# PhotonHub Demo Centre

## Course 01
## Photonics for Biomedical Applications

## Course Provider
Tyndall Institute,
University College Cork,
Ireland

# Course Overview

Photonics plays an important role in many biomedical applications, from diagnosis and sensing of disease and infection to minimally invasive imaging of tissue during clinical procedures.

This one-day hands-on training course provides industry, especially those developing new products or addressing an application need, with a detailed overview of important photonic-based biomedical devices and how they are applied in clinical environments.

The course will focus on three technology demonstrators; 1) Optical fiber-based catheter sensor for blood flow monitoring; 2) Integrated photonic biosensor for rapid disease detection; 3) Miniaturised imaging device for minimally invasive surgical procedures. Course attendees will learn how these biomedical devices are designed, fabricated and tested. They will also learn how early-stage prototypes can be scaled to volume manufacturing.

# 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 develop new photonic products, establish in-house or outsource packaging development and manufacturing.

# Expected Outcomes

1) Understanding of key features of photonic design for biomedical applications
2) See the fabrication processes to produce early-stage biomedical devices (hands-on activity)
3) See and evaluate working biomedical devices (hands-on activity)
4) Understand the photonic product design process and manufacturing ecosystem

# Course Schedule

| Time | Demo Activity |
|---|---|
| 09:00 – 10:30 | **Tyndall Orientation, Course Introduction & Tutorial** |
| 11:00 – 12:30 | Demo 1: Optical fiber-based catheter sensor for blood flow monitoring (hands-on) |
| 14:00 – 15:30 | Demo 2: Integrated photonic biosensor for rapid disease detection (hands-on) |
| 15:30 – 17:00 | Demo 3: Miniaturised imaging device for minimally invasive surgical procedures (hands-on) |
| 17:00 – 17:30 | **Follow-Up Questions & Close** |

# Course Trainers


**Course Director:** Prof. Peter O'Brien

**Course Manager:** Magaly Mora

**Demo 1:** Dr. Kamil Gradkowski

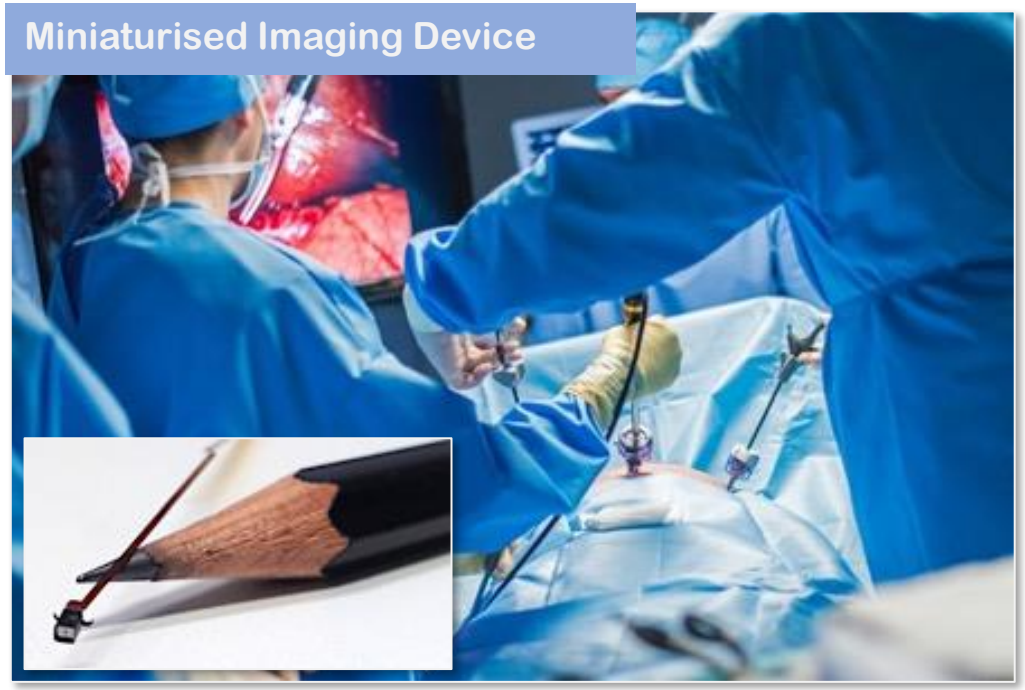
**Demo 2:** Dr. Padraic Morrissey

**Demo 3:** Dr. Marc Rensing

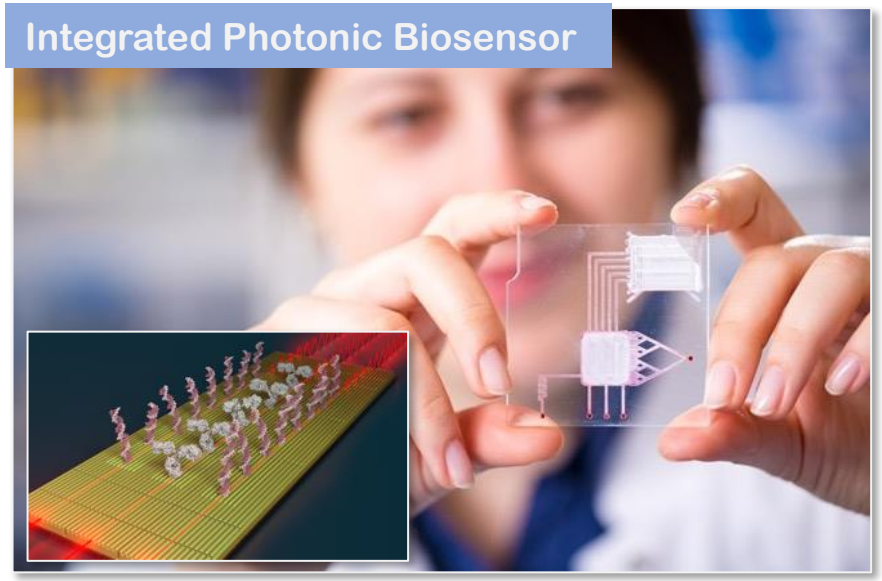
# Course Demonstrators

## Optical Fiber-based Catheter Sensor

## Miniaturised Imaging Device



## Integrated Photonic Biosensor



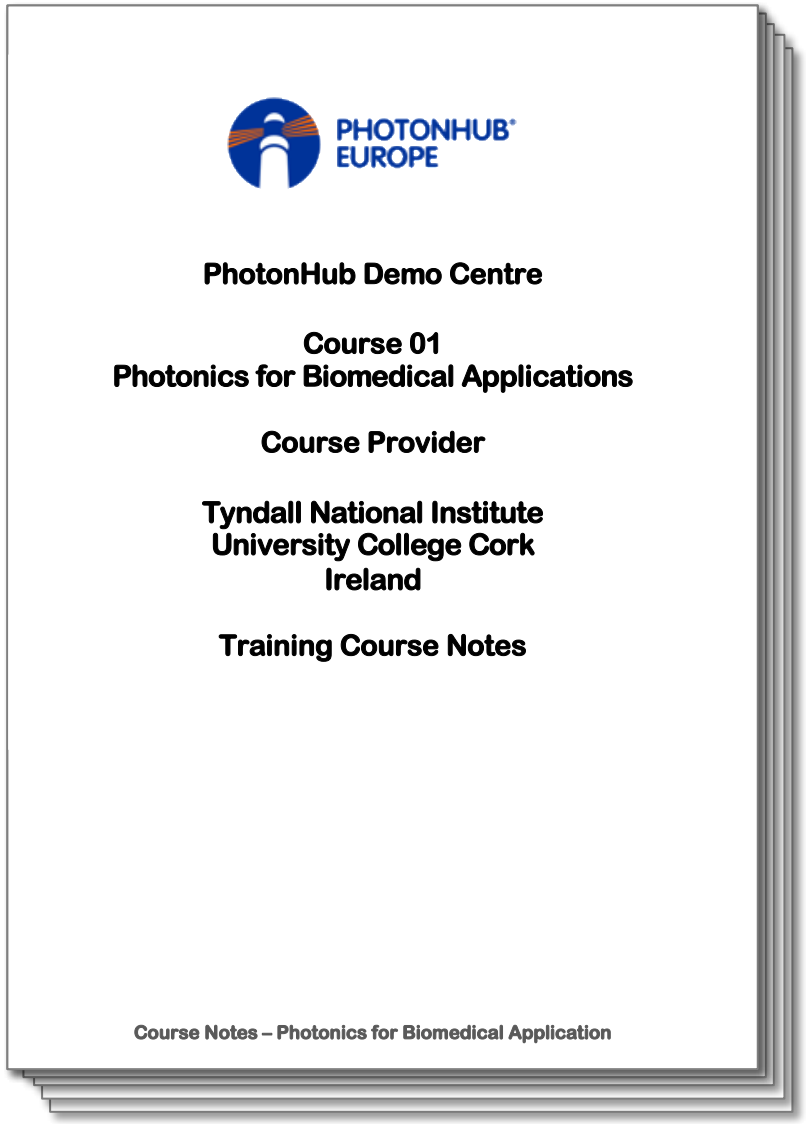
# Course Location, Schedule & Cost


- 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

- magaly.mora@tyndall.ie
- www.tyndall.ie/contact-us
- www.photonhub.eu/euphotonicsacademy

# **Course Material** (technical hand-outs)



# Keywords

Medical Devices, Catheter, Diagnostics, Sensor, Imaging, Surgical, Minimally Invasive

Photonics, Packaging, Assembly, Optical Fiber, Micro Optics, Laser, PICs, Integrated Photonics,

Manufacturing, Pilot Line, Ecosystem, Equipment, Automation