

# PhotonHub Demo Centre

Photonics and Food

## Course Provider

Vrije Universiteit Brussel,  
Brussels Photonics,  
Belgium

# Course Overview

Photonics plays an important role in the screening of food products. This includes the detection of foreign objects, the classification of a product batch based on its quality, the monitoring of the (potential) presence of carcinogenic elements, authenticity tests on liquids in the framework of food fraud and the quality monitoring of water.

This one-day hands-on training course provides industry with a detailed overview of how photonics and photonics-based techniques can contribute to the quality control and safety of liquid and solid food products.



**Foreign  
object  
detection**



**Ripeness  
classification of  
strawberries**

**Detection of  
mycotoxins in corn**



**Acrylamide precursors  
in potatoes**



Olive oils

Honey



Beers

Monitoring of drinking  
water quality



In the introduction part, the theoretical aspects of the various physical phenomena that can occur during food screening together with their related measurement setups will be discussed. Different case-studies will be presented illustrating the selection of the appropriate test set-up and data-processing techniques.

The second part of the course will focus on three demonstrators where participants can have hands-on experience.

# Target Audience

It is desirable but not essential that course attendees have a basic understanding of photonics. The course is ideally suited for people from food and agriculture industry that want to explore the possibilities of implementing photonics-based techniques in their specific application. People from water companies are also highly welcomed.

## Expected Outcomes

- 1) Understand key features of different photonics detection techniques used in food research
- 2) Evaluate various photonics test set-ups (hands-on activity)
- 3) Get familiar with machine learning techniques (hands-on activity)
- 4) Understand the photonic product design and manufacturing process

# Course Schedule

Time	Demo Activity
09:00 – 10:30	Course Introduction & Tutorial
11:00 – 12:30	Demo 1: UV-VIS-NIR Absorption spectroscopy on solid and liquid food products (hands-on)
14:00 – 15:30	Demo 2: Fluorescence spectroscopy (hands-on) and scatter measurements on solid food products (illustration demo)
15:30 – 17:00	Demo 3: The use of machine learning techniques in food spectroscopy (hands-on)
17:00 – 17:30	Follow-Up Questions & Close

# Course Trainers



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**Course Directors: Prof. Heidi Ottevaere & Prof. Wendy Meulebroeck**

**Course Manager: Nathalie Debaes**

**Demo 1: Prof. Heidi Ottevaere & Prof. Wendy Meulebroeck**

**Demo 2: Dr. Lien Smeesters**

**Demo 3: Ir. Indy Magnus**

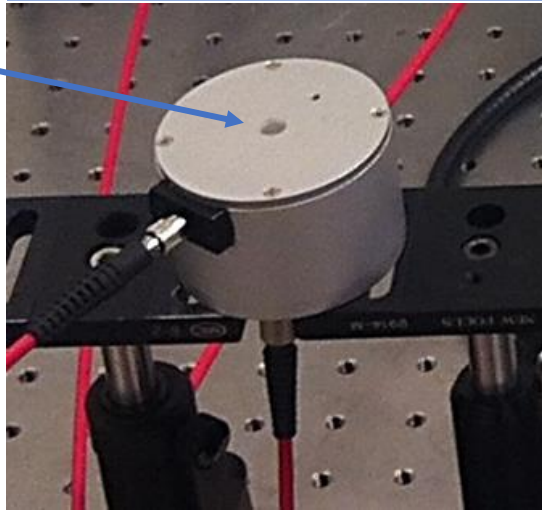


# Course Demonstrators

## Demo 1: UV-VIS-NIR Absorption spectroscopy on solids and liquids



Corn



Olive oil



vinegars



olive oils



vegetables



potatoes



dried fruits



nuts



fruits



seafood



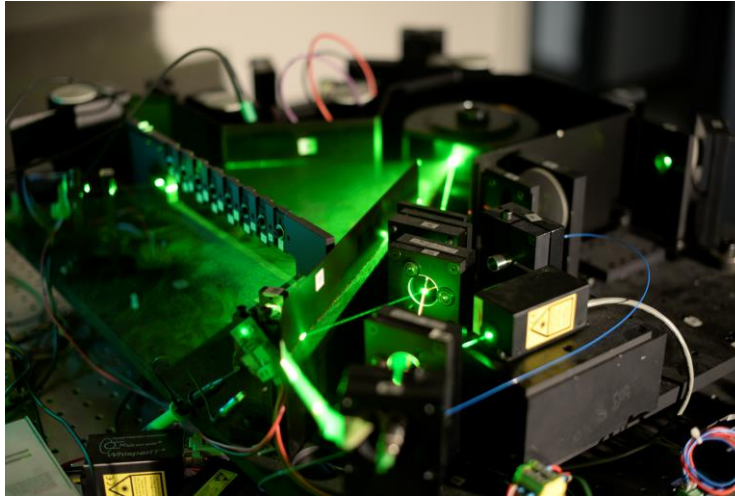
water



beers

# Course Demonstrators

## Demo 2: Fluorescence spectroscopy on mycotoxins



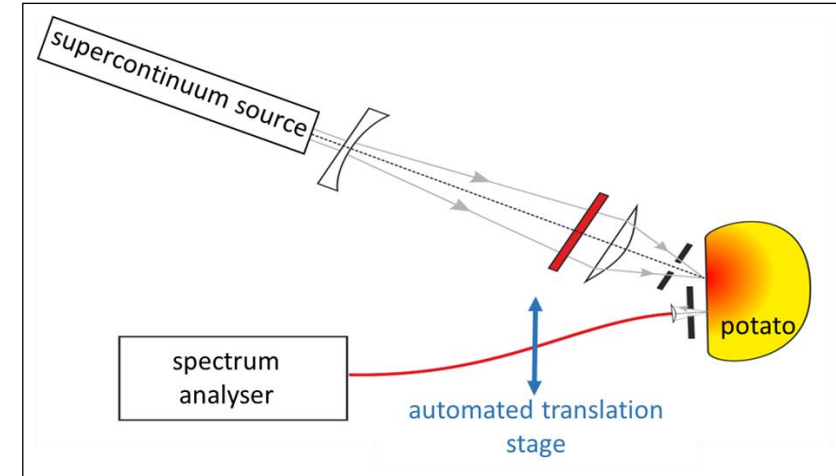
Corn



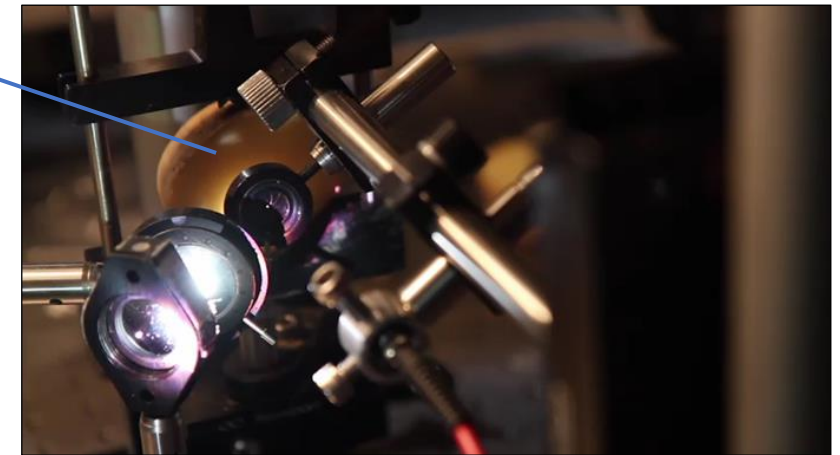
Nuts



## & UV-VIS-NIR Scattering on acrylamide precursors



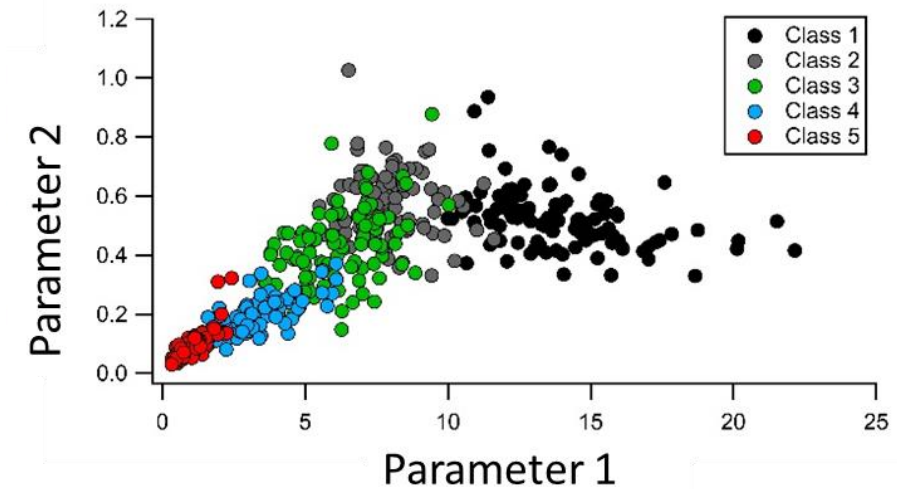
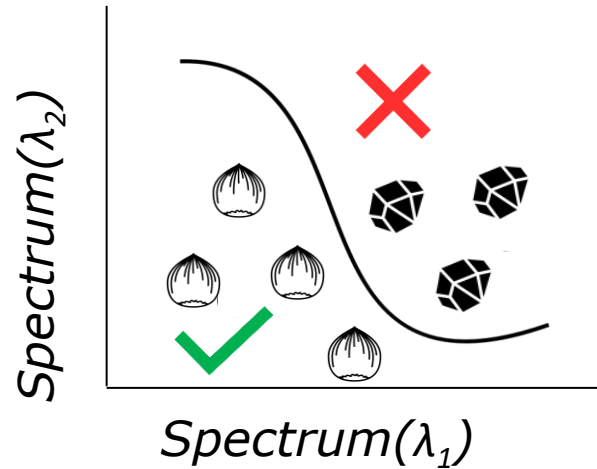
Potato





# Course Demonstrators

## Demo 3: Machine learning on recorded food data



Class 1

Class 2

Class 3

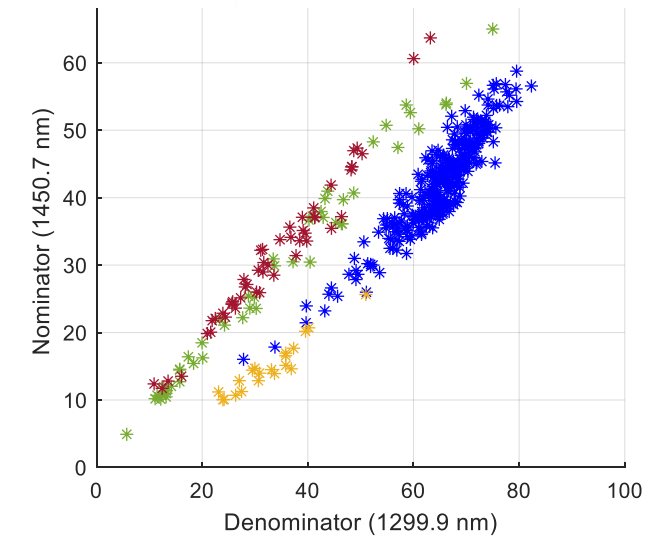
Class 4

Class 5

Strawberries



Nuts



# Course Location, Schedule & Cost



- Course Schedule (3 times a year – exact dates to be confirmed)
- Number of people (Groups of 3 persons per hands-on station, with a maximum of 9 persons per course)
- Course Cost (250 Euros per person, includes catering and project consumables)

## Further Information

- [DemoCentreFood@b-phot.org](mailto:DemoCentreFood@b-phot.org)
- [www.b-phot.org](http://www.b-phot.org)
- [www.photonhub.eu/euphotonicsacademy](http://www.photonhub.eu/euphotonicsacademy)

# Course Material (technical hand-outs)



**PhotonHub Demo Centre**

**Course on  
Photonics and Food**

**Course Provider**

**Vrije Universiteit Brussel  
Brussels Photonics  
Belgium**

**Training Course Notes**

# Keywords

**Food sensors, Solid food products, Liquid monitoring, Spectroscopy, Absorption, Fluorescence, Scattering, Machine learning, Food quality, Food safety, Food fraud, Water monitoring.**

## Relevant Technology & Application Domains

**Technology:** Free-Space Photonic Components & Systems

**Application:** Relevant to all application domains