

# Molecular Imaging by Optical Microscopy<sup>1</sup> and Ambient Mass Spectrometry<sup>2</sup>

Expected 4-8 July 2016, 10:00 - 16:00, 4 days

<sup>1</sup> VU University Amsterdam, Faculty of Sciences,  
De Boelelaan 1085, 1081 HV Amsterdam

<sup>2</sup> Wageningen University, Laboratory of Organic Chemistry  
Dreijenplein 8, 6703 HB Wageningen

## Content

A four-day MSc+ level course on the latest optical spectroscopy and mass spectrometry tools for the (bio)chemical characterization of surfaces and entire objects. Imagine, you bring your sample to a machine like a classical microscope, but now you also get the chemical information from the features you see.

Spatially resolved chemical information from sample objects is crucial for the characterization and understanding of dynamic systems in living cells, in (bio)catalysis, in microbiology, but also in plants, foods, forensics, conservation of art, etc. In this course, following a rapid recall of the basics, you will get insight in the principles and applications of the latest optical and mass spectrometric imaging tools from leading scientist in the field. The course format comprises lectures, work groups, demonstrations and hands-on practicals. The course is given in English.

## Target audience

The course is taught in the framework of the MSc+ program for talents in Master education (University). Therefore, the course is well fit for employees at that level. The course is also aimed at PhD-students in analytical sciences or related fields who are not specialized in Solids and Surfaces (ANAC-basic course). Finally, the course is suitable for graduates (BSc, MSc and PhD) interested in Solids and Surfaces and seeking additional knowledge and understanding.

## Topics

Schedule to be established  
Optical Microscopy, VU Amsterdam  
Monday 4 July

- Introduction to optical spectroscopy and microscopy
- Modern fluorescence spectroscopy and imaging (including single-molecule and high-resolution techniques)

Lecturers: Freek Ariele & Iddo Heller

Tuesday 5 July

- Modern IR and Raman spectroscopy and imaging (including 2D IR, depth Raman and Stimulated Raman)
- Tour LaserLaB

Lecturers: Freek Ariele & Sander Wouterse

Ambient Mass Spectrometry, Wageningen University  
Thursday 7 July:

- Introduction to Ambient Mass Spectrometry
- DESI mass spectrometry, principles and applications
- Paper Spray and Plant Spray mass spectrometry, principles and applications
- DART mass spectrometry, principles and applications
- LAESI imaging mass spectrometry, principles and applications
- Hands-on Ambient Mass Spectrometry and Demos: bring your sample of interest!

## Lecturers

*VU University Amsterdam: Dr Freek Ariese,*  
Associate Professor at the LaserLab of VU University Amsterdam



Ariese studied chemistry at the University of Amsterdam and obtained his PhD at VU University Amsterdam in 1993 for his research on fluorescence spectroscopy under cryogenic conditions (Shpol'skii spectroscopy). After his PhD Ariese worked at Iowa State University (USA) and after his return to the Netherlands at the Institute for Environmental Studies (IVM-VU). Since 1999 Ariese has worked at VU LaserLab on fluorescence and Raman spectroscopy, including Raman microscopy and time-resolved Raman methods. He teaches various spectroscopic courses at the bachelor, master and PhD level, and is involved in the management of the LaserLab VU. He has recently become part-time visiting professor at the Indian Institute of Science in Bangalore, where he is working - of course - on Raman spectroscopy.

*VU University Amsterdam: Prof. Dr. Ir. Erwin Peterman*  
Professor in Physics of Living Systems, University Research Chair

Peterman teaches several courses at the bachelor and master level to students in Physics, Medical Natural Sciences, and Biomolecular Sciences. Currently, he is director of the bachelor's program Medische Natuurwetenschappen and the master's program Medical Natural Sciences. His current research focuses on the cooperation of motor proteins in intracellular transport in *C. elegans* cilia, on the mechanics of DNA and DNA-processing proteins, on the dynamics of membrane proteins in living bacteria, and on the development of new instrumentation and approaches to study life at the single-molecule level. In 2013, he was appointed as full professor on a University Research Chair.



*Wageningen University: Prof. Dr. Michel Nielen*

Principal scientist at RIKILT Wageningen UR, Professor Analytical Chemistry at Wageningen University and Scientific Director of COAST.



Nielen obtained his PhD from the VU University (Amsterdam) in 1986. After a career at TNO and in industry at AkzoNobel, he became program manager Veterinary Drugs at RIKILT. In 2007 Nielen became professor at Wageningen University, focusing on research and development of bioactivity-related multi methods for the detection of chemical contaminants in the food chain. Since 2012 he is Principal Scientist at RIKILT and holds a special chair on Analytical Chemistry at Wageningen University. Nielen has published more than 150 papers covering a wide range of analytical technologies including mass spectrometry and diagnostics. Nielen is accompanied by his co-workers, who will inform you on the latest developments through their research topics at Wageningen University.

TI-COAST: A joint Private-Public initiative

Contact: Iris de Lange | T: +31 20 525 8393 | E: [lifelonglearning@ti-coast.com](mailto:lifelonglearning@ti-coast.com) | [www.ti-coast.com](http://www.ti-coast.com)

MSc\* Summer Course: Molecular Imaging by Optical Microscopy and Ambient Mass Spectrometry

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*Wageningen University: Dr Teris van Beek*

Associate professor in Natural Products Chemistry at the Laboratory of Organic Chemistry of Wageningen University

Teris van Beek obtained his PhD on alkaloids from medicinally used plant species from Leiden University in 1984. Van Beek is an academic researcher with 35 years of experience in the analysis, chemistry and bioactivity of natural products. Throughout the years he obtained extensive teaching experience at university level in the areas of analytical chemistry, phytochemistry and organic chemistry. His research is mainly focused on the analytical aspects of bioactive or economically useful metabolites from plants, microbes or animals.

## At the end of the course

The students will have a good overview of possibilities and limitations of the latest optical and chemical ‘microscopy’ tools for the analytical characterization of objects in life sciences, agrifood and smart materials.

## Course duration and time investment

Course duration: 4 (2+2) days, 10:00 - 16:00

Participant’s investment: 4 days (study load 1.5 ECTS)

## Extra Information

This course is taught as a Summer Course in the MSc+ program and is taught every two years.

Course fees:

- €800 (ex. BTW/VAT) per day
- COAST members pay a reduced fee of €400 per day (ex. BTW/VAT) or use a wildcard
- ASTP / MSc+ students: Free

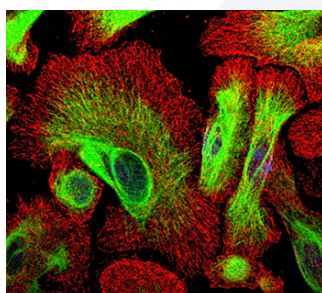
Special fees can be offered to PhD students and companies registering for three or more persons.

For up-to-date information about the course program visit our website at [www.ti-coast.com/L3](http://www.ti-coast.com/L3).

Please contact us for more information.

## Registration

To register fill out, sign and email the form attached to [lifelonglearning@ti-coast.com](mailto:lifelonglearning@ti-coast.com).



## Registration Form

**Molecular Imaging by  
Optical Microscopy<sup>1</sup> and Ambient Mass Spectrometry<sup>2</sup>**  
**Expected 4-8 July 2016, 10:00 - 16:00, 4 days**  
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Name	
Organization	
Address	
Billing address (if different from above)	
Educational background	
Email address	
Phone number	

### I will attend on the following date(s):

- ☐ Day one: 4 July 2016, 10:00 - 16:00  
☐ Day two: 5 July 2016, 10:00 - 16:00  
☐ Day three: 7 July 2016, 10:00 - 16:00  
☐ Day four: 8 July 2016, 10:00 - 16:00

### Payment

- ☐ I will pay the full course fee of €800 per day (ex. BTW/VAT)  
☐ I am a member of KNCV and will pay € 600 per day (ex. BTW/VAT)  
☐ I qualify for 50% discount, because my employer is a COAST participant, and will pay €400 per day (ex. BTW/VAT)  
☐ I am a PhD student and will pay €400 per day (ex. BTW/VAT)  
☐ I am a PhD student from a group participating in COAST and will pay €200 (ex. BTW/VAT) per day  
☐ I have received a wildcard from: ..... Therefore, I will follow this course for free  
 (note: this person must receive a copy of your registration mail, to indicate approval)

**Date:**

**Place:**

**Signature:**

To register, please email the duly signed registration form to [lifelonglearning@ti-coast.com](mailto:lifelonglearning@ti-coast.com)

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