

Optical microscopies and biophotonics (3 ECTS)

Teachers: Samuel Grésillon (IL, SU), Sandrine Lévêque-Fort (ISMO, Université Paris Saclay, CNRS), Gilles Tessier (Institut de la Vision, SU), Yannick De Wilde (IL, CNRS).

Objectives :

- The aim of this course is to provide students with the knowledge they need to understand and use today's optical microscopy concepts and methods.
- Both theoretical and experimental aspects are covered. After an introduction to the physical principles of imaging, this course explains the operation and practical use of an optical microscope, and looks at the most recent advances.

Content :

Teaching takes the form of lectures and practical work.

- Introduction to microscopy and Fourier optics
- Microscopy imaging techniques
- Fluorescence microscopy and applications in biology
- Super-resolution
- Tomography and 3D imaging
- Near-field optics
- Seminars
- Practical work
 1. super-resolution
 2. phase contrast microscopy, holography

Key words: far-field optics, Fourier optics, confocal microscopy, microscopy of fluorescence, nonlinear microscopy, super-resolution, holography, imaging for biology.

Place : Jussieu, with the exception of some practical work that may be carried out in laboratories in Paris or at the Université Paris Saclay.