PHOTONICS - EUROPHOTONICS MASTER COURSE
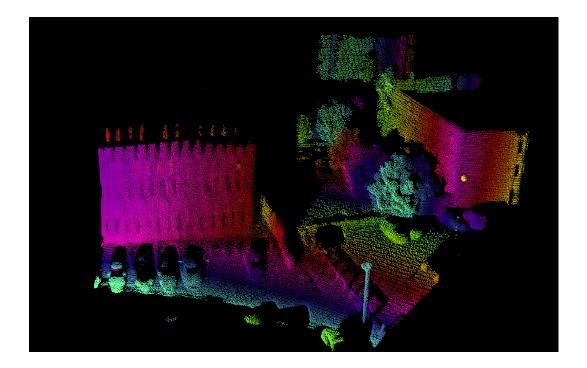
PROPOSAL FOR A MASTER THESIS

Dates: February 1ˢᵗ, 2021 – September 31ˢᵗ, 2021

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

Title of the master thesis:

Improvement of lidar images through turbid media

Name of the tutor of the master thesis: Santiago Royo
Email address : santiago.royo@upc.edu
Phone number : 34 93 7398904
Mail address : Rambla Sant Nebridi 10 E08222 Terrassa

Summary of the subject:

Aim: To explore novel processing approaches for processing of point clouds created within turbid media

Description. Imaging through turbid media, and in particular through fog and smoke, is one very challenging task for lidar imagers, as long as the backrreflection of the laser pulse temporally blinds the detector and prevents from a proper measurement of range. At CD6 we have developed a small-scale fog chamber to make experiments in it, and also have created a large dataset of lidar images through fog. The goal of the project is to explore different alternatives in order to improve the final scene displayed, filtering out clutter and noise in the point cloud by using additional information available in the scene. Different approaches may be explored starting from existing data, or for newly designed experimental approaches.

Project: This is an applied project with a strong experimental component. Full time dedication expected. Along the first weeks of the project you will be introduced to the theoretical basis of the project, to them implement your own algorithms, propose imaging approaches, and provide results. You will have direct support of CD6 staff in all moments.

Keywords: lidar imaging, point cloud processing, image processing, optical instrumentation, optical engineering

Additional information:

* Monthly allowance possible depending on value of candidate

* Recommended skills:
Interest in application-driven experimental work for solving real-world problems.
Basic concepts in optical engineering and image processing
Programming (C++, MatLab, Python)
Search of resources, both scientific and technical.
Self-motivated, objective-driven, autonomous worker 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 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 incorporation welcome.