

PHOTONICS - EUROPHOTONICS MASTER COURSE

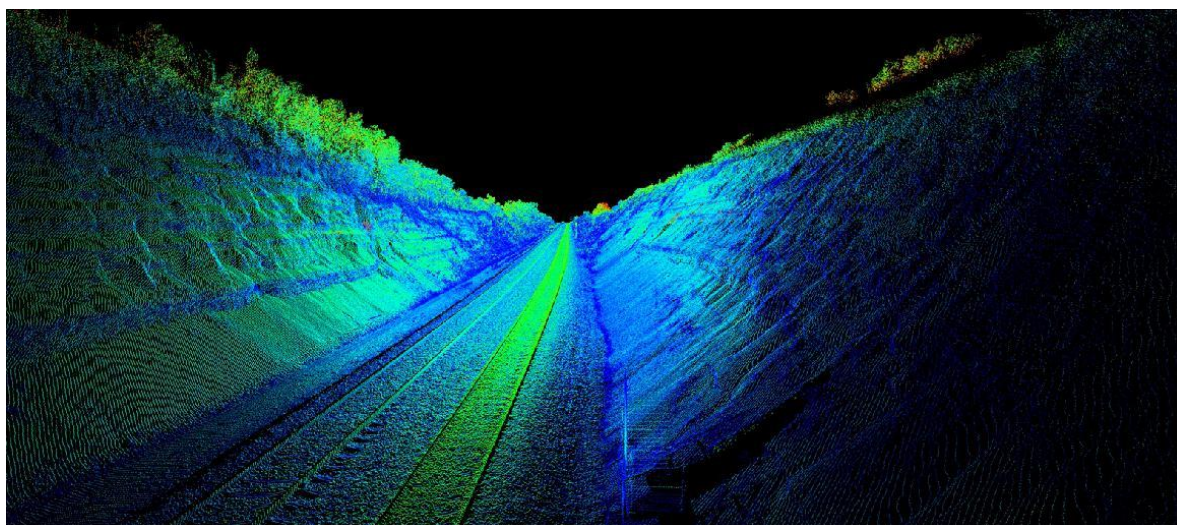
PROPOSAL FOR A MASTER THESIS

Dates : April 1st, 2016 – september 31st, 2016

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

Title of the master thesis :

Development of 3D point-cloud representations with open-source applications



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Summary of the subject (maximum 1 page):

A number of different experimental techniques in optical metrology deliver as a result a large amount of measurement points in the 3D space. This is the case for laser scanning, for time-of-flight data, and for different fringe projection or moiré techniques. However, the management of these uncorrelated point clouds becomes quite complex in typical commercial environments as the number of data points increases. The goal of the project is to explore the different available open source tools available in order to present CAD-like results on surfaces out of different types of 3D point clouds.

Several tools are now available for that, either in semi-finished appearance (Meshlab) or as customizable code (Paraview). The development of a tailored solution oriented to smoothing and manipulating large point clouds, and the analysis of its performance will be performed along the project.

The student should have a basic knowledge of programming (ideally C/C++/Borland Builder) and the capability to analyze and explore different tools and to design and develop a general-purpose representation software, used for data visualization and fitting, based on available open-source libraries and packages. Remote work with periodic presential meetings is possible for this project.

Keywords : 3D point cloud, data handling, data visualization, fringe projection, lidar imaging, optical metrology, reverse engineering

Additional information :

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

To be discussed depending on the value of candidate

* Required skills :

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

Concepts on data management and visualization

Basic concepts in optical metrology and optical engineering

Search of resources, both scientific and technical

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

* Miscellaneous :

International team with several years of experience in the topic 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 start welcome.