

Advanced Optical Fluorescence Microscopy Methods I

Course at glance

Advanced Optical Fluorescence Microscopy deals with this optical methods based on fluorescence that can also benefit of integration with scanning probe microscopy or other optical mechanisms of contrast towards investigations in biophysics, biomedical engineering and materials science.

Instructor

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Credits: 3

Synopsis

This course considers, as starting point, those implementations in advanced optical fluorescence microscopy (AOFM) that allow to get 4D(x-y-z-t) information like computational optical sectioning microscopy (COSM), confocal laser scanning microscopy (CLSM), two-photon excitation microscopy (2PEM) and light sheet fluorescence microscopy (LSFM). The course will consider theoretical and experimental aspects within a critical discussion related to focused applications. Variations on the theme will be treated by considering the possibility of getting complementary information by including Second Harmonic Generation, Light Scattering Polarization and Force interaction measurements in AOFM schemes. A possible route to bring such approaches to super resolution methods will be critically discussed.

Syllabus

The Course develops in about 9 hours in the classroom.

- Spatial and Temporal Resolution in image formation (spatial and frequency domain)
- Laser sources
- Critical discussion related to the biological, medical or materials science question
- Overview of microscopy methods

The examination consists in a journal club based on a selected list of papers provided to the students

Reading list

Please refer to the Educational Program Section of the NIC@IIT - <http://www.nic.iit.it/education-program-training/>

Notes by Alberto Diaspro will be available at the Course

Specific textbooks for this Course are:

- A.Diaspro (ed.), Confocal and Two-Photon Microscopy: Foundations, Applications and Advances, Wiley (2001)
- A.Diaspro (ed.) Optical Fluorescence Microscopy, Springer (2011)
- A.Diaspro (ed.) Nanoscopy and Multidimensional Optical Fluorescence Microscopy, Taylor and Francis/cHapmann and Hall/CRC (2009)
- J.Pawley (ed.) Handbook of Confocal Microscopy, Springer (2006)
- CJR Sheppard and D.Shotton, Confocal Laser Scanning Microscopy, Garland Science (1997)

Venue

IIT - Via Morego, 30 16163 Genova

Course date

- April 09th 10.00 – 12.00 Sala Natta
- April 10th 10.00 – 12.00 Sala Natta
- April 20th 10.00 – 12.00 Sala Montalcini
- April 22th 10.00 – 13.00 Sala Natta