



Master in Photonics – “PHOTONICS BCN” Master ERASMUS Mundus “EuroPhotonics”

MASTER THESIS PROPOSAL

Starting full time from April 2024

Presentation at the end of July or beginning of September 2024

Laboratory: Sensofar

Institution: Sensofar Tech SL

City, Country: Terrassa, SPAIN

Title of the master thesis:

Chromatic depth encoded microscopy for 3D surface measurement.

Name of the master thesis supervisor and co-supervisor:

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Keywords:

Chromatic Confocal, 3D microscopy, Focus Variation

Summary of the subject (maximum 1 page):

In this master thesis project, we will design a depth sectioning microscope with non-moving parts to achieve three-dimensional measurement of technical surfaces. The design will be constructed in a proof-of concept style, in which the optical, mechanical, and electronics components will be all them based on commercial parts. The construction will be realized on top of an optical table configuration.

The basic idea behind the chromatic depth sectioning, is that the conventional axial scan of a 3D measurement microscope will be replaced by an optical scanning based on chromatic depth dispersion along the optical axis.

Objectives:

- **Design an optical setup to achieve chromatic depth codification of a microscope**
- **Purchasing the optical, mechanical and electronics components**
- **Set-up the experiment on an optical benchtop table**
- **Realize optical sectioning, and acquire the resulting images**
- **Image processing to reconstruct 3D data (programming in Python)**
- **Study of the the Performance, characteristics and calibration procedure**



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Additional information (if needed):

* Required skills:

* Miscellaneous: