

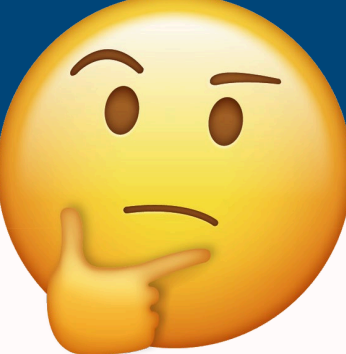
**The Inter-Departmental Center  
on Applied Photonics  
at Politecnico di Torino**

## 1<sup>st</sup> PhotoNext Researchers' Day

2023, June 19th



# Why this event?

- 
- An opportunity for all PhD students working in PhotoNext to present their research activities
    - To their peers
    - To the faculty members and to external people
    - ... and mainly: to create a network!
  - We have been thinking about it since the beginning of PhotoNext (end of 2017)
    - But then in the first 2 years we were fully booked in organizing the Center and acquiring the new lab instruments
    - ... then COVID came ☹️
    - ... then we had to catch up with all delays generated by COVID lockdown



- Pitch presentation for 5-6 minutes per each PhD student
  - Followed by 2-3 minutes of Q&A
  - Please try to give the "application scenario" of your PhD research
    - Not the technical details (!!)... almost no one will understand it in 5 minutes ☺
      - Apart (maybe!) your supervisor
- We need to STRICTLY respect this timing since we have MANY presentations
- **NO TIMING... no "aperitivo" at 6:00 pm ☺**
- ... and thanks a lot to Alberto Tibaldi for the organization of the event!

# The agenda for today



## VCSELs

- 14:10 Valerio Torrelli VCSELs for single-mode high-power applications
- 14:20 Alberto Gullino Physics-based simulations of VCSELs
- 14:30 Martino D'Alessandro Physics-based modeling of high-speed VCSELs
- 14:40 Andrea Marchisio VCSEL model parameter extraction: deep learning vs. evolutionary algorithms
- 14:50 Leonardo Minelli Nonlinear Digital Pre-Distortion for high speed VCSEL-MMF Data Center Intra-connects

## Optical communications

- 15:00 Giuseppe Caruso Ultra-high bitrates Next Generation Optical Architectures and Passive Optical Networks
- 15:10 Lorenzo Andrenacci Longitudinal Power Monitoring
- 15:20 Lorenzo Tunesi Photonic Integrated Switching and Routing
- 15:30 Mariacristina Casasco TDEC metric in 50G-PON: analytical and experimental investigation on several implementation aspects

## Optical components

- 15:40 Mohammad Heydari Numerical modelling of mode-locking at low repetition rate in Quantum Dot lasers
- 15:50 Francesco Mercinelli Modeling InGaN LEDs and solar cells with quantum corrected drift diffusion.
- 16:00 Matteo Cavaghetto Femtosecond written Fiber Bragg Grating

16:10 Break (20 minutes)

## Optical Sensing

- 16:30 Saverio Pellegrini Vibration Sensing over Metropolitan Fibers
- 16:40 Chiara Bellezza Prinsi Fiber optic water monitoring
- 16:50 Aurora Bellone Innovative Fiber Optic Sensors

## Biomedical applications

- 17:00 Malhar Nagar Optical fiber sensors for intravital monitoring
- 17:10 Serafini Valentina Yellow lasers for biomedical application
- 17:20 Jawad Talekkara Pandayil Multifunctional bioresorbable optical fiber for cancer theranostic application

## Silicon photonics

- 17:30 Stefania Cucco Design of Si/polySi microrings with complex waveguide cross-sections and minimal non-linearity.
- 17:40 Marco Novarese Non-linear effects in silicon photonic devices: modelling and experiments
- 17:50 Matteo Alasio Modeling of Ge-on-Si photodetector for wide-band Silicon Photonics applications

**18:00-19:00 Get together  
drink "Aperitivo" in front of Sala  
Maxwell**

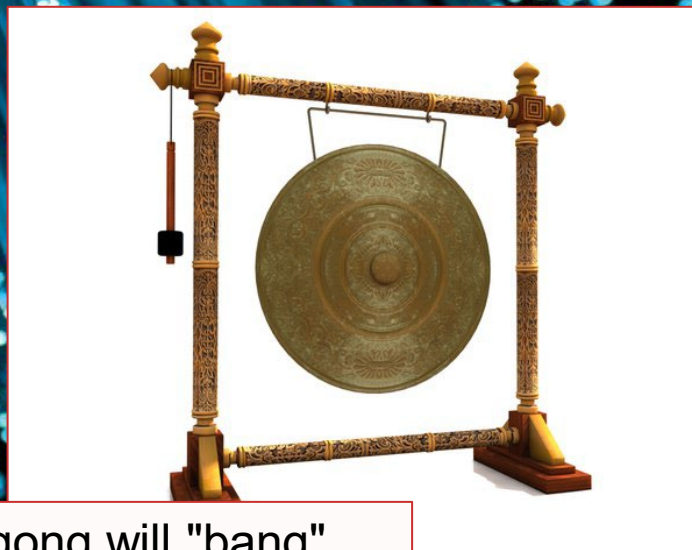
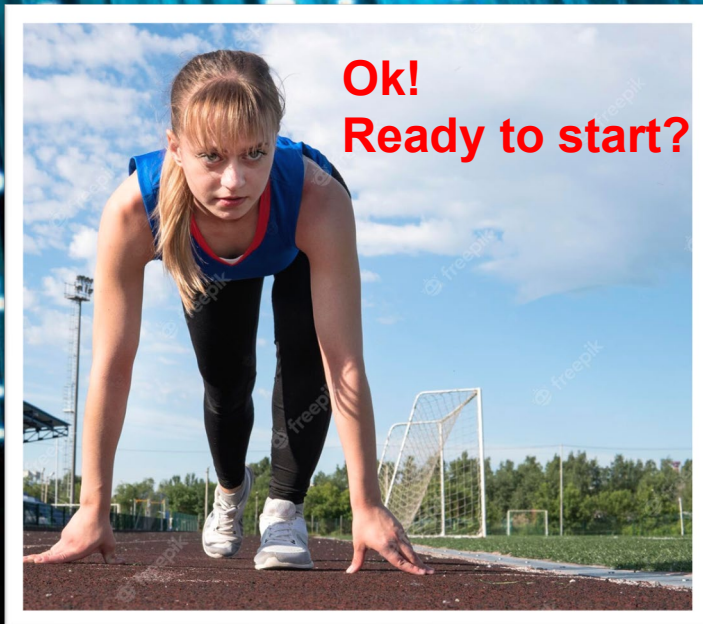
# Some further "opportunities"...



- For the PhD students of the IEEC School, today presentation will be counted as 2 hard skill hours
  - We will send you a .pdf document to upload on the portal in the next few days
    - Remember... no upload no hard skill hours!
- We would like to put all presentations (in pdf) on the PhotoNext web portal
  - We need your authorization (we will handle this by email in the next couple of days)
- For everyone: if you prepare a 3 minute video in which you present your work, we will put it on the PhotoNext web site homepage
  - If you are interesting to this opportunity, please upload the video on YouTube and send the link to [alberto.tibaldi@polito.it](mailto:alberto.tibaldi@polito.it)
  - The preparation of this video will be counted for an additional 1 hard skill hour



# PHOTONEXT



... and remember that a gong will "bang"  
after 5 minutes of presentation!!  
Then if you do not conclude in the following  
1 minute... **NO aperitivo!**

**Prof. Roberto Gaudino**  
Scientific Coordinator  
[roberto.gaudino@polito.it](mailto:roberto.gaudino@polito.it)

**For more information:**

[www.photonext.polito.it](http://www.photonext.polito.it)

[info.photonext@polito.it](mailto:info.photonext@polito.it)

**Linked in** [goo.gl/PVx4GY](https://goo.gl/PVx4GY)

[www.facebook.com/PhotoNext/](https://www.facebook.com/PhotoNext/)

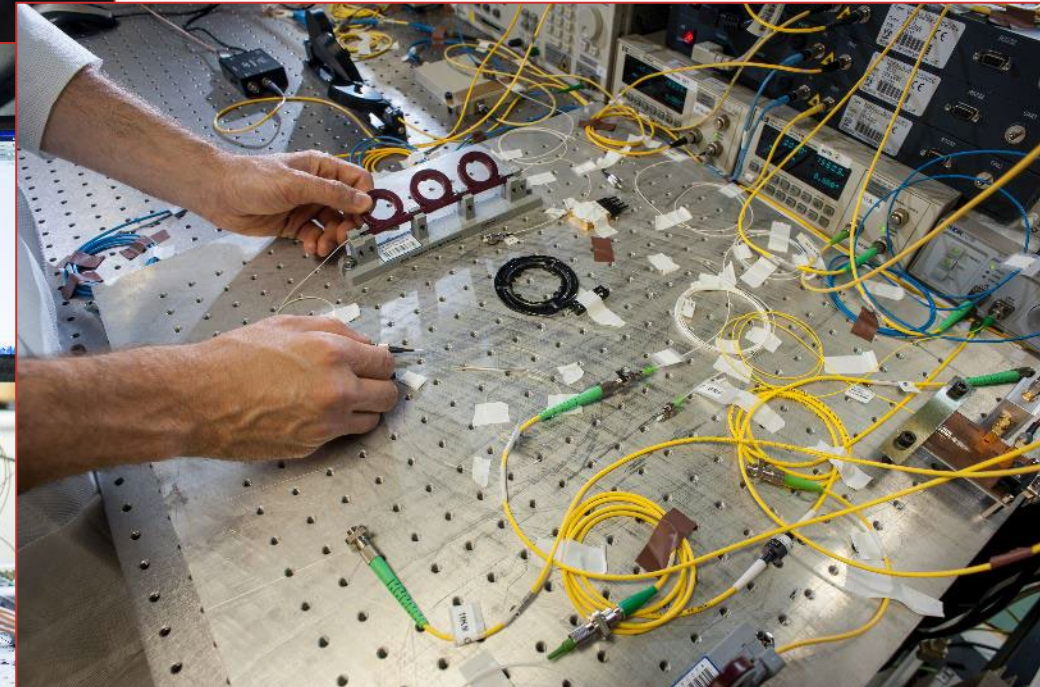
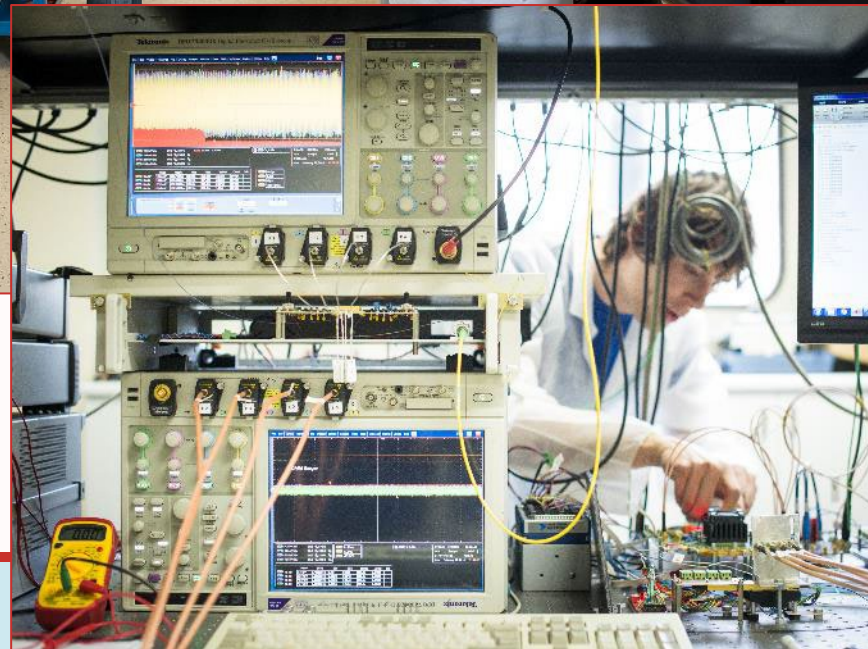
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# PHOTONEXT

## Mission

- What?
- Why?
- Where?
- Who?





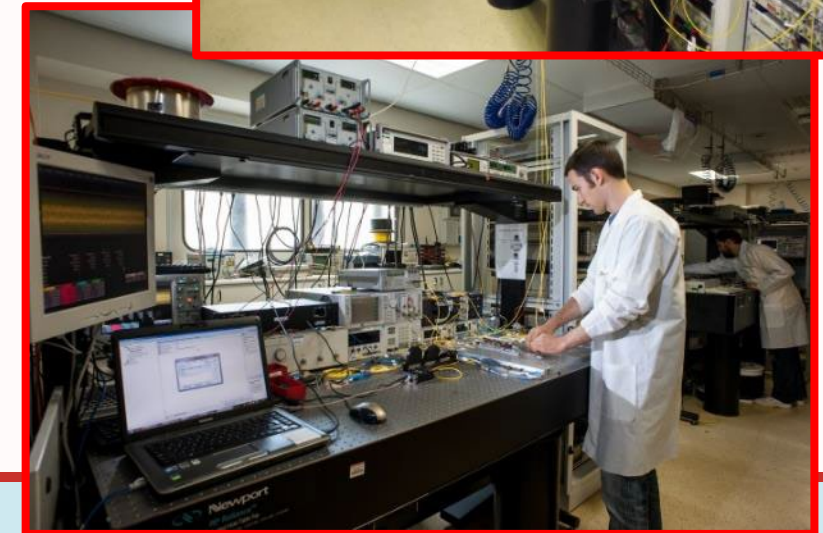
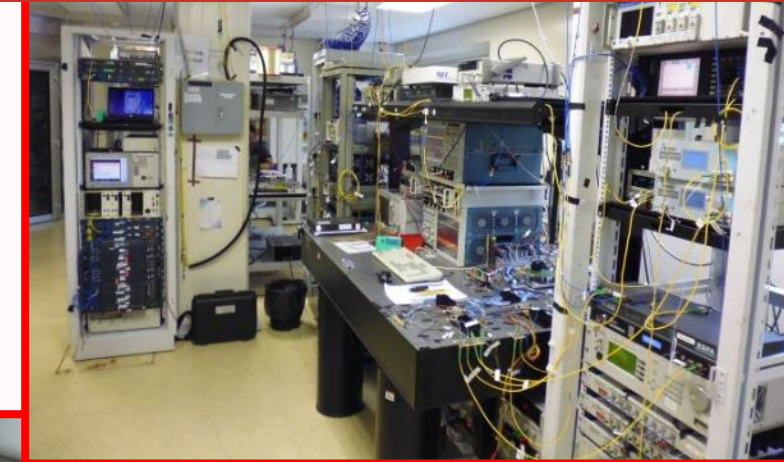
- PhotoNext is a large experimental laboratory on Applied Photonics at Politecnico di Torino (POLITO)
- It is inserted in the POLITO Inter-Departmental Center initiative
  - The goal is to create a critical mass of expertise in the area of Photonics
  - The infrastructure received the following institutional funding
    - 2001: 1.6M€ by POLITO, for the laboratory “bootstrap”
    - 2017: 1.8M€ by POLITO, for its expansion
    - 2018: 0.9M€ by the Piedmont Regional Government
- These institutional grants were instrumental to create a state of the art experimental facility on Photonics
  - Besides institutional funding from POLITO, the different groups working in PhotoNext have a long term tradition of industrial and EU research fundings (more than 1.5M€ per year overall)



# WHERE?



- PhotoNext uses the same spaces of the previously existing PhotonLab laboratory
  - PhotonLab was opened in 2001
- PhotonLab has a strong synergy with the LINKS Foundation (previously named ISMB)
  - A non-profit research center on ICT
    - POLITO is one of the two key founders
  - LINKS Foundation is focused on technology transfer (toward TRL 5-6)



# Four POLITO Departments involved



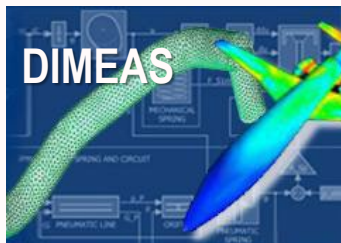
- The Mission of the PhotoNext center is to bring together different expertises in the area of applied photonics, involving research staff from four different Departments and several different research groups



## Coordinator:

- **Prof. Roberto Gaudino**

Dipartimento di Elettronica e  
Telecomunicazioni



## **DIMEAS**

- **Prof. Paolo Maggiore**

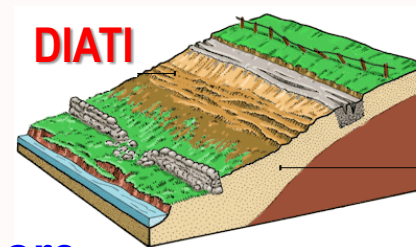
Dipartimento di Ingegneria Meccanica e  
Aerospaziale



## **DISAT**

- **Prof. Davide Janner**

Dipartimento Scienza Applicata e Tecnologia

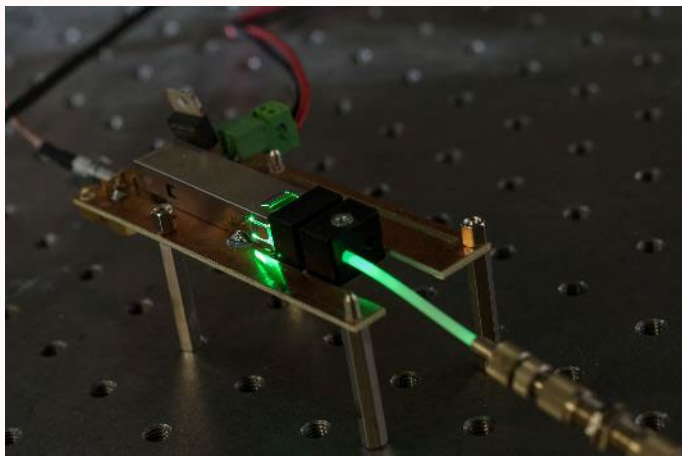


## **DIATI**

- **Prof. Alberto Godio**

Dipartimento di Ingegneria dell'Ambiente, del  
Territorio e delle Infrastrutture

# PhotoNext three main pillars: optical Telecommunications, Sensors, Components



Three areas of photonics focused on the use of optical fibers

