



# THEORETICAL COURSE of MICROSCOPY

12<sup>th</sup> October 2018 – aula verde (open to all)

## The optical microscopy day

*wide field and confocal microscopy with a brief introduction to phase imaging*

4 hours of theoretical lessons with extensive application suggestions to introduce wide field optical microscopy, confocal microscopy and holographic microscopy

### 1) Introduction to optical microscopy: (ED)

- a. Magnification and resolution
- b. The lens:
  - i. The numerical aperture and the resolution
  - ii. The optical aberration and difference among lenses
  - iii. How to chose the proper lens
- c. The fluorescence microscopy

### 2) The confocal microscopy (CR)

- i. Confocality: the optical sectioning.
- ii. The pin hole
- iii. Resolution on z axes. The Nyquist principle (ED).
- iv. Anatomy of a confocal microscopy:
  1. The scanning head
  2. The scanning devices: the mirrors and Nipkow disk
  3. The detector: cameras, PMT, spectral detectors
  4. Illumination sources: laser e led.
- v. The samples and the confocal microscopy limits

### 3) The phase microscopy (ED)

- i. Principles of interpherometric detection
- ii. The phase contrast microscopy
- iii. DIC microscopy
- iv. Quantitative Phase Imaging (SLIM e GLIM)



UNIVERSITÀ  
di VERONA

PhD School  
in NATURAL SCIENCES AND ENGINEERING  
PhD in Biotechnology

## **PRACTICAL COURSE OF CONFOCAL MICROSCOPY**

**17<sup>th</sup> October 2018 – aula riunioni Ca Vignal 2 (maximum 4 students)**

**18<sup>th</sup> October 2018 – aula riunioni Ca Vignal 2 (maximum 4 students)**

**19<sup>th</sup> October 2018 – aula riunioni Ca Vignal 2 (maximum 4 students)**

### **Hands on confocal microscopy (CR)**

- 1) Confocal microscopy description
- 2) Relationship between hardware and software.
- 3) Confocal image acquisition workflow
- 4) Scanning time and detector sensibility
- 5) How scanning time influence image quality
- 6) The resolution: x, y and z
- 7) Optical sectioning.
- 8) The sampling
- 9) How to manage a confocal image.

Teachers: Emiliano Descrovi, Politecnico di Torino and Cristiano Rumio, Università di Milano/Nikon Instruments

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### **REGISTRATION:**

The participation to practical course is free but it is necessary to send the registration. Participation to practical course is limited to the first 12 requests received.

For registration send an email to:

to: [laura.marcazzan@univr.it](mailto:laura.marcazzan@univr.it)

cc: [matteo.ballottari@univr.it](mailto:matteo.ballottari@univr.it) and cc: [daniela.cecconi@univr.it](mailto:daniela.cecconi@univr.it)