

PhotonHub Demo Centre

Course 01

Optical Fibre Sensing Applications

Course Provider

Brussels Photonics,
Vrije Universiteit Brussel,
Belgium

Course Overview

Optical fibre sensors (OFS) are part of the field of optical metrology, which is the science and technology of performing measurements with light. An optical fibre sensor encodes a measurand of interest (the perturbation that you want to measure) in one (or more) properties of an optical signal that is guided through an optical fibre.

This one-day hands-on training course provides industry, especially those addressing a sensorization need, with a detailed overview of important point and distributed OFS sensing techniques and how they are applied in engineering environments.

The course will focus on three hands-on sessions; 1) Fabrication and Characterization of fibre Bragg gratings (FBGs); 2) Measurement campaign with FBGs and optical frequency domain reflectometry (OFDR); 3) Processing of raw data into engineering values & Interpretation; Course attendees will learn how OFS are fabricated, installed and interrogated and what measurements they deliver.

Target Audience

It is desirable but not essential that course attendees have a basic understanding of photonics. The course is ideally suited to those planning to implement optical fibre sensors.

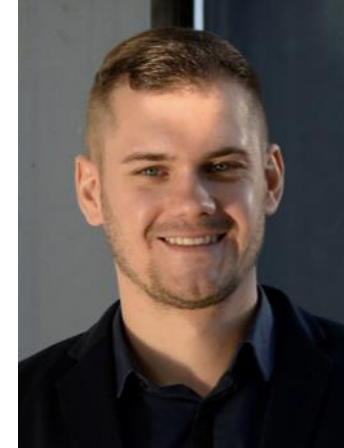
Expected Outcomes

- 1) Understanding of operation principles of optical fibre sensors
- 2) See the fabrication process to produce fibre Bragg gratings (hands-on activity)
- 3) Perform measurements on an asset instrumented with optical fibre sensors (hands-on activity)
- 4) Understand, process and interpret the raw sensor data (hands-on activity)

Course Schedule

Time	Demo Activity
09:00 – 10:30	VUB B-PHOT Orientation, Course Introduction & Tutorial
11:00 – 12:30	Demo 1: Fabrication and Connectorisation of a FBG-based sensor chain (hands-on)
13:30 – 15:00	Demo 2: Measurement campaign with FBGs and OFDR (hands-on)
15:30 – 17:00	Demo 3: Processing of raw data into engineering values & Interpretation (hands-on)
17:00 – 17:30	Follow-Up Questions & Close

Course Trainers



Course Director: Prof. Hugo Thienpont

Course Manager: Prof. Thomas Geernaert

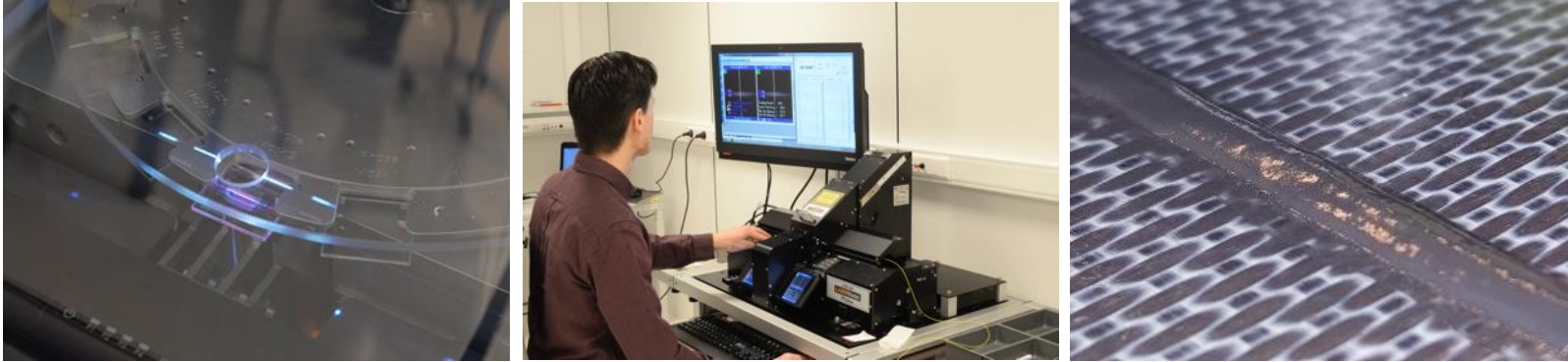
Demo 1: Dr. Tigran Baghdasaryan

Demo 2: Dr. Sergei Mikhailov

Data processing: Dr. Sidney Goossens

Course hands-on sessions

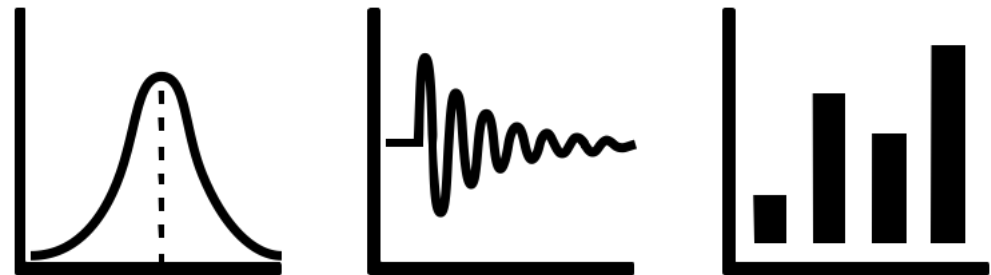
Fabrication and connectorization of fibre Bragg grating sensor chains



Measurement campaign with FBGs and OFDR



Processing of raw data into engineering values & Interpretation



Industrial application sectors of FOS

Bridges



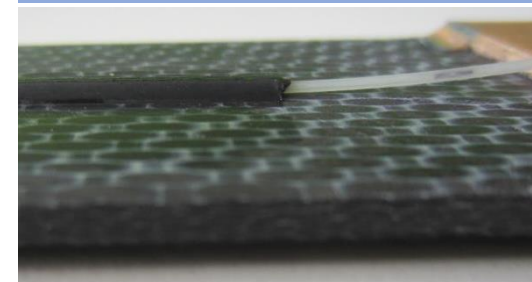
Wind turbines



Smart catheters



Composite materials



Railways



Smart energy grids



Smart mechatronics



Course Location, Schedule & Cost



- Course Schedule (January, July, December – exact dates to be confirmed)
- Number of people (Groups of 3/6/9 people per course)
- Course Cost (250 Euros per person, includes catering and project consumables)

Further Information

- Thomas.geernaert@vub.be
- <https://www.b-phot.org/contact>
- www.photonhub.eu/euphotonicsacademy

Course Material (technical hand-outs)



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Training Course notes

Keywords

Optical measurement, Sensor, Optical Fibre, Manufacturing, Pilot Line, Equipment, Automation, Optical fibre sensing, strain and temperature sensing, structural health monitoring, Fibre Bragg grating, Distributed sensing, Data interpretation and reporting

Relevant Technology & Application Domain

Technology: Glass and Polymer Specialty Fibres and Fibre Devices

Application: Relevant to all application domains