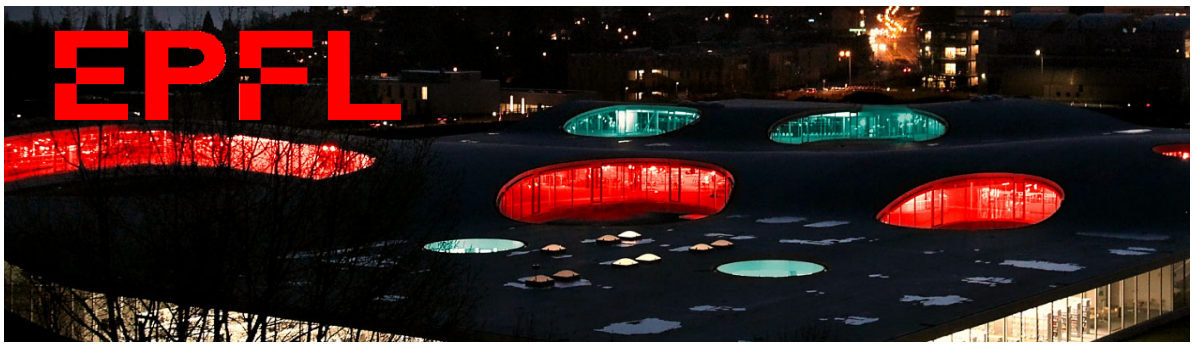

The Doctoral Program in Photonics presents

Photonics Day

Thursday October 23, 2025

EPFL Forum Rolex Learning Center

08:30	**Welcome, coffee, pastries and setting up of posters**
09:00	**Introduction Director of EDPO Prof. Camille Brès**
09:05	**Prof. Demetri Psaltis, EPFL** *Optical Computing*
09:50	**Prof. Hui Cao, Yale University** *High-power Single-Frequency Multimode-Fiber Amplifiers*
10:35	**Poster session - Coffee break**
11:15	**8% Doctoral Program in Photonics Thesis Distinction**
11:20	**Presentation by the Laureate of the above Distinction**
11:40	**Steven Jones, CADFEM** *Life after your PhD: when you come to a fork in the road… take it*
12:00	**Picture Contest presentation**
12:10	**Group Photo**
12:15	**Lunch - poster session**
13:45	**Dr Laurent Vivien, CNRS** *Surpassing the limitaiton of silicon photonics: which perspectives?*
14:30	**Prof. Romain Quidant, ETHZ** *Digital holography for biosensing and optofluidics*
15:15	**EPFL Photonics Chapter (EPC) Presentation & Best Poster Award**
15:25	**Coffee Break**
15:55	**Dr. Benjamin Galinet** *Life after your PhD: build your personal brand to unlock opportunities*
16:15	**Dr. Marie Didier** *From PhD to CEO: bridging science and culture on the rollercoaster of startup life*
16:35	**Dr. Pierre-Yves Fonjallaz** *Career Symposium on 7-8 May 2026 in Burgdorf (Bern)*
16:40	**PhD Poster Presentations in 180 Seconds**
17:00	**Apéro**

EDPO acknowledges our sponsors

CADFEM

GMP
PHOTONICS & MICROTECHNOLOGY

Abstracts

09:05 Prof. Demetri Psaltis, EPFL

Optical Computing

The emergence of artificial intelligence and the exponential rise in the associated computational load has ignited interest in optical computing. I will present a brief history of my involvement in optical computing and recent work on optics for AI and data centers.

09:50 Prof. Hui Cao, Yale University

High-power Single-Frequency Multimode-Fiber Amplifiers

High-power single-frequency laser sources have a wide range of applications from coherent beam combination to LiDAR and gravitational wave detection. For a fiber laser amplifier, it is difficult to achieve simultaneously high average power and high beam quality. Single-mode fibers are widely employed to ensure output beam quality, but at high power nonlinear effects are strong due to tight optical confinement in the fiber. A major bottleneck for further power scaling of single-frequency fiber amplifiers is the stimulated Brillouin scattering (SBS). We explore a highly multimode fiber amplifier, where stimulated Brillouin scattering is greatly suppressed due to reduction of light intensity in a large fiber core and broadening of Brillouin scattering spectrum by multimode excitation. To control the output beam profile, we apply a spatial wavefront shaping technique to the input light of a nonlinear amplifier to focus the output beam to a diffraction-limited spot outside the fiber facet. Our multimode fiber amplifier can operate at high power with high efficiency. The superior performance of our MMF amplifier reveals its potential in further power scaling while maintaining both high coherence and beam quality.

13:45 Dr Laurent Vivien, CNRS

Surpassing the limitaiton of silicon photonics: which perspectives?

Silicon (Si) photonics stands as a solid candidate to address the scaling challenges of emerging communication systems with an ever-growing number of interconnected devices. However, Si has major physical limitations that prevent on-chip integration of key functions including strong two-photon absorption limiting nonlinear optical phenomenon, an indirect bandgap nature hindering light emission and amplification and more specifically Si is a centrosymmetry semiconductor preventing ultra-fast and low power consumption optical modulation based on Pockels effect. The latter limitation strongly limits the evolution of the photonic integrated circuits (PIC).
An overview of the recent approaches to surpass these limitations will be presented.

14:30 Prof. Romain Quidant, ETHZ

Digital holography for biosensing and optofluidics

Biosensing technologies aim to detect bioanalytes within complex biological matrices, providing invaluable tools for addressing fundamental biological questions, diagnosing diseases, and monitoring treatment efficacy. A long-standing goal in this field is to achieve label-free, high-throughput detection of multiple analytes within complex matrices. In this presentation, we discuss how the versatile technique of digital holography can significantly contribute to this objective through three different optofluidic platforms:

- Multiplexed Label-Free Immunoaffinity Assay - We introduce an optofluidic platform that integrates state-of-the-art digital holography with PDMS microfluidics, utilizing supported lipid bilayers as a versatile surface chemistry building block. This platform enables the label-free, single-particle-sensitive fingerprinting of heterogeneous extracellular vesicle populations through a multiplexed immunoaffinity assay. We demonstrate the potential of this approach to extend beyond extracellular vesicles to single proteins.
- Wide-Field, Spectrally Resolved Optical Activity Imaging - Beyond simple detection, digital holography can provide additional insights into biomolecular properties. By employing polarization-sensitive off-axis holography, our system enables single-shot retrieval of circular dichroism (CD) and optical rotatory dispersion (ORD) images. This approach not only aligns with traditional CD spectroscopy but also offers the unique capability to spatially resolve local chirality variations that are often obscured by ensemble averaging.
- Dynamic, Reconfigurable Fluidic Boundaries - We present a novel optofluidic toolbox that harnesses structured light and photothermal conversion to create dynamic, reconfigurable fluidic boundaries. This system enables precise manipulation of fluids and particles by generating 3D thermal landscapes with high spatial control. Our approach mimics the functions of traditional physical barriers while offering the advantage of real-time reconfiguration for complex tasks, such as individual particle steering and size-based sorting in heterogeneous mixtures. This versatile platform has the potential to revolutionize microfluidic systems, finding applications in chemical synthesis, lab-on-chip devices, and microbiology.