UNIVERSITÀ
DI PAVIA

Ph.D. Program in Electronics, Computer Science and Electrical Engineering

PhD Course

Introduction to photonic integrated circuits

Prof. Marc Sorel,
Scuola Sant'Anna (Pisa, Italy) and Glasgow University (UK)

In a similar way to the evolution experienced by electronics, the demand for photonics devices with smaller footprint, lower cost and higher functionality has driven a rapid growth in the development of integrated photonic chips. The course will start by providing an overview on the main photonic integrated technologies, on their limitations and on the challenges to be addressed to sustain the current growth. We will then introduce a number of basic building blocks such as waveguide couplers, resonators, diffraction gratings, semiconductor sources and detectors, and show how these can be combined to form more complex circuits. Examples will include multiplexers for optical communications, optical combs for atomic clocks, mid infrared chips for pollution sensing and spatial mode sorters for advanced imaging. The course will conclude with a discussion on future trends that will cover the heterogeneous integration of hybrid materials for novel functionalities, bendable and foldable photonic chips and 3D integrated photonic circuits.

Marc Sorel is professor of optoelectronics at the University of Glasgow and Scuola Superiore Sant'Anna. He has been active in research related to integrated photonic devices and optoelectronics for over 25 years, supported by several national funding bodies and industrial collaborations. His present research activities revolve around the development of integrated photonic technologies in silicon, silicon nitride and III-V semiconductors for applications in telecoms, sensing and quantum. He has authored or co-authored more than 250 papers in peer-reviewed journals including in Science, Physical Review Letters, Optica and Nature Communications that have attracted over 10.000 citations.

Schedule

24 March 2023 –14.00 - 16.00 Room E7 – Floor E

31 March 2023 - 9.30 - 11.30 online lesson
https://santannapisa.webex.com/santannapisa/j.php?MTID=mc494387e9a34e405011271ee8122ebde

3 April 2023 - 14.00 - 16.00 online lesson
https://santannapisa.webex.com/santannapisa/j.php?MTID=mde1eb1e42aec87181ffe8d9c7742595b

7 April 2023 - 9.30-11.30 online lesson
https://santannapisa.webex.com/santannapisa/j.php?MTID=mc063e7606465f8ba5cdbb2968e733838

21 April 2023 - 14.00 - 16.00 Room E7 – Floor E - Final presentations

Please send an email to alice.albini@unipv.it to enroll in the course and get information. Students who are not currently in Pavia can request to attend all the lessons online.

Ph.D. Coordinator

Prof. Ilaria Cristiani