

# PhotonHub Demo Centre

Course

Advanced imaging

## Course Provider

Center for Sensors, Instruments and Systems

Development (CD6)

Universitat Politècnica de Catalunya (UPC)

Spain

# Course Overview

**Color imaging (RGB)** is an integral component of nearly every industry manufacturing colored product: electronic imaging, digital photography, printing, desktop publishing, car industry, textile, paints, plastics, etc. **Spectral imaging** is a recently developed more sophisticated technology to overcome the problems of conventional color imaging systems, using additional spectral bands and so reaching a great spectral and spatial resolution. **Polarimetric imaging**, on its side, explores polarization, a feature of light invisible to the unaided eye or cameras which hides valuable information applicable to industrial inspection and other applications. **Lidar and TOF imaging** adds information regarding the 3D geometry of scenes and objects.

This 1-day training course provides industry with a background in color, spectral, polarimetric and lidar imaging using state-of-the-art instrumentation and recent research developments. This industrial ‘hands-on’ training program outlines new applications in machine vision linked to novel imaging modes, by dedicated tutorials and mentoring from technical experts.

# Target Audience

It is desirable but not essential that course attendees have a basic understanding of optics and photonics. The course is ideally suited to those planning to carry out color and spectral measurements for industrial applications and to develop and manufacture new imaging products including color, spectral, polarimetric and lidar technology, in particular related to novel machine vision applications, including AI-based ones..

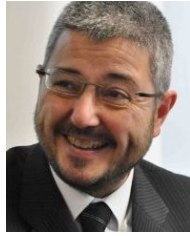
## Expected Outcomes

- 1) Learn the basics of colorimetry, spectroscopy, polarimetry and time of flight imaging
- 2) Perform color and spectroscopic measurements with conventional equipment
- 3) Perform spectral imaging with the use of advanced setups and explore the applications
- 4) Identify and capture different types of 3D data
- 5) Understand examples of machine vision and measurement industrial applications

# Course Schedule

Time	Demo Activity
09:00 – 10:00	Color and spectral imaging (lectures)
10:00 – 11:00	Color and spectroscopic measurements (hands-on)
11:15 – 12:30	Color and spectral imaging in practice (hands-on)
13:30 – 14:30	Polarimetric and lidar imaging (lecture)
14:30 – 15:30	Polarimetric imaging in practice (hands-on)
15:45 – 17:00	Lidar and time of flight imaging (hands-on)
17:00 – 17:15	Follow-up, questions and closure

# Course Trainers



**Course Director: Prof. Meritxell Vilaseca**

**Course Manager: Prof. Santiago Royo**

**Advanced imaging: Prof. Jaume Pujol, Dr. Francisco J. Burgos, Laura Rey, Maria Ballesta**



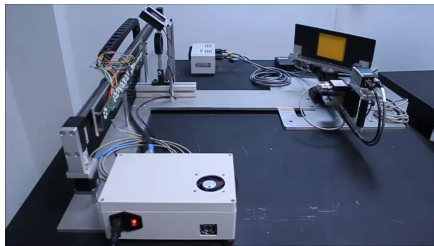
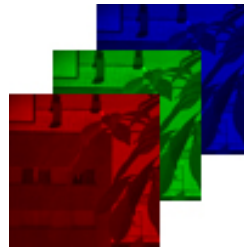
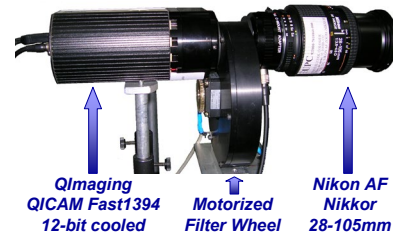


# Course Demonstrators

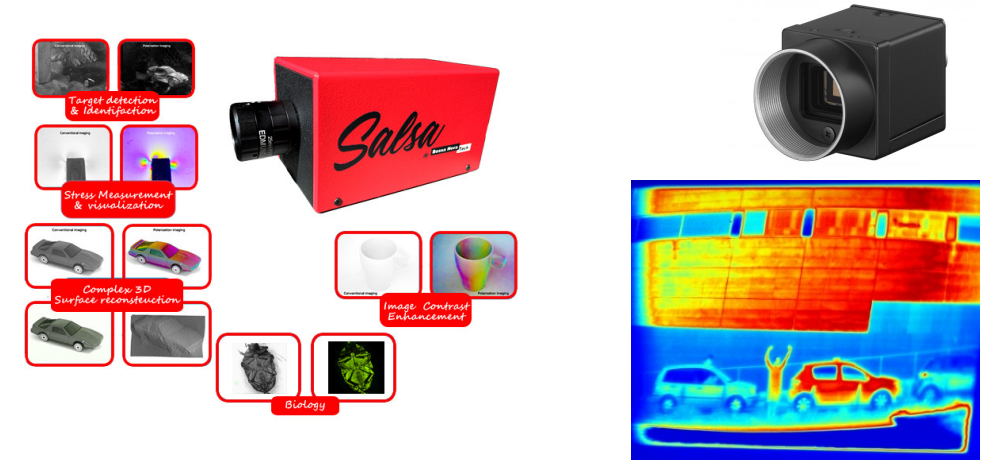
## Instrumentation for color and spectral measurements



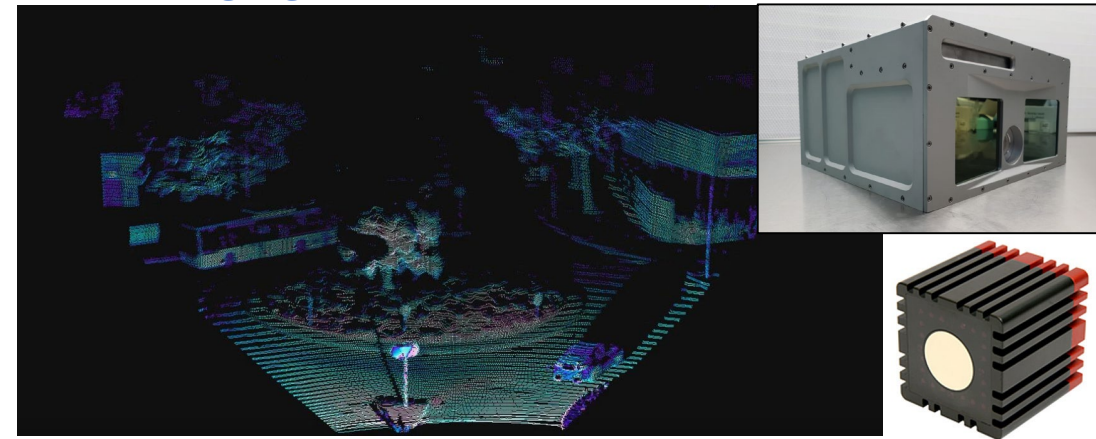
## Color and spectral imaging devices, instruments for calibration



## Polarimetric imaging devices



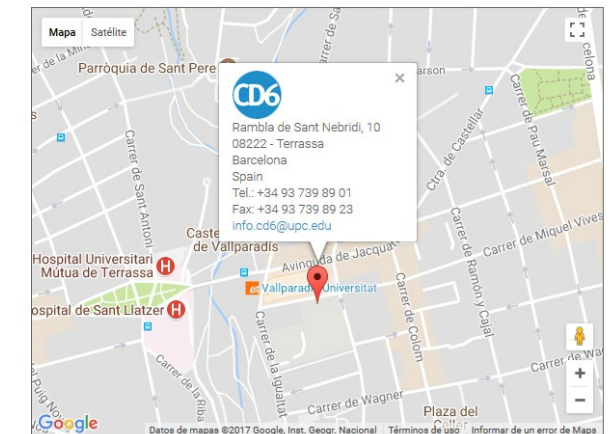
## Lidar imaging devices



# Course Location, Schedule & Cost



Getting here



- Course Schedule (February and July – exact dates to be confirmed)
- Number of people (8 people per course)
- Course Cost (250 Euros per person, includes catering and project consumables)

## Further Information

- [meritxell.vilaseca@upc.edu](mailto:meritxell.vilaseca@upc.edu)
- [www.cd6.upc.edu](http://www.cd6.upc.edu)
- [www.photonhub.eu/euphotonicsacademy](http://www.photonhub.eu/euphotonicsacademy)



**Centre for Sensors, Instruments and  
Systems Development**  
UNIVERSITAT POLITÈCNICA DE CATALUNYA  
*Shaping light to your needs*

# Course Material (technical hand-outs)





# Keywords

Colorimetry, Color measurement, color imaging, spectral imaging, polarimetric imaging , lidar, time of flight, machine vision, computer vision, industrial inspection, quality control

## Relevant Technology & Application Domain

**Technology:** Free-Space Photonic Components & Systems

**Application:** Relevant to all application domains