

Ciclo di Seminari

Scuola di Dottorato in Scienze Molecolari
Corso di LT in Biotecnologie

il **prof. Marc van Zandvoort**

Department of Genetics and Cell Biology
and Maastricht AMMI EuroBioImaging
Maastricht University (NL)

terrà un Ciclo di seminari dal titolo:

Microscopy visits Padova

Learning more on advanced optical microscopy

Calendario delle lezioni presso il complesso Fiore di Botta, aula 0C

Giovedì 3/11 ore 9:30-11:15	Giovedì 10/11 ore 9:30-11:15
Martedì 15/11 ore 11:30-13:15	Giovedì 17/11 ore 9:30-11:15

Abstract

The use of advanced imaging techniques in light microscopy is wide-spread, particularly in the fields of material science, chemistry, and biomedical imaging. In recent years, the resolution and/or functionality of such tools has been increased due to the development of (confocal) fluorescence microscopy, spectral fluorescence microscopy, two-photon excitation microscopy, and stimulation emission depletion (STED) microscopy [first experimentally shown by the winners of the 2014 Nobel Prize in Chemistry]. Together with rapid developments in aberration correction and image analysis, this allows users to understand much more about the samples they are investigating. This course will introduce several of these advanced imaging techniques to participants, detailing theoretical aspects as well as practical considerations. There will be ample possibility to discuss questions and an active participation is expected.

La presenza della S. V. sarà molto gradita

Il docente organizzatore
Antonio Barbon

Il Coordinatore della Scuola di Dottorato
Leonard Prins
Il Presidente del CCS di Biotecnologie
Livio Trainotti

Curriculum vitae

Prof. Marc van Zandvoort



Prof. Marc A.M.J. van Zandvoort, PhD achieved his PhD degree in Biophysics at Utrecht University (1994) and worked as a postdoc at Università di Bologna and LENS institute, Florence (Italy). He returned to Utrecht University as a postdoc in 1996. In 1998 he moved to Maastricht University first as postdoc, from 2000 as assistant professor Biophysics. In 2007 he became associate professor at the department of Biomedical Engineering. In 2012 he moved to the department of Molecular Cell Biology. Currently, he is interim head of that department. In 2017 he obtained the chair “Advanced Optical Microscopy” in Maastricht.

In 2009 he additionally became professor Biophysics of Microscopy (part-time) at the Universitätsklinikum Aachen (Germany) and scientific leader of the Two-photon core-facility in Aachen. Marc is board member of the conference series Focus on Microscopy, board member of the Dutch Society of Microscopy, and board member of the NL-BioImaging-AM initiative. He also is leader of the EuroBioImaging Node Maastricht.

His research currently zooms on the application of advanced optical microscopy (multi-photon, high-resolution 3D-STED microscopy, spectral microscopy) to biomedical research in the broadest sense. As an example, his group recently developed a method to quantify lipofuscin droplets in brain vessels using ex vivo multi-photon microscopy. He has also done a variety of studies on in vivo bimodal (e.g., optical-MRI, optical-US) imaging. In combination with the techniques used, a variety of systems can be studied, ranging from artificial systems, via cells in culture (e.g., lamin substructure, mitochondrial network and substructure), to whole tissues, organs, and animals.

Objectives of the Course

The objectives of the course are as follows:

- To acquaint the student with the principles of optical microscopy and limiting factors in resolution.
- To introduce a few modern microscopy techniques and the theory behind them.
- To discuss factors that limit contrast, resolution, and penetration depth of these techniques
- To get acquainted with sample preparation procedures.
- To get acquainted with technical aspects of each technique
- To get acquainted with basic image processing methods.

Overview of the Course

The course will give a broad overview of the most common and significant optical microscopic imaging techniques and will consist of 6 lectures and 11 tutorials. The techniques that are going to be presented and discussed in the lectures are:

- Topic 1: Brightfield and fluorescence microscopy: basic techniques in imaging
- Topic 2: Labelling, confocal and STED microscopy: going to imaging in 3 dimensions
- Topic 3: Two-photon microscopy and sample preparation: penetrating deeper to learn more
- Topic 4: The pipeline of optical microscopy: optical imaging in relation to other methods