



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

UAB
Universitat Autònoma
de Barcelona

 UNIVERSITAT DE
BARCELONA

ICFO
The Institute
of Photonic
Sciences



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

MASTER THESIS PROPOSAL

Dates: April 2020 - September 2021

Laboratory: Polarimetry Lab, Feman Group
Institution: Universitat de Barcelona
City, Country: Barcelona, Spain

Title of the master thesis: Imaging polarimetry in real time for bio applications

Name of the master thesis supervisor and co-supervisor: Oriol Arteaga

Email address: oarteaga@ub.edu

Phone number: 934039221

Mail address: C/ Martí i Franqués 1, Dep. Física Aplicada, 08028, Barcelona, Spain

Keywords: polarimetry, imaging, polarization, microscopy

Summary of the subject (maximum 1 page):

Mueller polarimetric imaging measures Mueller matrices over a field of view and thus allows for visualizing the polarization characteristics of the objects. It has emerged as a promising technique in recent years for tissue imaging, improving image contrast and providing a unique perspective to reveal additional information that cannot be resolved by other optical imaging modalities. The Mueller matrix represents the transfer function of an optical system in its interactions with polarized light, and it contains all of the necessary information about the linear optical properties of the medium.

This work proposes the modification a polarimetric microscope [O. Arteaga, M. Baldrís, J. Antó, A. Canillas, E. Pascual, and E. Bertran, “Mueller matrix microscope with a dual continuous rotating compensator setup and digital demodulation,” Appl. Opt. 53, 2236-2245 (2014)] with a new camera that uses a polarization sensor. The goal is to reduce significantly the measurement time in order to make possible polarimetry measurements based on the Mueller matrix in real time (around 1 frame every second or better). This instrument will be used to study moving biological systems such as active liquid crystals and for enabling in vivo measurement in medical diagnostic applications.

Additional information:



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

UAB
Universitat Autònoma
de Barcelona

 UNIVERSITAT DE
BARCELONA

ICFO
The Institute
of Photonic
Sciences



* Required skills: Interest in polarization optics and experimental work is recommended.
Some Labview programming fluency is necessary.