Fellow R3: Analysis of ocular structures using multispectral imaging and deep learning

Closed position

Supervisor: Prof. M. Vilaseca
Institution: Universitat Politècnica de Catalunya (UPC), Barcelona, Spain
Duration: 36 months
PhD program: Doctoral School in Optical Engineering
Research group**:** Optical Engineering Group, Center for Sensors, Instruments and Systems Development (CD6)
Secondments (short visits) at: **AMBROSYS GmbH** (Germany), **IMO** (Spain) and **MEGOS** (Spain)
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Objectives

To develop a multispectral imaging (MSI), laser-based system for the spectroscopic analysis of the eye fundus, allowing retinal oximetry. To perform experimental measurements on controls and patients with unhealthy retinas, collecting a clinical database of spectral images. To combine this information with that from other optical modalities to carry out a multimodal analysis of eye structures using deep learning (DL) algorithms, these being a useful supporting diagnostic tool for ophthalmologists and allowing for the screening and early-detection of ocular disorders.

What is offered

To work within an interdisciplinary environment, receiving training from leading experts in visual optics and MSI in a full-time Ph.D. position for 36 months, in which living and mobility costs will be fully covered with a gross salary of 34.375,60 € per year.

Required skills

We are seeking an enthusiastic candidate holding **a M.Sc./B.Sc. degree in Physics, Engineering Physics, Optical Engineering, Biomedical Engineering, Electronics Engineering**, or similar. The applicant should have:

- Excellent programming skills (i.e., C++, Matlab, Python).
- Professional experience and/or scientific activity in the field of **optics/photonics** or a related discipline.
- Background in **optical design** software (i.e., Zemax), **experimental optical setups** (i.e., lasers, sensors, light measurement devices) and **deep learning**

techniques, such as **convolutional neural networks (CNNs)**, for image analysis and classification.

Additional skills

Interdisciplinary skills and clinical knowledge: to collaborate with clinicians, optometrists, and ophthalmologists to bridge the gap between research and clinical practice. Effective communication skills: to convey research findings and methodologies to a clinical audience. Innovation and research skills: A creative and innovative mindset to develop new methodologies and tools for improving ocular diagnosis.