field in which the advantages of optical spectroscopy as an analytical tool are combined with two-dimensional object visualization obtained by optical imaging. In HSI, each pixel of the image contains spectral information, which is added as a third dimension of values to the two-dimensional spatial image, generating a three-dimensional data cube, sometimes referred to as hypercube data or as an image cube. The illumination system plays a key role in HSI devices and the need for improved illumination sources and geometries becomes a fundamental field of study and development.

The work will be part of a European funded project called MULTICYCLE focus on advanced and sustainable recycling processes and value chains for plastic-based multi materials (<http://multicycle-project.eu/>).



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The student will be involved in the simulation (using Zemax software), development and characterization of different illumination systems for hyperspectral imaging systems.

**Additional information :**

\* Required skills : Basic knowledge in illumination systems, hyperspectral imaging knowledge and Zemax software.

\* Miscellaneous : Team work, problem solving abilities, curiosity, analytical thinking and a great deal of enthusiasm.