

# Luca Leggio

PhD in Optoelectronics



## Education

### University Carlos III of Madrid (Madrid, Spain)

- 2017 PhD in Electrical, Electronic and Automatic Engineering (Cum laude)

Thesis: *Design and development of a multi-wavelength optoacoustic system based on high-power diode laser sources. Optoacoustic signal generation with nanoparticles for biomedical applications.*

### University of Roma Tre (Rome, Italy)

- 2012 Master's Degree in Telecommunications Engineering (110/110 cum laude)
- 2009 Bachelor's Degree in Electronic Engineering



## Masters, Courses and Seminars

### Polytechnic University of Madrid (Madrid, Spain)

- 2018 Master in Development of Applications for Mobile Devices

### Asociación Española de Programadores Informáticos (Madrid, Spain)

- 2017 Intensive Course of Java and SQLite
- 2017 Course of C/C++

### Seminaries in OILTEBIA European Project

- 2016 Industrial Involvement Workshop in "Micro-electromechanical systems and biosensors" (Phillips, Eindhoven, Netherlands)
- 2016 Summer School in "Optical and Ultrasound Imaging" (University of Lyon, Lyon, France)



- 2016 OILTEBIA Laboratory Training Platform in “Biological and Medical Imaging” (Helmholtz Zentrum München, Munich, Germany)
- 2016 Industrial Workshop in “Laser Sources for Biomedical, Scientific and Industrial Applications” (Sacher LaserTechnik, Marburg, Germany)
- 2015 Industrial Workshop in “MEMS-based Transducers and Biomedical Applications” (VERMON, Tours, France)
- 2015 Summer School in “Biophotonics and Molecular Imaging” (FORTH Institute, Heraklion, Greece)
- 2014 Laboratory Training Platform in “Sensors and Instrumentation in Biomedical Imaging” (Politecnico di Milano, Milan, Italy)
- 2014 Course of “Introduction to Analogue and Mixed Signal IC Design” (Oxford, UK)



## Prizes

- 2018 *Winner of Extraordinary Prize for the year 2017*: Doctoral Program in Electric, Electronics and Automatic Engineering (University Carlos III of Madrid, Madrid, Spain)

This award is based on merits in scientific publications during the doctoral studies.



## Employment history

### From May 2019 University of Minho (Braga, Portugal)

- Participation in the project “*In vivo biometric and optical changes of the crystalline lens with accommodation and its impact in subjective retina image quality-LensUM*”. In this project, my task is to investigate the effects of eye accommodation, consisting in the focusing of objects at different distances, in the retina image quality. The responsible of eye accommodation is the crystalline lens that changes its curvatures depending on the object distance. In the long run, eye accommodation leads to deterioration of sight, resulting in myopia, astigmatism or presbyopia.

In order to measure the eye aberrations of different human subjects we use an aberrometer, composed of different optical elements, among which a light source, several lenses, a deformable mirror, and a Hartmann-Shack sensor that measures the eye aberrations comparing the light wavefront reflected from the eye with an reference ideal wavefront.

In parallel, we use a custom-built optical tomography system to measure the changes of biometric parameters of the lens induced by eye accommodation. In this way, we can analyze in real-time the images of the eye and, after signal processing in Matlab and Wolfram Mathematica, we can detect the curvatures of both cornea