



# Master in PHOTONICS BCN

(<http://www.photonics.masters.upc.edu>)



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH

**UAB**

Universitat Autònoma  
de Barcelona



UNIVERSITAT DE  
BARCELONA

**ICFO**

The Institute  
of Photonic  
Sciences

**Meritxell Vilaseca**

**UPC coordinator**

**Crina Cojocaru**

**Director**

**Universitat Politècnica de Catalunya, Barcelona**

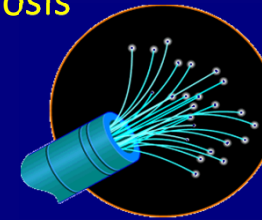
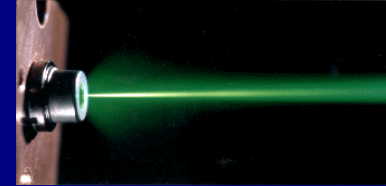
([meritxell.vilaseca@upc.edu](mailto:meritxell.vilaseca@upc.edu))

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# Optics & Photonics

➤ A traditional area of science and technology evolving very fast (one of the most relevant branches for the XXI<sup>th</sup> Century)

- **Imaging** (displays, ...) and **vision**
- **Sensors and new light sources** (lasers, ...)
- **Biophotonics and medicine:** instruments for diagnosis and treatment (ophthalmology)
- **Optical communications** (fibers, ...)
- **New materials** (nanophotonics, ...) and **processing** (cutting, 3D printing,...)
- **Energy & environment** (LED lighting, solar panels,...)
- **Quantum and nonlinear optics** (Photonic computers, ...)

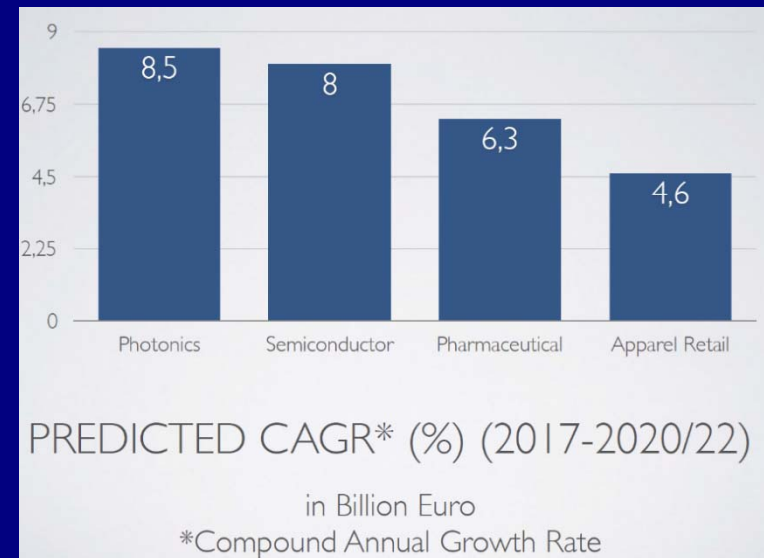
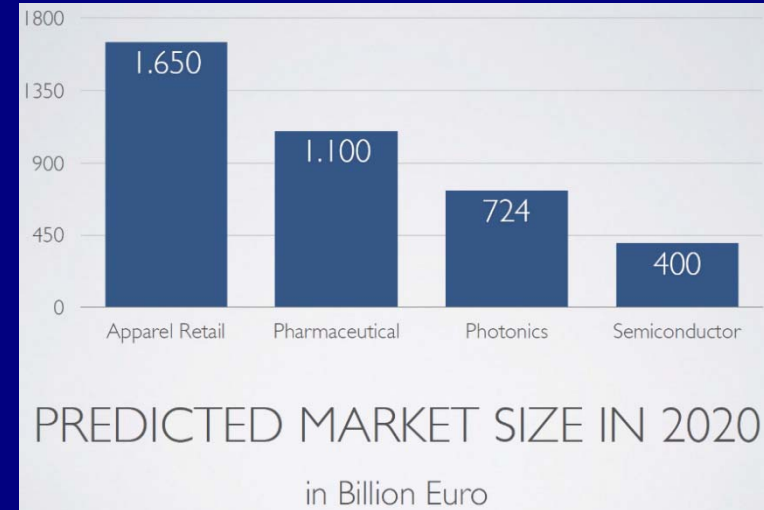
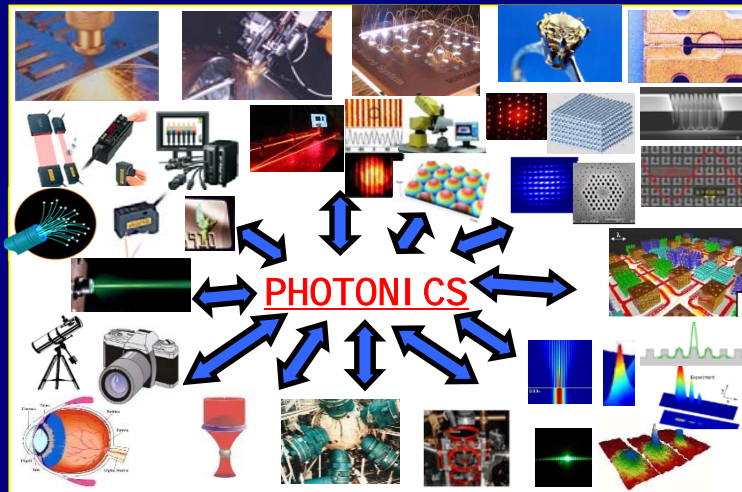


**XXI century:** - 8 Nobel Prize in Physics  
- 2 Nobel Prize in Chemistry

**related to PHOTONICS**

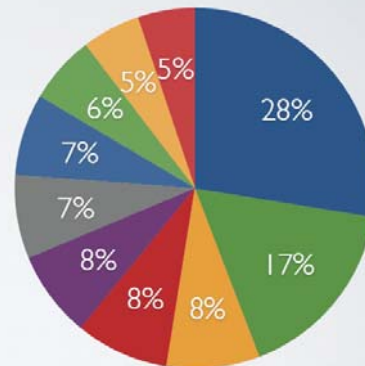
# Photonics in Science and Technology

Highly multidisciplinary



## PHOTONICS SEGMENTS

- FP Displays
- IT
- Medical and Life Science
- Lighting
- Measurement and Image Processing
- Photovoltaics
- Defence and Security
- Production Technology
- Optical Component and Systems
- Optical Comms



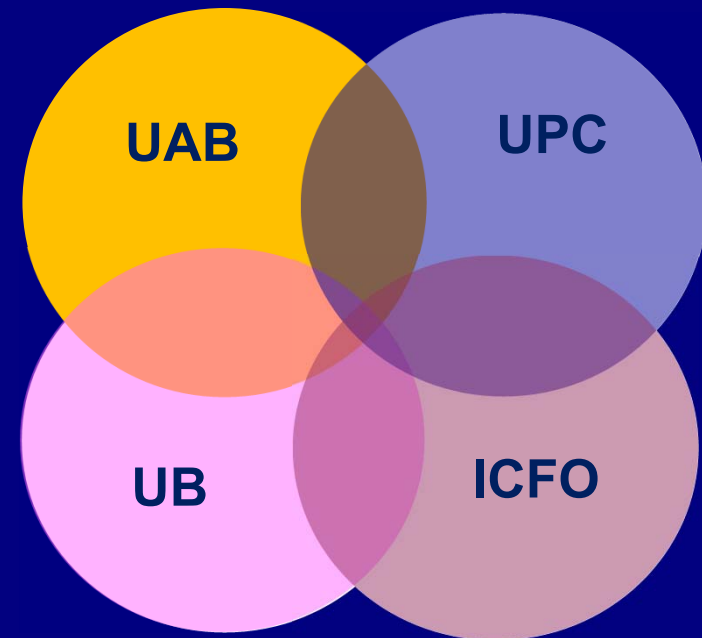
**2010** EU selects Photonics as one of the five KET (“Key-Enabling Technologies”)

**2020** EU renews the KET list keeping Photonics as one of them



# MSc Photonics – “PHOTONICS BCN”

- 15 years ago, researchers covering different fields of Photonics in Barcelona area (**UPC**, **UAB** and **UB**) and in the Institute of Photonic Science (**ICFO**), decided to put together their complementary expertise to offer a joint Master in Photonics.
- The program started in 2007
- Official **60 ECTS (1 year)** Spanish Degree.
- All courses are taught in English.



# Masters in Photonics – “Photonics BCN”

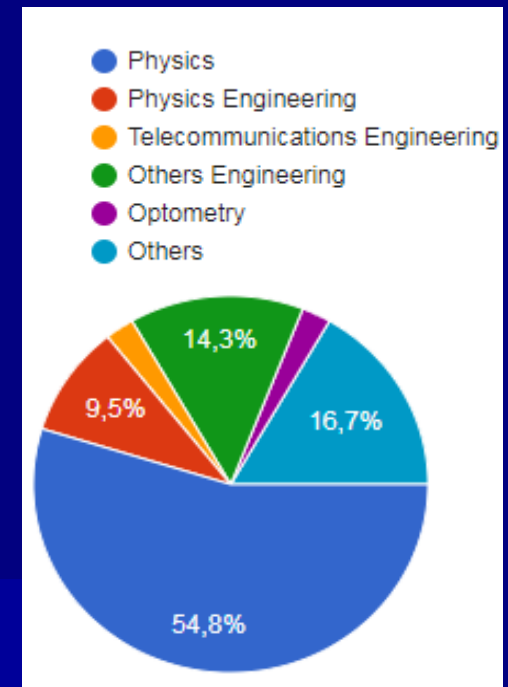
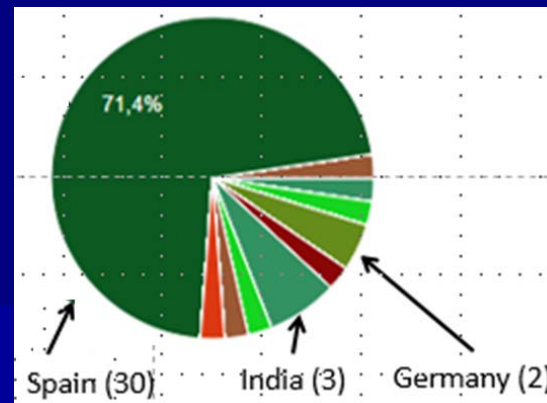
## OBJECTIVES

- Provide knowledge and training in different areas of PHOTONICS
- Flexibility: the student can choose from many elective courses, to get either general training, or more specialized training in different possible areas.
- Develop competences and skills that will help the student to initiate a research (PhD thesis) or a professional carrier in a company.



## ADDRESSED TO

- Bachelor in Physics, Physical Engineering
- Bachelor in Telecommunication and Electronics Engineers
- Bachelor in Optics and Optometry
- Other degrees
- 30-40 students



## Compulsory courses

**20 ECTS**

### Fundamentals of Photonics

**10 ECTS**

- Introduction to photonics (Optics and Lasers) 5 ECTS
- Beam Propagation and Fourier Optics 5 ECTS

### Applied Photonics & Transversal Skills

**10 ECTS**

- Photonics Laboratory 5 ECTS
- Business and Patents in Photonics (entrepreneurship, contacts with companies) 5 ECTS

## Elective Courses

**24 ECTS**

### Quantum Optics (QUANTOP)

**18 ECTS**

### Biophotonics and Imaging (BIOIMA)

**12 ECTS**

### Materials and Nanophotonics (MATNANO)

**12 ECTS**

### Telecomm. & Photonics Circuits (TELPHO)

**12 ECTS**

### Optical Engineering (OPTENG)

**18 ECTS**

### Master Thesis

**16 ECTS**

**Total: 60 ECTS**

## Biophotonics and imaging

12 ECTS

Experimental optical techniques in biology	3
Active and spectral imaging	3
Visual optics and biophotonics	3
Image processing in biophotonics	3

## Optical Engineering

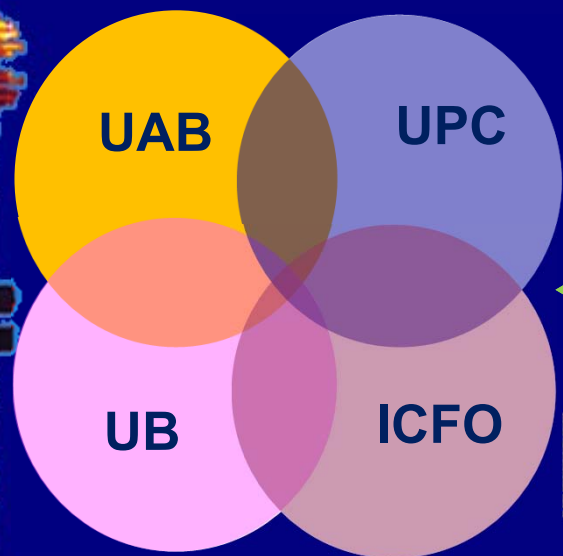
18 ECTS

Laser systems and applications	3
Managing light with devices	3
Measuring with light (optical metrology)	3
Optical design	3

### TIMETABLE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00-11:00					SEMINARS (A23M)
11:00-12:00					
12:00-13:00					
13:00-14:00					
14:00-15:00	INTRODUCTION TO PHOTONICS (A43M)	Quantum Optics (A43M) / Active and Spectral Imaging (A44M)	INTRODUCTION TO PHOTONICS (A43M)	Optoelectronics & Photovoltaic Technology (A43M)	Quantum Optics (A43M) / Active and Spectral Imaging (A44M)
15:00-16:00					
16:00-17:00	BEAM PROPAGATION AND FOURIER OPTICS (A43M)	Measuring with light (A43M)	BEAM PROPAGATION AND FOURIER OPTICS (A43M)	Measuring with light (A43M)	Photonics Materials and Metamaterials (A43M)
17:00-18:00					
18:00-19:00	Optoelectronics & Photovoltaic Technology (A43M)	Machine Learning on Classical and Quantum Data (A43M)	Photonics Materials and Metamaterials (A43M)	Machine Learning on Classical and Quantum Data (A43M)	BEAM PROPAGATION AND FOURIER OPTICS (A43M)
19:00-20:00					

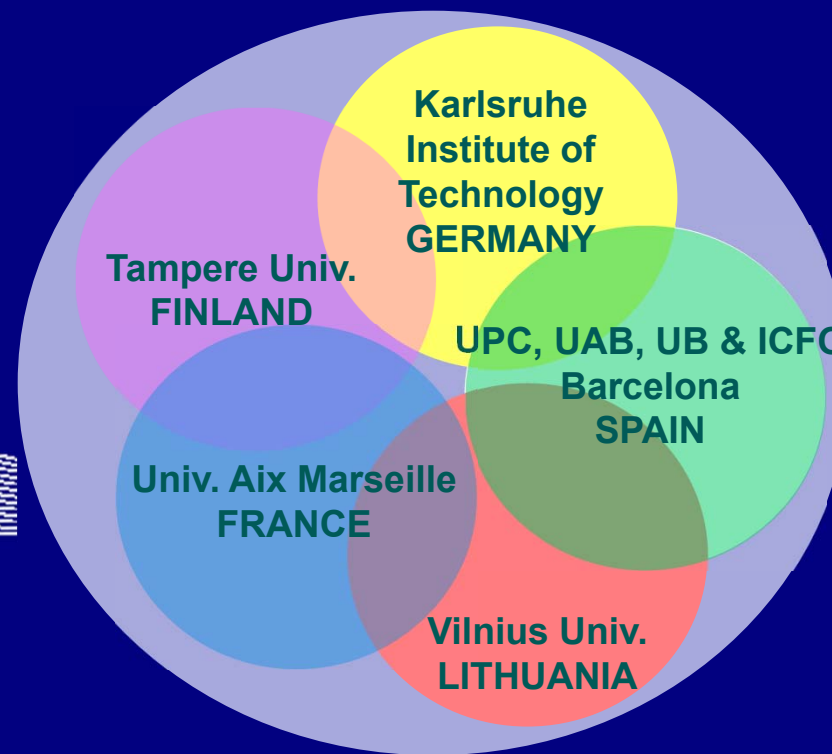
# Masters in Photonics "PHOTONICS BCN" & Master Erasmus+ "EUROPHOTONICS"



since 2010



Erasmus Mobility Scheme



European Erasmus+ Program  
(2 years): multiple degree



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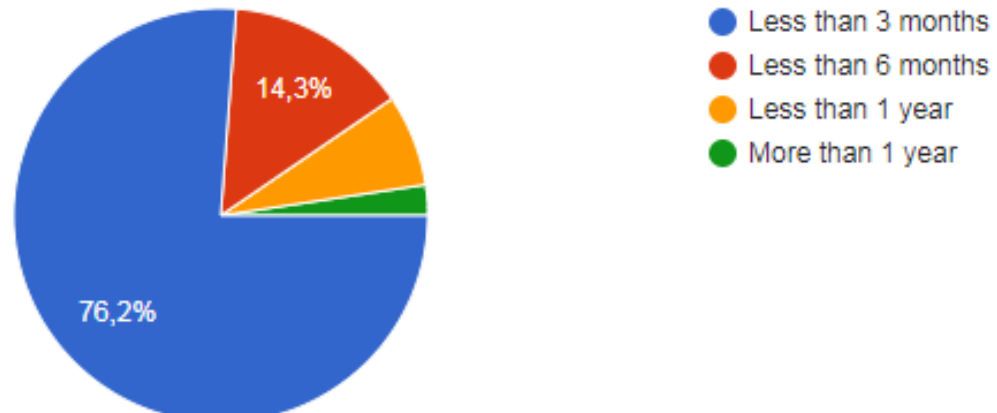
ICFO<sup>®</sup>  
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# Careers in Photonics *Statistics*

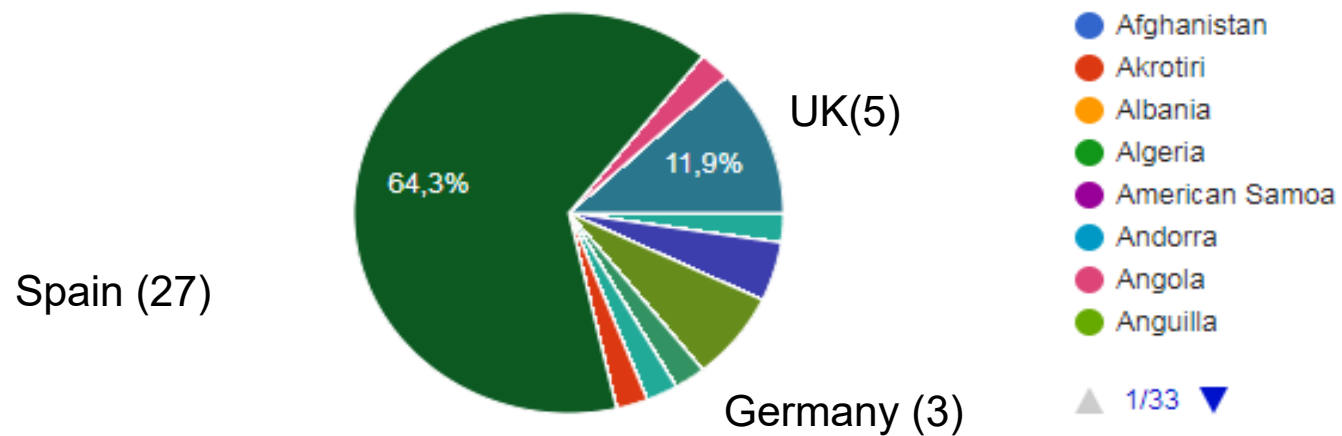
How long did it take you to find a position after graduation?

42 responses



In which country?

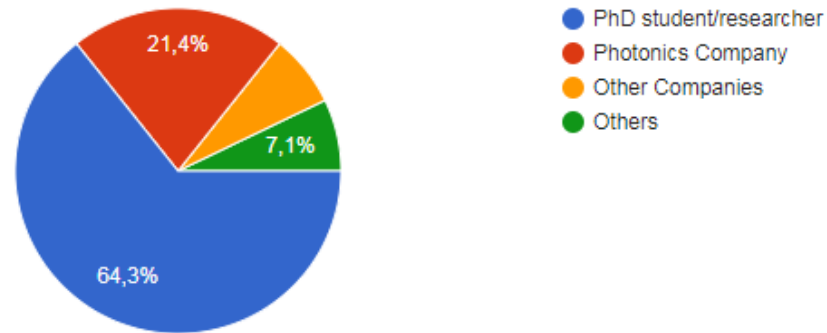
42 responses



# Careers in Photonics *Statistics*

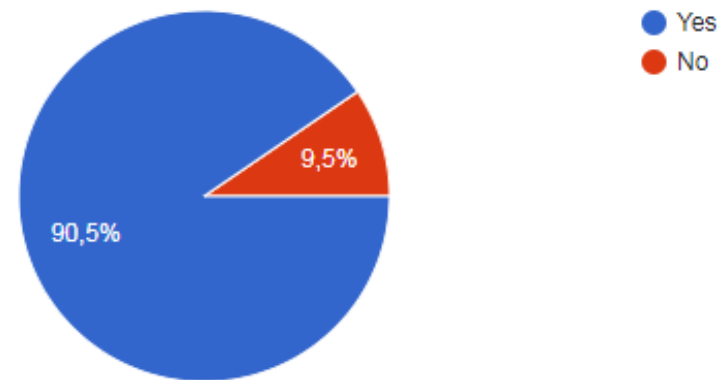
Which was your first position after graduation?

42 responses



Is your current professional career related to photonics?

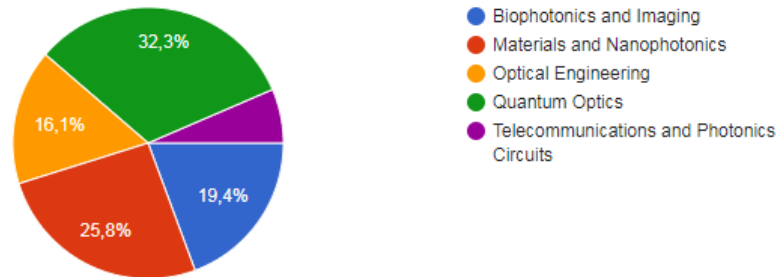
42 responses



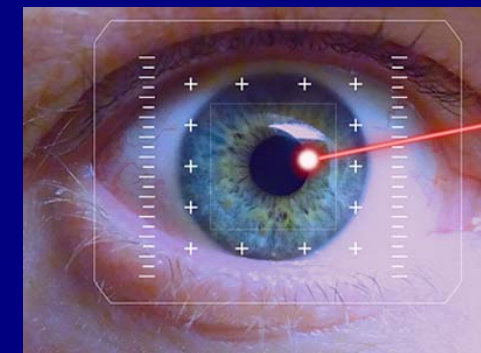
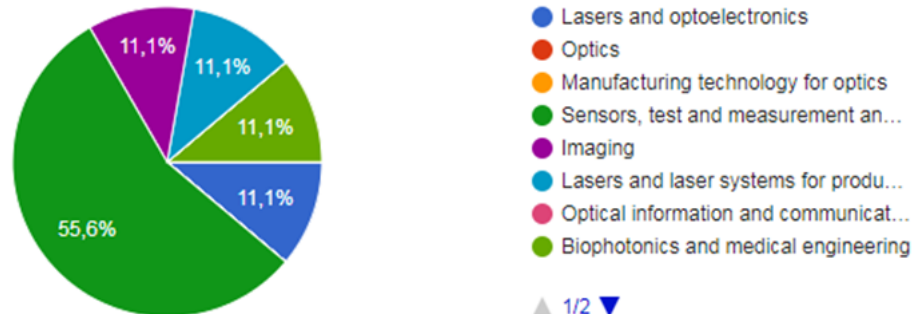
# Careers in Photonics *Statistics*

If your first position was "PhD student/researcher", which was your main Research Field?

31 responses

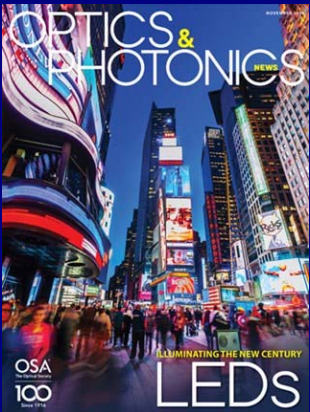


If your first position was "Photonics Company", which was your Photonics Sector?



# MSc in Photonics

<http://www.photonics.masters.upc.edu>



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## Master's degree in Photonics



You are here: Home

### General Information

Academic Year 2020-21 [▶](#)

Academic Year 2019-20

Academic Staff

ERASMUS MUNDUS Master and PhD

Grants

Related Research Groups

PhD & Job Advertisements

Frequently Asked Questions

Sponsorship and collaboration



Experimental laser setup 1

Three universities and one photonics research institute in the BARCELONA area offer a comprehensive master's degree in PHOTONICS, the science and technology of LIGHT. PHOTONICS is one of the disciplines that will play a key role in the technology development of the 21st century. The **Master in Photonics - PHOTONICS BCN** aims at educating future researchers in this field and also promoting entrepreneurial activity in PHOTONICS amongst its students. Addressed to an international audience, the Master in Photonics is conducted in English.

Contact for information about the program, course contents, timetable:

[master.photonics@etsetb.upc.edu](mailto:master.photonics@etsetb.upc.edu)

For application, registrations and administrative questions:

[masters@etsetb.upc.edu](mailto:masters@etsetb.upc.edu)

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