

PhotonHub Demo Centre

Course 01

Super resolution and advance microscopy imaging techniques

Course Provider

ICFO

Barcelona, Spain

Course Overview

Advanced microscopy and super resolution imaging techniques are becoming essential tools for non-invasive observation of samples at scales that go from several nm to the mm scale. Applications go from agriculture and food industry, materials, diagnosis of diseases, understanding of cellular and subcellular dynamic processes to study of embryo development, etc.

This 1-day course provides ad-hoc basic training on super resolution and advanced microscopy imaging techniques including STED, STORM, Confocal, spectral confocal, multiphoton, Raman and LSFM.

The course includes a basic overview of the main concepts involved in each technique, and hands-on sessions. In these, the trainee will have the opportunity to acquire images from different test samples which will be provided according to the technique and microscope in use.

This unique 'hands-on' training program provides attendees with access to state-of-the-art facilities, materials and equipment, with dedicated tutorials and mentoring from technical experts.

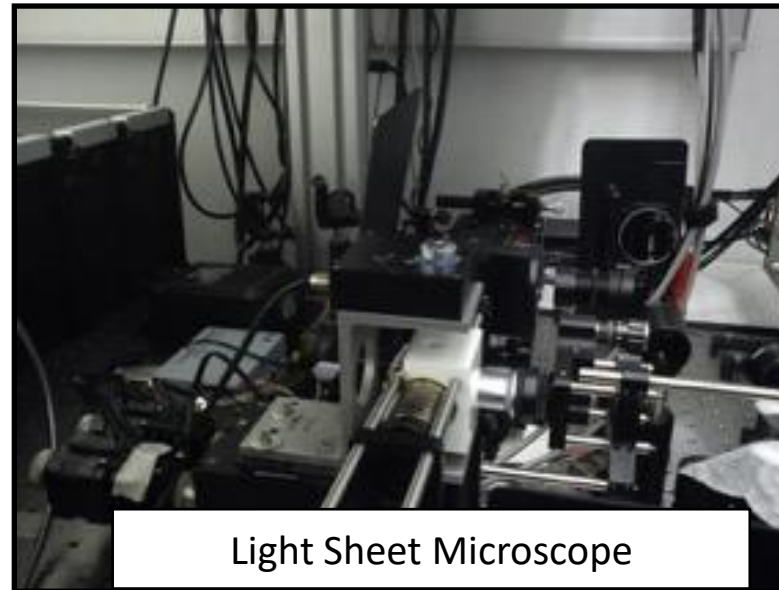
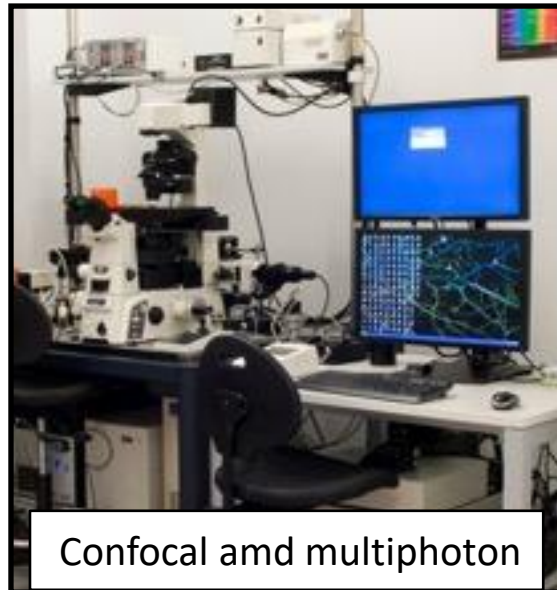
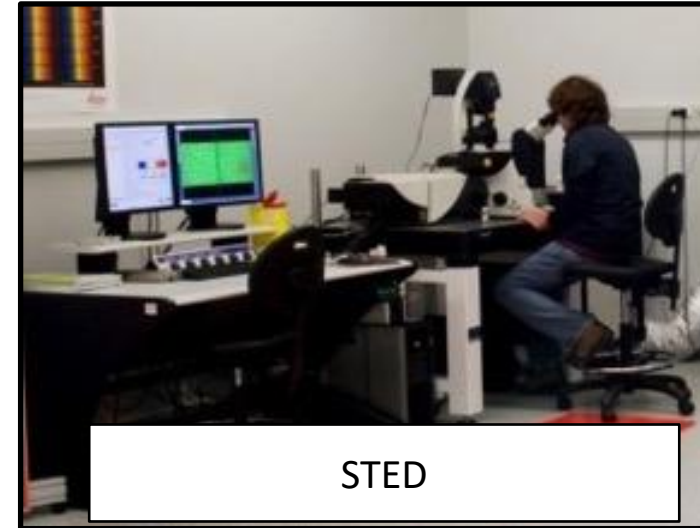
Target Audience

It is desirable but not essential that course attendees have a basic understanding of optics and photonics. The course is at an “entry level” for those interested in modern microscopy techniques. Depending on the attendees, the course can be tailored to match their needs and backgrounds.

Expected Outcomes

- 1) Understanding the key features of modern microscopy
- 2) Familiarize with the different concepts of super resolution
- 3) Devising an imaging experiment from sample preparation to image quantification on 3 of the available technologies (according to the attendees preferences)

Course Equipment & Infrastructure



Course Schedule (Demo)

Morning (9:00-10am)

LECTURE
(1hr)

Introduction to
advance
imaging
techniques:
Concepts and
examples

Morning (11:00-13:00)

G1: MT1

G2: MT2

G3: MT3

Afternoon 14:00 16:00

G2: MT1

G3: MT2

G1: MT3

Afternoon 16:30-18:30

G3: MT1

G1: MT2

G2: MT3

Microscopy techniques (MT) that can be offered for training

- Confocal and Multiphoton
- STED
- STORM
- LSFM
- RAMAN

Gn: Group number. 4 persons/group. Hands-ON sessions: 2 hrs

Course Trainers

Course Director: Dr. Pablo Loza-Alvarez



Dr. Pablo Loza-Alvarez : Lecture

Dr. Gustavo Castro: Confocal and Multiphoton



Dr. María Marsal : STED



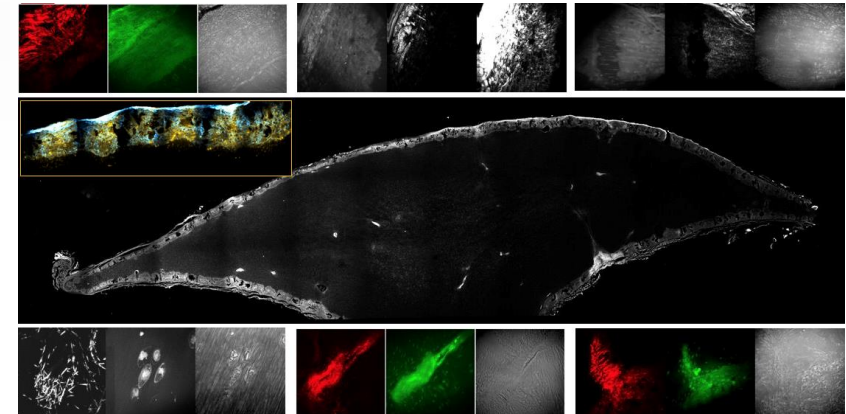
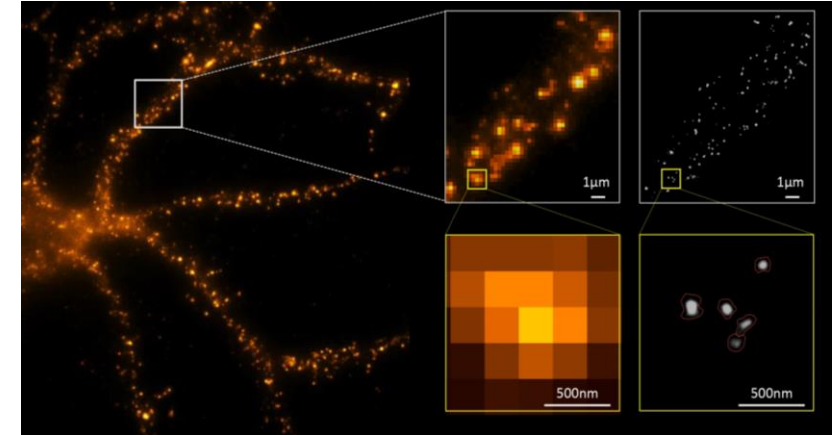
Dr. Jordi Andilla: STORM



Dr. Javier Morgado: LSFM



Dr. Mónica Marro: Raman



Course Material (power point presentation)

The screenshot displays a PowerPoint presentation interface with the following content on the grid:

- Slide 1:** Title slide: "The Super resolution light microscopy and nanoscopy lab (SLN)"
- Slide 2:** "The Super resolution light microscopy and nanoscopy (SLN)" - A circular diagram showing the intersection of User driven, Biological applications, and Research & Development (optics and photonics).
- Slide 3:** "The Super resolution light microscopy and nanoscopy (SLN)" - A "MULTIDISCIPLINARY TEAM" diagram listing fields: Engineering, Chemistry, Physics, Image and Data processing, and Biology.
- Slide 4:** "The Super resolution light microscopy and nanoscopy (SLN)" - A "MULTIDISCIPLINARY TEAM" diagram listing fields: Biology, Chemistry, Physics, and Engineering.
- Slide 5:** "EU Consortia" - Research Infrastructures and networks including RSCG, EUPHOREMAGING, RSCG, and ACT.
- Slide 6:** "SLN Collaboration with Industry" - IFO-Nobel Alliance, EXCELLENCE in Nanoscopy, and IFO-Loza Alliance.
- Slide 7:** "The SLN Team Loza" - A collage of team members and logos.
- Slide 8:** "The SLN Team Wieser" - A collage of team members and logos.
- Slide 9:** "Multimodal confocal microscopy (the AiryScan-4000)" - A grid of microscopy images.
- Slide 10:** "Multimodal confocal imaging (microscopy) (the AiryScan-4000)" - A grid of microscopy images.
- Slide 11:** "Resonance Microscopy (the AiryScan-4000)" - A grid of microscopy images.
- Slide 12:** "Light-Sheet Transmission Microscopy (the AiryScan-4000)" - A grid of microscopy images.
- Slide 13:** "STED - microscopy tomography (the AiryScan-4000)" - A grid of microscopy images.
- Slide 14:** "STED - microscopy tomography (the AiryScan-4000)" - A grid of microscopy images.
- Slide 15:** "STED - microscopy tomography (the AiryScan-4000)" - A grid of microscopy images.
- Slide 16:** "STED - microscopy tomography (the AiryScan-4000)" - A grid of microscopy images.

The interface includes a menu bar (Home, Insert, Draw, Design, Transitions, Animations, Slide Show, Review, View, Acrobat) and a status bar at the bottom showing "Slide 1 of 21", "English (Spain)", and "80%".

Course Location, Schedule & Cost



Course Schedule (exact dates to be confirmed)

Number of people (groups of 9 - 12 people per course)

Course Cost (250 Euros per person, includes catering and project consumables)

Further Information

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www.sln.icfo.eu

www.photonhub.eu/euphotonicsacademy

Keywords

**Microscopy, Biology, medicine, super resolution, nonlinear microscopy, biomedicine
Fluorescence, light sheet microscopy, confocal, Raman, spectral imaging, Agriculture
and food industry**